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Visio

Teaching braille

A manual for teachers, parents and decision makers

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Teaching braille

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Photo cover
Andrew Kartende

Contents

Foreword

Gyntha Goertz
Braille expert with Royal Visio and team leader of Visio primary school, Rotterdam

I have worked as a teacher for 43 years, 27 of which with children with a visual impairment. I am a professional with a heart and strong drive for braille teaching!

I learned the braille system with my eyes 27 years ago because, as a sighted teacher, I was going to supervise a 6-year-old girl who had become blind. I was amazed that she learned to read braille as quickly as all the children I had taught black print before. After that, I further developed myself in teaching braille to young children and to adolescents who started learning braille at a later age.

I learned the braille system with a braille course for sighted counsellors. But during my work with braille students, I learned how I, as a teacher, could teach the children the real reading pleasure (and reading speed) in braille.

I have been teaching braille at our special school in Rotterdam for children with visual impairment for 27 years (since 1995). I have taught more than 100 children to read braille and to learn arithmetic and mathematics in braille. I also taught the parents of all these children the braille system, so that they could better guide their children at home.

In the Netherlands I have given training to 400 fellow teachers on how to teach braille to young and older children. Internationally I have given training to more than 300 colleagues (Belgium, Cameroon, Congo, Egypt, Gambia, Ghana, Iceland, Philippines, Zambia) on how to teach braille literacy and braille mathematics to children.

Reading, in whatever writing system, is important for everyone because it increases independence, study skills, language development, spelling and knowledge about the world around us. Without braille, blind people would be illiterate and would not have the same opportunities in development as sighted people.

Braille can be learned and taught at any age! If you want tips on teaching braille, read this manual!

Acknowledgments

Thanks to Gyntha Goertz for many constructive suggestions and corrections; to Gyntha Goertz, Hein Wagner, Charlotte Glorie, Guzu Beatrice, Shatha Abusrour, Amton Mbangeni, and Peter Obeng-Asamoa for the inspirational stories printed as the foreword and at the end of each chapter; and to Evas Kyakunzire for proofreading the braille. Thanks also to all the known and unknown contributors who created the materials that this manual refers to and builds on.

1. Introduction

1.1 Who is this book for?

This book is especially aimed at the following people in developing countries:

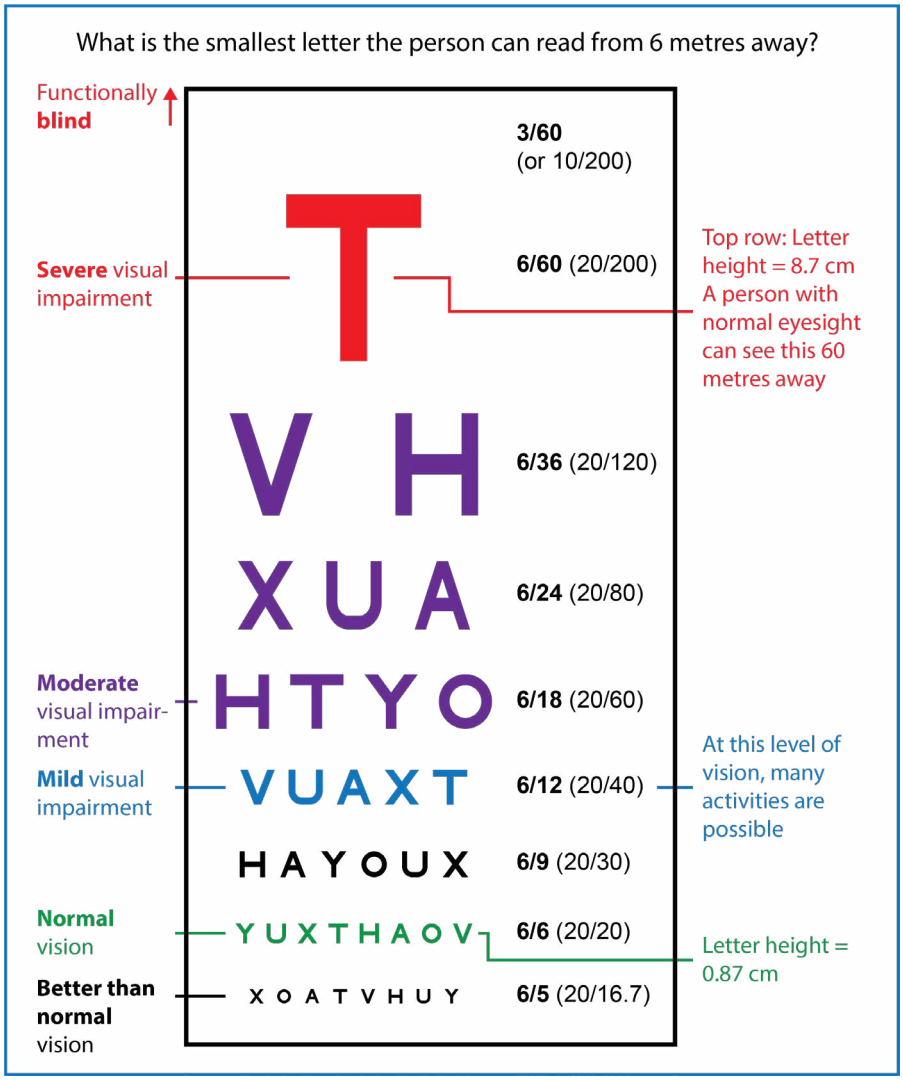
- **Teachers at special schools** for the visually impaired.
- **Teachers at mainstream schools** and other professionals who have a visually impaired child in their classroom or who support them in another way.
- **Resource room teachers** and classroom assistants.
- **Parents, caregivers and siblings** of visually impaired children.
- **Decision-makers:** education officers, school principals and others who make decisions about the education of blind and visually impaired children.

While the book is intended for people who work with blind or partially sighted children, many of the ideas may be useful if you work with older children or adults.

While developed countries typically devote substantial resources to educating blind children and supporting their parents and families, this is not always true in the developing world. Specialized institutions such as special schools for the blind may be non-existent, underfunded, or too far away. Equipment such as computers and embossers is expensive, and reading and teaching materials in braille may be hard to get. So this book focuses especially on techniques that do not depend on such equipment and materials. We emphasize instead things you can find or make easily.

1.2 What do we mean by blind or visually impaired?

Visual impairments range from mild, moderate and severe to total blindness. The ideas in this book are likely to be useful for learners who are blind or who have severe visual impairments, so need to use braille instead of (or in addition to) print.



Levels of visual impairment as measured by a Snellen eye test chart. Important: eyesight tests should be done by a qualified professional. In a full-sized chart, the largest letter is 8.7 cm high.

Visual acuity is tested by an optician using a standard letter chart.

- **Normal vision** is known as 6/6 (or 20/20) vision. This is what a person with good sight can see at a distance of 6 metres (or 20 feet). On the eye-testing chart, it means the person can read one of the rows of small letters near the bottom of the chart.
- A person with **mild visual impairment** has a visual acuity of between 6/12 and 6/18: they can see at a distance of 6 metres what a person with normal sight can see from 12 metres away. That means they have to be closer to the object. At the standard distance of 6 metres, the person can read only the rows of larger letters on the test chart.
- A **moderate visual impairment** is where the person has a visual acuity of between 6/18 and 6/60. They can read the top letter in the chart and perhaps one or two rows of smaller letters below it.
- A severe **visual impairment** is a visual acuity of between 6/60 and 3/60. This person cannot read the biggest letter of the chart.
- **Blindness** is a visual acuity of worse than 3/60 – or no perception of light at all.

Visual impairments have different causes, including injury, disease and congenital problems. Some children are born blind; other people lose their sight either gradually (because of disease) or suddenly (through injury). Learners who have lost their vision may still be able to remember what it was like to see, and may have been able to read. They are in a different situation to those who have been blind since birth or who lost their vision at an early age.

If you suspect a learner in your class is visually impaired (for example, if they squint at the board or hold the paper close to their eyes), make sure an optician tests their eyesight. Some types of visual impairment can be corrected using glasses.

Depending on their level of visual impairment, learners may find it better to use braille instead of, or as well as, alternatives such as large-size print or a magnifier. Learners who will use their sight because of a progressive disease should also learn braille. So too should those who support blind students: teachers, teaching support staff, social workers and parents.

1.3 How to use this book

Obviously you need to know braille yourself if you are going to teach it. But you do not need to know it in order to use this book.

If you are not familiar with braille, or if your braille needs refreshing, we suggest you first read Chapter 1 (*this Introduction*), and then jump to Chapter 6, *Braille: What it is and how it works*. Read the sections in this chapter on *Terminology in braille and Grade 1 braille*, before coming back to Chapter 2, *Phases in learning braille*. You will need to read the latter part of Chapter 6 on *Grade 2 braille* only before you start Chapter 5 *Advanced braille*.

If you are already familiar with braille, feel free to skip the next section in this chapter (*What is braille?*) and go straight to *Why braille?* You may find the tables in Chapter 6 useful as a reference source.

If you want to teach braille, you will first have to learn it yourself. Fortunately, it is easier for sighted readers to learn braille than for blind learners, since they can read the raised dots visually. You should be able to pick up the basics in just a few days. Chapters 4–6 can help. You can also find many excellent resources on the internet. See the *References* section at the end of this chapter for some of them.

Sighted readers do not have to learn how to distinguish the braille patterns by touch – though doing so will give you valuable insights into the challenges that blind learners face.

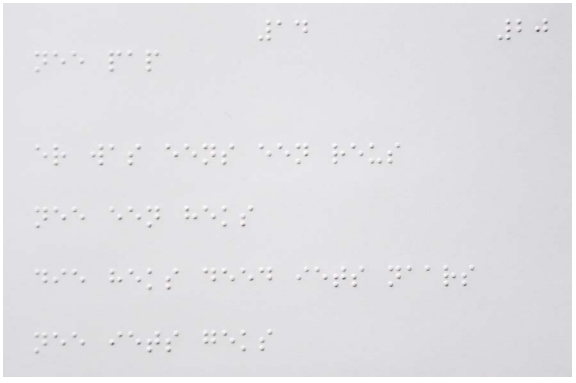
If you work only with small children with visual impairments, you will be most interested in helping them develop their sense of touch. You should focus on the earlier chapters in this book, especially Chapter 3, *Preparing for braille*.

If you work with braille learners, then Chapters 4 *Initial braille* and 5 *Advanced braille* are for you. See Chapter 6 *Braille: What it is and how it works* for a more exhaustive introduction.

If you are a school principal or policymaker, then Chapters 1, 2, and 7 (which gives an idea of the range of teaching materials and equipment available) will be of most interest.

1.4 What is braille?

Braille is a system of writing and reading designed for people who are blind or who have impaired vision. Instead of printed letters and numbers, braille uses patterns of raised dots. By running your fingertips over the dots, you can, with training and practice, feel these patterns and read what is written. You can also write braille using special equipment.



Braille consists of patterns of raised dots that can be read with the fingertips. (This sample is in Dutch).

Children in Ghana reading braille.

1.4.1
The braille alphabet

Each letter or punctuation mark in braille consists of up to six dots in a particular pattern.

A normal six-dot braille cell measures 6 mm by 3.6 mm, or about this size ⠿

1 • • 4
2 • • 5
3 • • 6

The dots are numbered 1–6 as shown above. So we speak of dot 1, dot 2, dot 3, dot 4, dot 5 and dot 6.

This sign (which stands for the letter **b**, consists of dots 1 and 2: ⠃

This sign stands for the letter **p**. It consists of the dots 1, 2, 3 and 4: ⠏

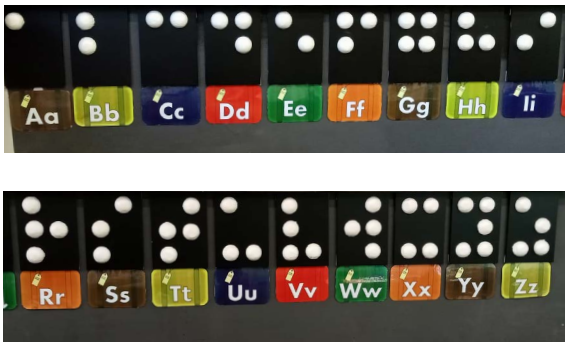
Here is the alphabet in braille.

⠁ a	⠃ b	⠉ c	⠙ d	⠑ e	⠋ f	⠛ g	⠓ h	⠊ i	⠚ j

⠅ k	⠇ l	⠍ m	⠝ n	⠕ o	⠏ p	⠟ q	⠗ r	⠎ s	⠞ t

⠥ u	⠧ v	⠺ w	⠭ x	⠽ y	⠵ z

There are altogether 64 possible combinations of the six dots, including the blank cell where no dots are raised. Twenty-six of the dot combinations are used for the letters a–z. The remaining 38 combinations are used for other signs (such as punctuation marks) and special meanings.
See Chapter 6 for a detailed guide to braille.



Large braille letters in a classroom in South Africa.

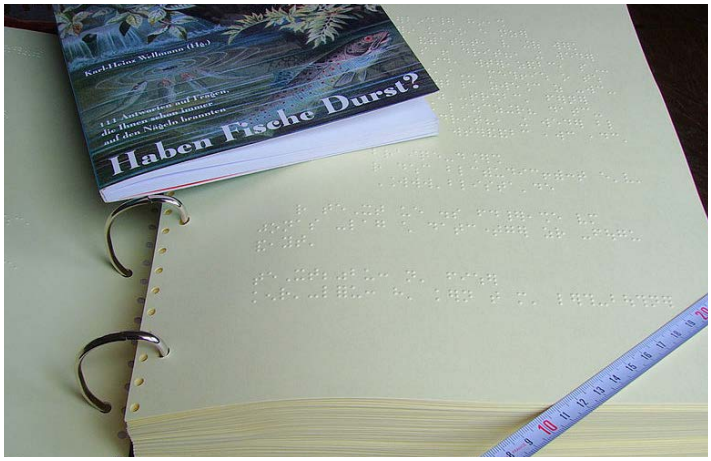
Another system with 8 dots and 256 possible combinations exists and is used on some digital devices. This is beyond the scope of this book.

This book uses braille signs printed as black ink dots. These are very useful for sighted readers, but cannot be used by blind readers, who need the dots to be raised as small bumps so they can feel them with their fingertips. To make it easy to see the different patterns, we show the raised dots as heavy dots, and the dot positions that are not raised as tiny points.

The word “braille” written in braille.
Each dot represents an embossed bump that can be felt with the fingertips.

The same word, “braille”, showing all 6 dot positions for each character.
The small dots are not embossed.

The braille in this book shows all 6 dot positions.



A braille book and the original printed edition.

1.4.2
History of braille

The braille system of writing was invented by Louis Braille, a French schoolteacher, in the early 19th century. He was born in 1809 in Coupvray. near Paris, France. His father was a saddler. At the age of 4, he lost sight in one eye due to an accident with a sharp instrument from his father’s workshop. With time, he also lost sight in the other eye.

Later on, he joined the Valentine Hauy school (also called the Young Blind People’s Institute) in Paris, by then a well-established school for the education of blind children. At the age of 20 (1829), he published his first version of braille, but continued to work on it until he produced an improved version by 1834, which he used for teaching. Braille derived this system from an eight-dot system used in the French military for communication at night.

In 1852, Louis Braille died of tuberculosis. But his writing system lived on. It has been adapted throughout the world and is used in many different languages. In languages that use the Latin alphabet, such as English, French and Spanish, the 26 braille signs nearly always represent the same letters.

1.4.3
Grades of braille

English braille has three levels, grades 1, 2, and 3.

- **Grade 1 braille.** Grade 1 braille, or **alphabetical braille**, is the simplest form. It consists of the letters of the alphabet a–z, the numbers, punctuation signs, and a few special signs, for example to indicate numbers and capital letters.
- **Grade 2 braille.** Uncontracted braille can take up a lot of space. Grade 2 braille, **contracted braille** or **advanced braille** saves space by using short forms that represent common letter combinations (such as **-tion**) or whole words (**every, people**). While it is possible to write anything in Grade 1 braille, most books and magazines in English use contracted braille. Grade 2 braille is more difficult to learn than grade 1 because it uses more signs, and some signs are used to mean more than one letter or word, depending on where they appear.
- **Grade 3 braille** has more contractions (363 of them!). It is used mainly in personal correspondence.

1.4.4
Unified English braille

While the letters **a** to **z** are the same in all English-speaking countries, slightly different forms of braille developed in Britain and in the United States. In the 1990s, the braille authorities in a group of English-speaking countries adopted a common standard, known as Unified English Braille. Many, but not all, English-speaking countries have adopted this this standard, which is the one we use in this book.

You may come across braille materials written following the older British or American rules.

1.4.5
Braille in other languages

The letters **a** to **z** are the same in nearly all languages that use the Latin alphabet. The other signs are often different. French, for example, uses several braille signs to represent accented characters. In French ⠯ stands for **ç** (c with a cedilla). In English braille it stands for the & sign (or the word **and**).

	⠯	⠿	⠷	⠾	⠧
English	& and	for	of	the	with
French	ç	é	à	è	ù

Braille has also been adapted for languages that use other writing systems, such as Arabic, Chinese, Hindi and Russian. Here, the braille signs may stand for different letters or sounds. Braille is always read from left to right, even in languages like Arabic and Hebrew, where print is read from right to left.

Some other languages also use contractions, but they are different from those used in English.

1.5
Why braille?

Digital technology is getting better day by day. Computers and smartphones can help blind and partially sighted people perform many of the tasks that previously required a knowledge of braille. Audiobooks make it much easier for them to enjoy literature. Audio assistants such as Alexa and Siri are helpful assistants in everyday life. Partially sighted people can use magnifiers or their smartphone camera to read text.
So why should blind children learn braille – a writing system invented 200 years ago? And why should teachers and parents go to the trouble of teaching it to them?

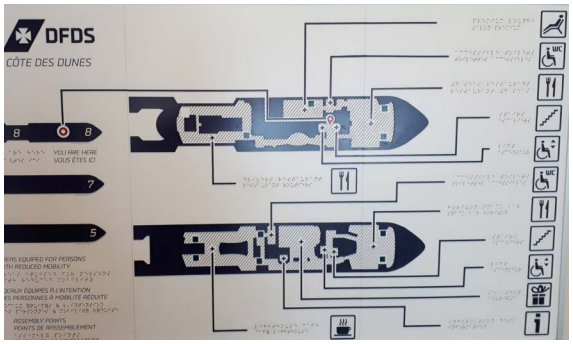
Here are some reasons.
Personal independence. For many blind and visually impaired people all over the world, the ability to read and write braille is still key to their independence. They can make shopping lists, make notes, and write letters to other braille readers. Braille labels can be put on everyday items to help the visually impaired identify what they are. Braille is found on cash machines, lift keypads, doors, medicines, menus, and increasingly on packaged food. Some governments, banks and other authorities can offer correspondence in braille. Being able to read braille means that a blind person may not have to ask for help in navigating a building or using a cash machine.

Equal access and social inclusion. Braille prevents illiteracy. Everyone – and not just sighted people – should have equal access to the written word. Braille provides this access to the visually impaired, giving them the power, flexibility and enjoyment that the written word has to offer. It can be important for their self-esteem. For people with hearing loss as well as visual impairment, braille may be a vital connection with the outside world.

Everyone is entitled to participate fully in society. That means that society must make it possible for them to do so. Braille is an important way of providing opportunities to the visually impaired and enabling them to develop the individual and social skills they need in life.

Braille on a sign in a train station (in Dutch).


Braille on lift buttons. This one says “alarm”.



Braille on the plan of a ship.

Braille on a railway station plan (in Italian).

Braille description of a tactile model of Worms Cathedral (in German).

Braille on a hotel room number.

Medicine packages with braille.

Braille and extra-large lettering on lift buttons for blind and visually impaired users.

Listening is different from reading. Knowing braille allows blind people to learn and apply the rules of grammar, spelling and punctuation. Audiobooks and digital assistants do not tell the listener how a word is spelled or how a sentence is punctuated.

Maths and science. Braille makes it possible for blind and partially sighted people to learn maths and science. It is difficult to do anything but the simplest arithmetic using audio alone.

Advanced education. Braille can be used for taking notes in lectures and for doing writing exercises and homework. Electronic braille notetakers are portable and quiet (unlike mechanical braillers such as the Perkins).

Choice. Printing did not mean the end of handwriting, and digital technologies have not meant the end of traditional print for the sighted. Sighted readers can choose between printed books, digital screens and audio. Visually impaired readers should also have such choices. People learn in different ways, with some finding it easier to take in information and express their ideas via the spoken word, and others preferring the written word.

Technology independence. Being reliant on a smartphone or a digital assistant is not good if the battery is dead or the internet goes down. And digital gadgets are expensive and hard to repair. They may be out of the reach of poorer people, especially in developing countries – where patchy internet coverage is also a problem.

Employment. People with a visual impairment who can read and write braille are more likely to have a job than those who do not use it. Blind employees can take notes in braille and use them when giving a presentation or speech. Ideally, the workplace should provide facilities for blind and partially sighted employees to use braille and assistive technologies in their work.

Technologies for braille are constantly evolving. New gadgets include embossers (making it easy to convert printed text to braille) and refreshable braille displays (which use a series of pins to display braille text, so avoiding the need for paper).

1.6 Who should learn braille?

Three main groups of people should learn braille:

- Someone who is blind, whose vision is not good enough, or who finds it too tiring to read printed text, even if it is enlarged.
- Someone who is expected to go blind in the near future, for example because of an eye disease.
- Someone who works with a person in one of the two groups above: a teacher, teaching assistant, parent or sibling. These people will read braille with their eyes rather than their fingertips.

Many people are not born blind but lose their sight either through an injury or disease. Because they can still remember things from when they could see, they do not face the same difficulties as children who are born blind, for example in conceptualizing distant things like a "tree" or "aeroplane". However, they may have other problems adjusting to a world without vision – for example in training their sense of touch. For them, a special approach known as **rehabilitation braille** is useful.

Some people with visual impairments also face other health problems that make it difficult or impossible for them to learn braille. These include diabetes (which can dull the sense of touch), and other disabilities.

For some children who face with difficulty seeing, it may be possible to correct their vision using glasses. For others, enlarged print, or a combination of enlarged print and braille, may be best. Always check with an eye specialist (ophthalmologist) before deciding whether to teach a child braille or enlarged print.

1.7 In this book

This book consists of seven chapters. You do not have to read all of them, and you do not have to read them in order. For example, if you already know braille, you can skip Chapter 6 (or use it as a reference). If you do not know braille, you might want to read Chapter 6 first.

Chapter 1 is this Introduction.

Chapter 2, Phases in learning braille, describes the phases that blind children go through when learning to read and write braille. While there are broad similarities with the experience of sighted children, there are also important differences.

Chapter 3, Preparing for braille, covers the vital process of helping a blind child develop their sense of touch and their ability to perceive the world around them. This chapter covers the skills they will need before they can start learning braille itself.

Chapter 4, Initial braille, describes the process of teaching a child how to read and write the braille alphabet, individual words, sentences and entire texts. It focuses on Grade 1 braille.

Chapter 5, Advanced braille, covers how to teach Grade 2 braille, increase the child's fluency and speed in reading and writing, and help them learn how to use more sophisticated equipment.

Chapter 6, Braille: What it is and how it works, describes the mechanics of braille: the meanings of the various signs and the terminology relating to braille.

Chapter 7, Equipment and software, describes the main types of devices and computer programs available for reading and writing braille. It also explains how to get these resources.

In between the chapters are stories from people who use braille and who have been highly successful as leaders in various fields: teaching, entertainment, motivation, and organizational management. They show how learning braille can open doors that would otherwise remain shut for people with impaired vision.

1.8
A word about words

We have tried to keep the language in this book simple. We avoid using technical terms wherever possible.

We refer to the learner as a "child", even though the learner may be older. We use "they" to refer to the learner rather than the clumsier "he or she".

We use "blind child", even though the learner may not be completely blind.

1.9
More information

Sight Scotland. Benefits of braille.
sightscotland.org.uk/articles/information-and-advice/benefits-braille#:~:text=The%20ability%20to%20read%20and%20write%20braille%20provides%20the%20vital,word%20that%20sighted%20people%20have.

Visio. 2022. Curriculum braille. Royal Visio.
www.eduvip.nl/het-vernieuwde-curriculum-braille/

Who should learn braille.
nfb.org//sites/default/files/images/nfb/publications/fr/fr15/issue1/f150102.html

1.9.1
Books

RNIB. Braille resources for schools.
www.rnib.org.uk/braille-and-moon-%E2%80%93-tactile-codes-learning-braille/braille-resources-schools

Initial braille

ClearVision. 2009. Crack the code. Teach yourself to sight read basic braille.
www.clearvisionproject.org/resources/crack_the_code.pdf

Ideas for parents

ClearVision. 2012. A braille reader in the family. Helping your child enjoy learning braille.
www.clearvisionproject.org/resources/brif.pdf

1.9.2
Videos

Initial braille

Grade 1 braille basics: www.youtube.com/watch?v=1KMSLVTz0_g
Learn braille in one lesson (for sighted learners): www.youtube.com/watch?v=sqQ3gdE7ks0

Grade 2 braille

How to memorize 50 of the 64 braille cells (for sighted learners):
www.youtube.com/watch?v=g9hUmlXyabk (This is the first of 7 videos on grade 2 braille.)

Hein Wagner
Motivational speaker, founder and CEO,
Hein Wagner Academy, South Africa
heinwagner.com

1.10
Why braille?

Originally from Cape Town, South Africa, I now live in Gothenburg Sweden. I'm married to Monica and we have a 6 year old daughter called India. I'm the founder of a training academy for the blind in South Africa and run my own international speaking business. I've been blind since birth and have very limited light perception.

I went to the Pioneer School for the Blind in Worcester, South Africa, from the age of five, and this is where I was introduced to braille. We were 300 blind and partially sighted kids at the school and those like me who could not use large print had to learn braille.

I had no choice but to learn braille! I'm so happy that I was introduced to this medium almost 45 years ago.

My teacher first introduced me to braille by using an egg box that contained six round objects. By using similar objects that became smaller and smaller I was eventually introduced to the real thing!

For a totally blind person like myself, it's absolutely important to learn braille. I'm not sure how one would learn to appreciate reading for one if you cannot read braille. Language is taught through having to put letters together, so I do not think there is a better way than using braille as a medium.

From reading books on my braille display to making cue-cards for my keynote presentations, I use braille all the time! I also feel a lot more confident to sign off financial statements etc., once I've had them under my fingers. Braille is the real deal! I use it almost every day.

Braille is a fantastic medium, and in my opinion the best way to maintain your language/ spelling ability. I also use a screen reader on my computer, however braille will always be my medium of choice.

2. Phases in learning braille

When it comes to learning how to read and write, there are many similarities between sighted and blind children. Both go through a series of overlapping phases, from simple to progressively more complex. They learn to read and to write at the same time. Reading supports writing, and vice-versa.

But blind learners must contend with various problems that sighted children do not face.

Understanding and perception of the world. Sighted children can perceive the world around them without effort. They can see large, distant objects (aeroplane, bridge, tree) as easily as smaller, nearby ones (doll, mother, table). Blind children can learn the shape and nature of nearby objects by feeling them, as well as through their other senses of hearing, smell and taste. It is difficult for them to grasp the concept of a large, faraway object. What is it? How big is it? What does it do?

Reading via touch. Blind children must learn to read with their fingertips. This much harder than using the eyes. Most sighted children have no trouble distinguishing different objects, letters and words from one another by sight. Blind children must learn how to do so by feeling with their hands. Using their fingertips to detect small differences between sets of bumps in a braille character is a difficult skill that they have to learn. They may develop their senses of touch and hearing more acutely than sighted children do.

Reinforcement. Sighted learners come across letters and words everywhere they go: at home, in the street, in books and other printed material, on television and computer screens, on packaging and in games. Homes and schools are full of visual, printed materials that parents and teachers can use to teach, and that children can absorb passively or learn through play.

Expose the child to braille from an early age. Mark their belongings with their name in braille: by sewing on beads (left) or marking with hot glue (right). This child's name is ⠽⠁ (aya).

Blind learners have no such constant reinforcement: they rarely encounter braille in everyday life. They cannot seek out braille in the same way that sighted children can seek out printed words. They have to be presented with braille material, which may have to be prepared especially for them.

Complexity of braille. While initial braille has a fairly simple structure, advanced braille in English (Grade 2) contains a lot of contractions and rules that visual readers do not have to contend with. In visual text, the letter e always has the same meaning.

In braille, the sign ⠑ usually means the lowercase letter e. But depending on the context in which it appears, it may also be part of a capital **E**, or the number 5, or the words **every** or **ever**, or the suffixes **-ence** or **-ance**. Advanced braille readers must learn the rules that govern these permutations.

Equipment. Writing visual text requires only two things: a pencil or pen, and some paper. Writing braille requires more equipment – a slate and stylus or brailling machine, as well as paper. This equipment can be expensive and is not available to all children. Writing using a slate and stylus or a Perkins brailler is physically more demanding than using a pencil or pen.

Mirror writing. A slate and stylus (see **Chapter 7**) are the cheapest equipment for writing braille. But the text must be written in reverse, as a mirror image and from right to left. It is difficult to check what you have written before you have finished a line or a page.

Teaching skills. Primary school teachers are trained how to teach sighted children how to read, but may not have learned how to work with blind children. Sighted parents may remember how they, or their younger siblings, learned to read. They can learn from and copy how others teach their children. But most have little experience of how to work with a blind child. They may be at a loss for what to do.

Both sighted and blind children may make mistakes when reading and writing letters. Sighted children may mistake one letter for another (C and G; I, 1 and l [lowercase L]; O and o). They may write letters backwards (Ǝ instead of E). Braille learners make similar mistakes.

2.1 Learning to read

Below are the rough phases that blind children go through when learning to read.

2.1.1 Preparatory braille

Braille readers use their fingers to read patterns of raised dots. The tips of the fingers are highly sensitive. But reading quickly and without errors is a skill that must be learned and practised.

A child must first learn how to use touch to learn about the world. They must develop the ability to detect the differences between patterns of tiny bumps on a piece of paper. This should begin long before the child enters primary school.

Children learn how to explore their surroundings through the sense of touch.

They learn how to recognize particular objects through touch. They rely on the objects themselves (**apple, orange**) or on models **(aeroplane, elephant**).

They learn to associate particular objects with particular sounds (**apple begins with a**).

They learn about the six dots used in braille.

1 • • 4
2 • • 5
3 • • 6

They learn how to feel the embossed braille dots with their fingertips.
They learn to distinguish one braille sign from another: spotting the odd sign in a sequence.

Developing the sense of touch is a vital part of preparatory braille. Here, a blindfolded teacher in Congo is practising an exercise used with blind learners.

2.1.2
Initial braille (Grade 1 braille)

Initial braille is also known as Grade 1 braille, alphabetical braille or uncontracted braille. It involves learning the basic braille signs: the letters **a–z**, the number, capitals and letter signs, and the punctuation. It also means developing the ability to use these signs to form words and sentences, both in reading and writing.

Just as there is more than one way to teach reading to sighted children (start with lowercase or capital letters?), there are different ways to teach braille. For example, some schools teach the braille characters in groups of five in alphabetical order: **a–e, f–j, k–o**, etc. Others teach the most common and easily distinguished letters and wordsigns first.

1 Children recognize individual braille signs and associate them with a particular sound.

⠁ = **a** ⠃ = **b** ⠉ = **c**

2. They associate certain signs with objects that begin with those sounds.

⠁ is for **apple**

3. They learn the braille signs group by group.

⠁ ⠃ ⠉ ⠙ ⠑ = **abcde** (alphabetical order)

or

⠁ ⠛ ⠃ ⠇ ⠊ ⠅ = **agblik** (most common and easily distinguished signs first)

4. They learn to associate combinations of letters with familiar words, such as their own name.

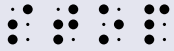
⠁ ⠍ ⠑ ⠇ ⠊ ⠁ = **amelia**

5. They associate combinations of letters with particular words.

 = **bag**

6. They learn how to put signs together to make simple words.

 = **ball**

 = **stop**

7. They learn how to combine signs to make new words.

 = **cat**

 = **mat**

 = **sat**

8. They learn how words combine into phrases and simple sentences.

 = **the cat is fat**

9. They learn how to form capital letters using the  sign.

 = **a**  = **A**

10. They learn to recognize longer, familiar words.

 = **monster**

 = **dinosaur**

11. They learn the punctuation marks and rules of punctuation.

 = **comma**  = **full stop**  = **question mark**

12. They learn how to form new, unfamiliar words.

 = **ridiculous**

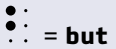
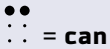
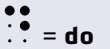
 = **stupendous**

2.1.3
Advanced braille (Grades 2 and 3)

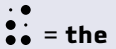
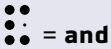
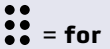
Advanced braille is also known as Grades 2 and 3 braille, or contracted braille. It involves learning the remaining braille signs and combinations of signs, which are used to represent whole words (or parts of words), mathematical symbols (such as **+, –,** × and ÷) and other printed symbols such as **$** and **%**.

Some teaching approaches introduce some contracted forms earlier, along with the letters of the alphabet. Examples are the wordsigns  = **the** and  (standing on its own) = **like**. This avoids the learners having to relearn these words later when they come to Grade 2.

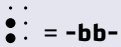
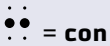
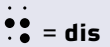
1. They learn simple wordsigns (braille signs that normally represent letters, but can stand for particular words if they stand alone).

 = **but**  = **can**  = **do**

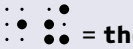
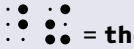
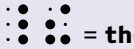
2. Children learn contracted forms (braille signs that are not part of the alphabet, but which represent particular words or letter combinations).

 = **the**  = **and**  = **for**  = **ch**  = **er**

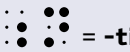
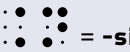
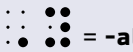
3. They learn the lower contraction signs (braille signs that use the lower four dots 2, 3, 5 and 6).

 = **-bb-**  = **con**  = **dis**

4. They learn compound signs (combinations of two signs that represent particular words).

 = **there**  = **these**  = **their**

5. They learn compound suffixes (combinations of two signs that represent common suffixes).

 = **-tion**  = **-sion**  = **-ally**

6. They learn how to read longer sentences and entire paragraphs.
7. They learn to read whole stories and books.

These steps are not separate and sequential, but may run alongside each other. They occur somewhat after the child's own oral/aural language development. A child will be able to understand spoken sentences, and form their own sentences, long before they can read them.

2.2
Learning to write

In braille, writing means forming the braille signs. There are several ways to do this.

- Using a **slate** (a grid laid over a base containing a set of dots that serve as a guide) and **stylus** or **style** (a handheld tool to punch dots in paper).
- Using a specialized typewriter that embosses dots on paper, such as a **Perkins** brailler.
- Using a **refreshable braille display**: an electromechanical device that displays braille characters by pushing round-tipped pins through holes in a flat surface.

- Using a **computer** with special software and an embosser (a printer that produces the raised dots).

All of these are considerably more complex than simply picking up a pencil and scribbling on a piece of paper. This makes learning to write braille different from learning to write letters. They also require more finger strength and coordination than the initial phases of handwriting.

2.2.1
Slate and stylus

1. The children learn how the slate and stylus work: pushing the stylus into the grid on the slate produces embossed dots from right to left.
2. They learn which places in the grid correspond to which dots, and that they must make a mirror image of the signs that they want to write.
3. They learn how to write simple words.
4. They learn to write sentences and entire passages.

See **Chapter 7** for more on the slate and stylus.

A teacher in Congo practising how to load paper and use a full-page slate.

2.2.2
Perkins brailler

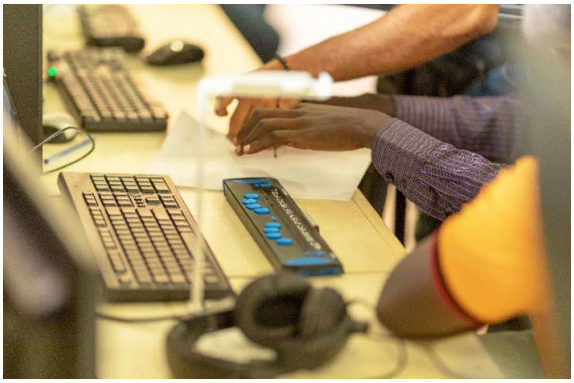
1. The children learn how the brailler works: pressing one key repeatedly to produce a series of dots on paper.
2. They learn to put a piece of paper in the brailler independently, and the meaning of each of the keys in the brailler.
3. They learn that pressing different keys produces dots in different places. They learn to associate each key with a dot position.
4. They learn how to press more keys simultaneously to produce braille letters.
5. They learn how to type simple words.
6. They learn to write sentences and entire passages.

See **Chapter 7** for more on the Perkins brailler.

A Perkins brailler is a typewriter that embosses braille signs into heavy paper.

2.2.3
Refreshable braille display and computer

They learn how to use other equipment, such as a refreshable braille display or a computer with screen reader or sound feedback.



A refreshable braille display (in front of the regular keyboard) has keys for inputting braille and a row of retractable pins to form braille signs that the user can read with their fingertips.

2.2.4
Mathematics

As with reading, children learn counting and arithmetic in a similar series of phases, from simple (starting with objects and fingers) to complex (using numbers and symbols).

1. Children learn to count objects.
2. They learn to recognize 3D shapes (ball, cube, cylinder).
3. They learn the braille number signs after they learn the letter signs.
4. They learn to add and subtract objects.
5. They learn simple arithmetic, using numbers and symbols instead of objects.

Mathematics in braille is more complex than in print for several reasons:

- In print, each number has its own symbol, 0–9. In braille, the numbers are formed by a special number sign ⠼ followed by one or more of the letters a–j.

⠼⠁ **= 1 (number sign + a)**

⠼⠃ **= 2 (number sign + b)**

⠼⠁⠃ **= 12 (number sign + ab)**

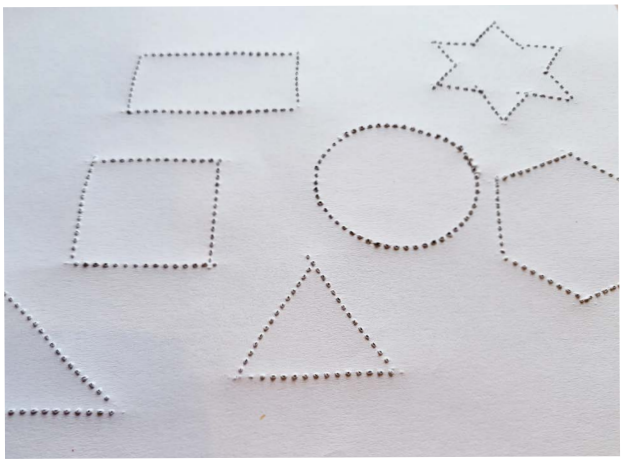
- Depending on the system used, the arithmetic symbols +, − etc. may also take up more than one braille character. In Unified English Braille, dot 5 is followed by another sign to form a symbol.

⠐⠖ **= +** ⠐⠤ **= -**

- Braille takes up more space than print, so even simple equations may take up more than one line.

⠼⠁ ⠖ ⠼⠃ ⠶ ⠼⠉ **= 1+2=3**

- Mathematics relies on a lot of visuals, as in geometry (circles, triangles) and graphs. It is hard to render these in tactile form, so creativity is needed.



Tactile shapes embossed on paper.

2.3
How long does it take to learn braille?

Like any new skill, braille takes time to learn – and how long depends on many factors. Some children learn quickly, others more slowly. The teaching must be paced according to the child's abilities. At the same time, it is important that the child learns braille skills as quickly as possible so they can take part in regular classes alongside sighted children.

On average it takes about 18 months or more for a blind child to learn to read and write letters, words and sentences in the uncontracted version. They may be able to read simple books in a year. After 3 years they may be at the same level as sighted children in terms of reading ability – but not necessarily in terms of speed, since reading braille is usually slower than reading by sight. This is because braille readers cannot read ahead and it is difficult for them to scan a page. Braille readers should be given twice the length of time of sighted children to read a text. Grade 2 braille may take another couple of years or longer to master.

Almost anyone can learn braille and, like anything else, the more practice, the better. Children should do each exercise several times so they become fluent. Encourage and help them to do so. Once the child has picked up the basics of braille, they have got it for life.
Teaching blind children can be a more intensive process for both the teacher and the child than with sighted children. Blind children require more continuous and individual attention, for example to make sure that the child (or children, if there are several) understand the exercise and are doing it correctly.

2.4
Where to teach braille?

In schools where the blind children are in the same classes as sighted children, they should do as many activities as possible together with their sighted peers. This includes reading, writing, arithmetic, music, games, etc.

But braille is a skill that they will have to learn in addition to other subjects. It is best to teach them braille reading and writing separately from the rest of the class. This can be done by taking them out of the classroom at suitable times and giving them special lessons. This is often done by a visiting specialist teacher or a teaching assistant.

2.5
Classroom management

2.5.1
Desks and equipment

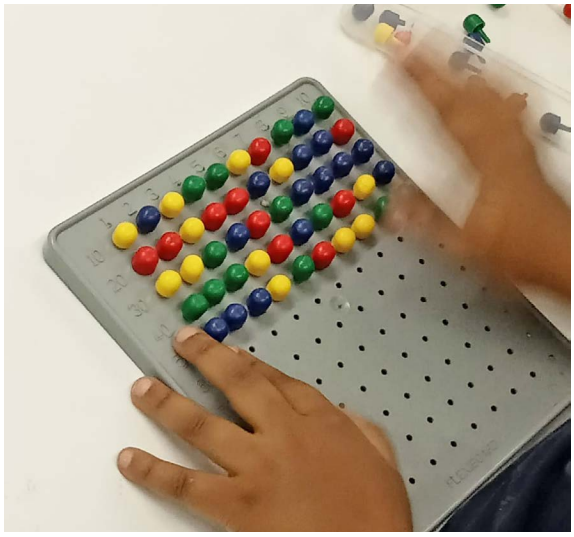
All children in the class should have their own regular places in the classroom, with the items they need within easy reach. This is especially true for blind children. Smaller groups are better for blind learners.

Sighted children are automatically provided a suitable learning environment from Day 1: they are given the books, equipment and working space they need. You should give a blind child the equivalent environment that will help them learn to the best of their ability.

Set up the desk and the surrounding area so the blind child can use them independently. The child needs to know where books, papers other items will be, and where to put completed work. The items should always be in the same place and within the child's easy reach. Tell the child if something is moved, direct them to the new location.

If the child moves between classrooms, make sure the equipment and materials are available in the right places.

Put tactile materials and braille books in one corner of the classroom for the blind child to use. Encourage sighted children to bring in materials for the blind child to feel and learn from.



Practising putting pegs in holes. Many children's toys make good teaching materials.

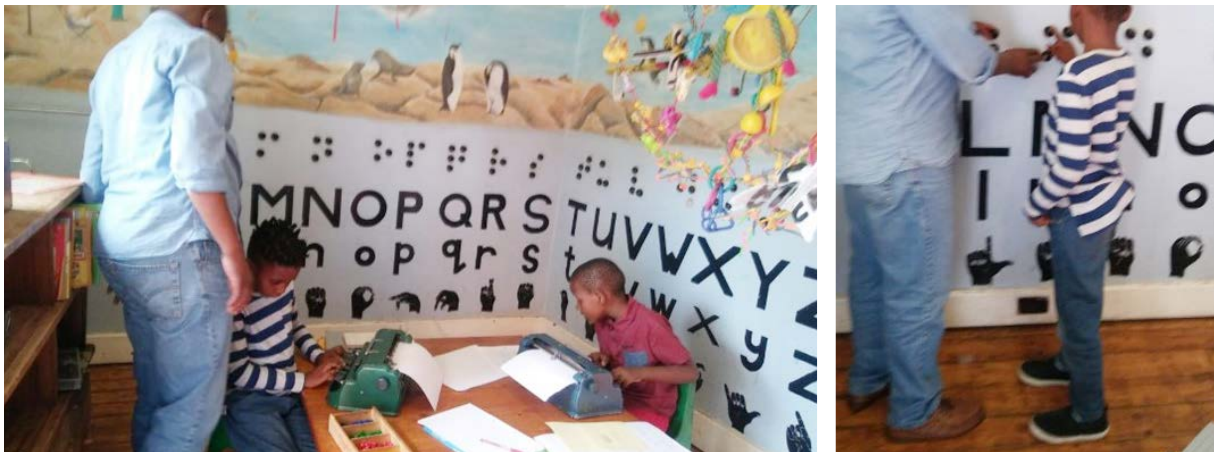
A tactile book in Dutch.

A braille story made of simple materials, prepared by a teacher.

A story from a specialized publisher that produces tactile books. The text (in Arabic) is both in print and braille.

A tactile story about a butterfly that makes friends with a cactus flower.

Put signs in braille around the classroom and the school buildings so the blind child can become familiar with braille and to help with navigation. Put a tactile marker such as a piece of corrugated cardboard next to each sign so the blind child can locate the sign easily. Also teach sighted children how to read signs in braille.



Decorate walls with large braille alphabet signs.

Many classroom walls are decorated with words to increase children's exposure to the written word and to remind them of things like the days of the week, the months of the year, and the names of children in the class. Write these "wall words" in braille and put them in a folder for the building child to refer to.
Stick the letters of the alphabet and the numbers in braille on the child's desk so they can refer to them easily.

2.5.2
Noise

Noise can be very disturbing for the blind child. They need quiet so they can hear and make sense of what is happening in the classroom. At the same time, a Perkins brailler (used by blind children to take notes and write exercises) can be noisy and distract other children from their work.

2.5.3
Involvement in activities

Involve the blind child fully in classroom activities. For example, get them to do show-and-tell sessions, or to read out loud from a braille text, along with their sighted peers.

Get sighted children to cooperate with a blind child wherever possible. For example, read picture books with blind and sighted children together. Use the same book a couple of times and pick three-dimensional objects out of the book and put them in a box that goes together with the book. After a while, the sighted and blind children will be able to read the book together – at first reciting from memory, but then reading the written words.

With the right equipment and approach, blind children can play many games on an equal basis with sighted children. The sighted children should not perform tasks for the blind child: make sure that everyone takes their turn. For some games (such as practising the sense of touch), sighted children can put on a blindfold.

Help sighted children relate to the blind child. For example, remind them to say who they are, and get the blind child to ask. Tell the blind child what their classmates are doing and help them interact with each other. Encourage the classmates to include the blind child in their activities.

Help sighted children appreciate the challenges that blind children face. You can give sighted children a blindfold and do tasks to teach tactual functioning, for example sorting small objects that feel similar. This is also a useful exercise for sighted children as it teaches motor skills.

2.6 Lesson planning

Most lessons should have a fixed, predictable structure. This allows the blind children to anticipate what is expected of them and allows them to work independently sooner.

Plan each lesson carefully to find ways for the blind child to participate fully. This may require special materials. For example, the child may need a braille version of a printed book. Objects and models can substitute for photos in the book. Such materials will need to be prepared beforehand. Try to find ways for the sighted and blind children to use the same equipment.

Verbalize information. Remember that a blind child cannot see what you are pointing at. "Up here" doesn't mean anything to a blind child. "At the top left of the page" is more helpful.

When giving instructions for an activity, first make sure the sighted kids understand what to do. Then give individual attention to the blind child, before going on to supervise the sighted children. Alternatively, the teaching assistant can make sure the blind child has understood what to do.

Blind children may need more time to read texts and do exercises than sighted children. Allow them additional time to do exercises and tests. But do not give them too much time: they (along with sighted children) need to be challenged to work quickly and efficiently. They may also need more one-on-one guidance. The teaching assistant can be very helpful in providing this.

2.7 Tests and exercises

Reading and writing braille takes longer than reading and writing printed text. Give the blind students up to 100% longer for class exercises and tests.

You will need to mark tests and exercises in a tactile way: using stickers, paperclips, pushpins, small pieces of waxed string, magnets, rolled-up masking tape, or glitter crayon. You can use a slate and stylus to braille corrections onto stickers to attach to a text or exercise sheet. See *Correcting work* in **Chapter 4**.

A teaching assistant can be very helpful in converting braille into written text and vice-versa (see the section on *Teaching assistants* below).

2.8 Working with parents

Keep in contact with the parents of the blind child. Explain to them what their child is learning and what you are doing to help them learn.

Encourage them to learn braille so they can support their child at home. Provide them with learning materials if possible. Braille courses designed for sighted learners are available to buy or online.

Provide the parents with feedback on their child's performance. Discuss problems with them and seek solutions. Discuss with them how they can help their child further.

Provide a printed copy of the braille materials (text, exercises) that the child takes home so the parents can help the child with homework.

2.9 Teaching assistants

A school that has one or more blind pupils should have at least one teaching assistant to ensure that these children have the same opportunities to learn as sighted children.

Here are some guidelines if you are a teaching assistant who works with a blind child. Note that the situation and tasks will vary from one school to another.

The classroom teacher is responsible for all the children in the classroom, including the blind child. Your job as an assistant is to support the teacher and help child learn and become an independent adult. Remember, the emphasis is always on helping the child learn to do things themself, and not doing things for them.

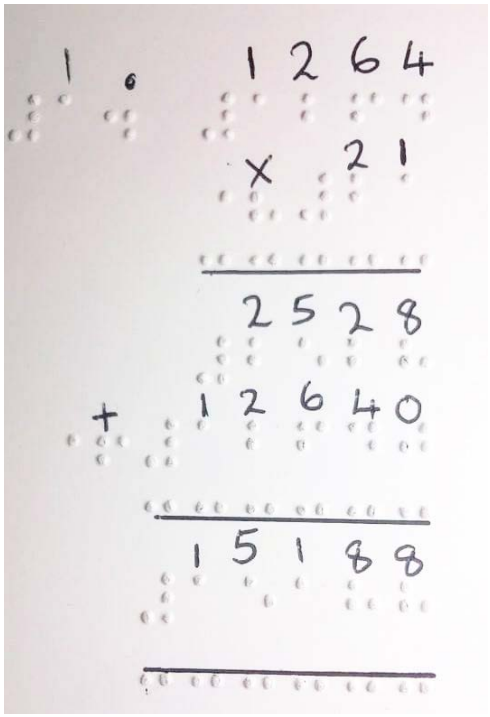
Your job consists of four main tasks:

- Behind the scenes work
- Direct assistance
- Facilitating
- Enrichment.

2.9.1 Behind the scenes

- The blind child's desk should be for their use, not for you. If you have a desk in the room, it should not be next to the blind child's. That way, the child's focus is on the teacher, not on you.
- Watch the child's progress and identify tasks that they can do by themselves.
- Plan with the classroom teacher what to do, and prepare materials and equipment as needed. This includes obtaining (or making) braille versions of texts and exercises.
- Adapt materials for classroom subjects. Sometimes this is easy; sometimes it will require a lot of imagination and creativity. Sometimes it may be necessary to provide the blind child something very different from what the sighted children are using. Coordinate with the teacher.
- Obtain materials that the blind child will need for their lessons.
- Maintain the resource room and help children that use it.

- Advise and help teachers to adapt lessons to accommodate blind children.
- Many braille books omit diagrams, maps, etc. Check them and provide alternatives if needed.
- If braille worksheets are used for homework, provide a print copy for the parents.
- If you have learned braille (this is a good idea!) transcribe the child's work by writing in ink above each braille line. The teacher can them mark the work along with the rest of the children's papers. Label items that are in braille with printed letters so the teacher and parents know what they are.
- If the school has a braille translation program and embosser, you can produce many items in braille: worksheets, tests, announcements, etc. You can also print out the teacher's comments and corrections. If you have only a Perkins brailler, you will be able to produce much less braille material, so you will have to choose what to give priority to. You can use tactile materials such as tactile glue or waxed thread to put the teacher's marking in a form the child can read.



The teaching assistant can transcribe what the child has written in braille so the teacher can correct it.

2.9.2 Direct assistance

- Pre-teach (or post-teach) topics that the blind child is likely to find difficult during the regular class. It may be necessary to allocate at least one hour a day to do this. The aim is for the blind child to participate in and profit from the regular lessons in the classroom.
- Teach topics that the blind child must learn but sighted children do not. These include reading and writing braille and working with tactile equipment.
- Blind children always need help to form a mental map of any place they are in for the first time – for example, when they move to a new class at the beginning of the school year. They will need assistance with tasks such as finding their desk, locating items, and performing certain activities.
- Help the child become as independent as possible. Do not do things for them. Instead, find ways for them to learn how to do things by themselves. This is especially true for tasks they will have to repeat frequently, such as opening a book at the right page, or packing their bag at the end of the day. As children get older, they should be able to do more and more tasks on their own.

2.9.3
Facilitating

Facilitating means helping the blind child to do things competently.

- Encourage the child to explore and learn. Guide them to make discoveries. Help the child understand the classroom and learn how to respond in an appropriate way.
- Guide the blind child in the class. Practise routes into and around the classroom so the child can navigate independently. Verbalize what materials there are and which ones to use. Help the child become familiar with the materials and how to use them.
- Give cues rather than help. Step back and allow the child to do things themselves. A blind child will need more time than a sighted child.
- Read text to the child, either directly or as a recording.
- Help the child develop friendships and interact socially.
- Help the child learn how to behave in an appropriate way: sitting with the right posture, paying attention, facing the right direction.
- Help the blind child learn daily routines: changing classrooms, going to the toilet, etc. Guide, but do not lead.

2.9.4
Enrichment

This means enriching the blind child's educational experience to deepen their understanding and appreciation.

- Help the child become aware of the many written and printed items around them, such as posters, bulletin boards, announcements, and children's work on the classroom walls. Add braille labels to these items. Make the child aware that this information exists, and help them learn how to discover it by themselves.
- Provide verbal descriptions of classroom activities, videos, assemblies and field trips.

2.9.5
More information

Castellano, C. 1996. The blind child in the regular elementary classroom. Future Reflections 15 (3). nfb.org//sites/default/files/images/nfb/publications/fr/fr15/issue3/f150302.html

2.10
Resource room

The school should have a resource room with the space, equipment and materials needed for teaching blind children.

Depending on the situation, this room may perform various functions.

- Teaching blind children certain subjects separately – for skills such as reading and writing braille.
- Independent learning by the child
- Storage of equipment and materials
- Preparation of teaching and learning materials.

2.10.1
Teaching basic skills in braille

In some mainstream schools, the resource room is a place where visually impaired new arrivals can be taught individually basic skills such as reading and writing braille. When the child has acquired these skills, the braille teacher assesses their abilities and places the child in the correct mainstream grade.

2.10.2
Workspace

The resource room may provide a workspace for blind children to have separate lessons or to learn independently.

- Desks and chairs set up for teaching and independent work.
- A computer with a refreshable tactile display, Perkins brailler or slate and stylus.
- Learning materials and consumables within easy reach.

2.10.3
Storage space

Shelves or cupboards to store equipment and materials. Braille materials should be stored upright to prevent the embossed dots from being squashed. They should not be squeezed into shelves for the same reason.

Certain equipment and materials, such as textbooks and reading materials, may be lent out to the blind child and returned when they are no longer needed.

Other equipment and materials should be taken to the classroom by the teacher or teaching assistant as required, and then. returned to the resource room.

The storage space in the resource room should be kept organized, with items in the correct places. Shelves, cupboards and boxes should have printed and braille labels to show what they contain.

2.10.4
Teaching and learning materials

These may include the following.

- Braille versions of textbooks and exercises.
- Braille reading materials (these can also be kept in the school library).
- Tactile versions of teaching materials such as diagrams, graphs and maps.
- Three-dimensional equivalents of items presented to sighted children as two-dimensional pictures: small objects, models, shapes
- Building blocks, Lego bricks, magnetic manipulatives, etc.

Take care of the reading materials. Keep them upright in shelves, and do not squeeze them together as this will squash the dots and make them unreadable. Make sure that the tactile dots can still be felt easily. Replace worn materials if necessary. For frequently used materials, have the braille embossed on plastic or card, which lasts longer than braille on paper.

2.10.5
Equipment

Some of this equipment is for use by the teacher; others are for the learners to use. For student use, several items of equipment may be needed.

- Computer with braille translation software, screenreader, braille display
- Embosser for creating tactile materials, heat lamp for swell paper
- Perkins brailler
- Slate and stylus
- Taylor frame
- Abacus
- Scissors, knives, marker pens, etc.
- Etc.

See **Chapter 7** for details on equipment.

2.10.6
Consumables

- Braille paper, swell paper
- Waxed sticks
- Tactile glue and paint
- Etc.

Charlotte Glorie
Teacher and cabaret artist, Netherlands
charlotteglorie.nl

2.11
Why braille?

I am 52 years old and mother of two adult children. I have been blind since I was born. My function is braille trainer in a centre for intensive rehabilitation. That means that I teach reading and writing braille to adults who have become visually impaired. Apart from that, I perform as an artist.

I have an elder sister and brother who are also blind. They taught me to read braille when I was 4 years old. When I went to a school for blind children, I could already read braille very well so I got very bored.

I learned braille because I could not read in another way and because I wanted to be as big and wise as my elder sister and brother. My brother and sister told me which dots were which letter. They didn't pay attention to a good reading technique and sitting position. That kind of things I learned from the teachers at school.

It is very important to learn braille. In this time, it is possible to listen to speech on the computer. Some people think that for that reason you don't have to learn braille. But, while listening to speech, you don't know the spelling of a word or a name. When you write a letter or message to someone, the danger exists that you will make many spelling errors. That decreases your possibilities in society. Besides that, it is very nice to read a book without intervention of a voice that pronounces it for you. By reading yourself, you can read as fast or slow as you want and you can use your own fantasy.

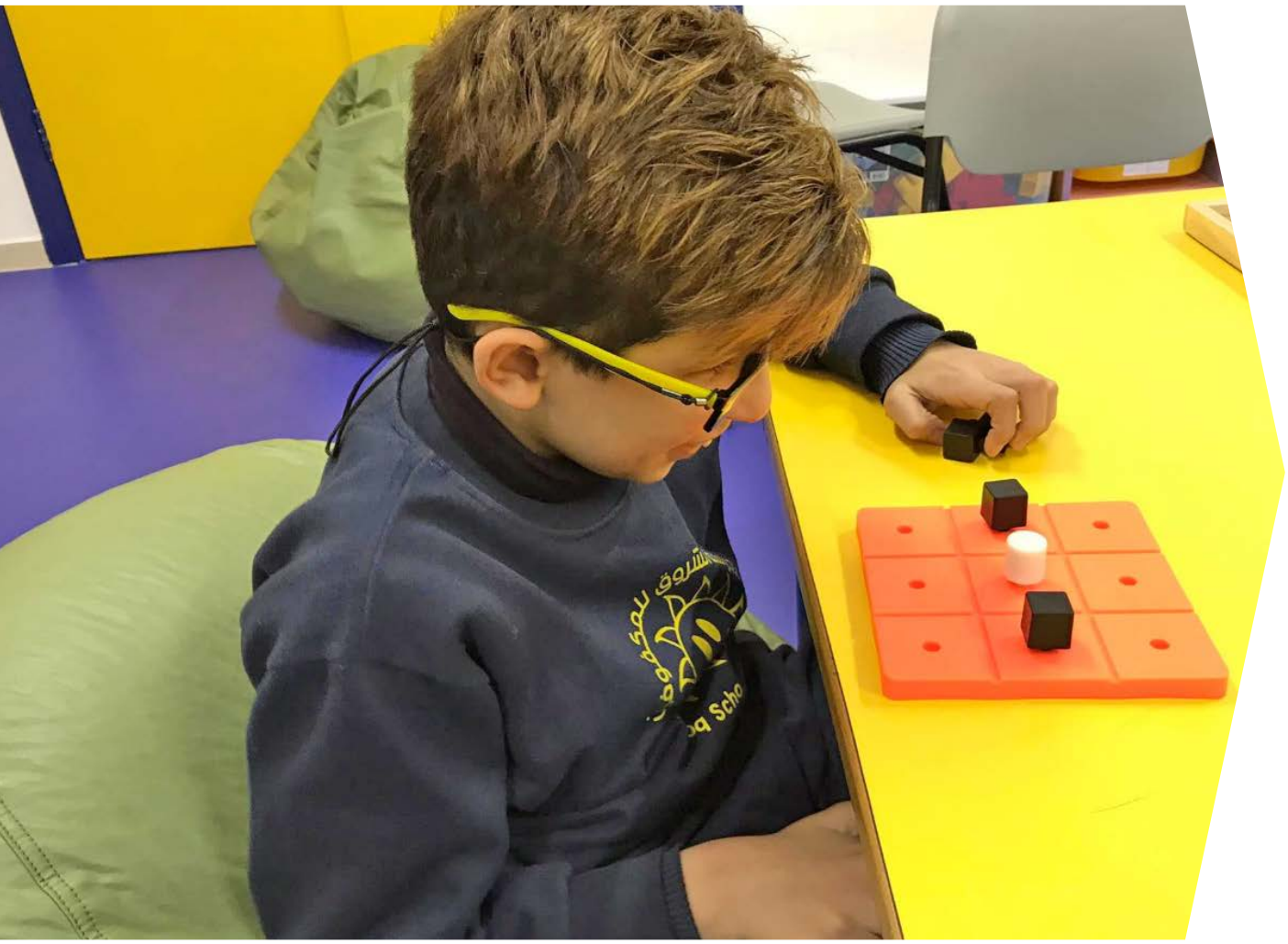
I use braille for my work: teaching other people braille. I read a book in braille every day for relaxation. When I have to read a text aloud in the church or at a party, I type it with my braille writing machine so I can read it. I put braille labels on many objects in my kitchen, such as herbs and frozen products, so I can find the right product. At a station, I read the braille labels on the handrails so I know which platform I am on.

I use braille most often to read e-mails, type and correct messages, and search for information on the internet. For that purpose, I have a braille display that connects with my desktop computer and my smartphone. I use braille several times every day. It lets me do things without help.

To persons who are visually impaired, I would say this: If you have the possibility, learn braille! It gives you more possibilities to lead an independent life and to use your talents in education or work.

I would ask sighted people to imagine that someone says to you that, from now on, you cannot read any more. You can only listen to words from a computer. I think that you would feel panic. You want to read a text for yourself, so you can read it again if you need, and you can better memorize what you read. If you imagine that, you know that braille is indispensable for visually impaired people.

3. Preparing for braille

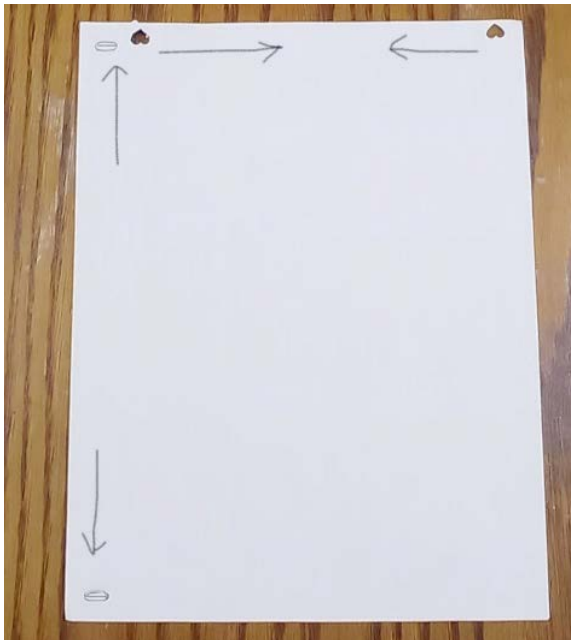


Before they can start learning braille, children need to develop a set of basic skills.

- **Language and listening.** They need to be able to form concepts about the world around them. They need to be able to express these ideas in the form of words and sentences. They need to be able to listen carefully and understand sounds and words.
- **Using the hands.** They need to be able to use their hands in a systematic way to explore their surroundings and manipulate objects.
- **Touch.** The need to develop their sense of touch so they can identify and feel objects, shapes and textures. They need to be able to remember what they have touched.
- **Meanings and symbols.** They need to grasp the idea that symbols (such as patterns of braille dots) can stand for words, and words stand for objects, actions and relationships.
- **Spatial relationships.** They need to understand positions such as “above”, “below”, “left” and “right”.

These skills overlap with, depend on, and reinforce each other. They should be taught in parallel, not one at a time, and the exercises should continue even after the child has started with initial braille.

Blind children learn to recognize objects through the sense of touch.



A sheet of paper with holes to explain "right" and "left", and with staples to demonstrate "top" and "bottom".

Make learning fun! Use exercises and games to stimulate the child and maintain interest. It may be necessary to repeat certain exercises several times before the child has learned the skill. You can vary the content of the exercises to challenge the child and ensure they do not rely only on their memory.

Only when the child has learned enough of these skills is it useful to start teaching them braille. This chapter describes how to help the child develop these skills.
The appendix to this chapter has a checklist you can use to check a child's progress.

3.1 Language and listening

Blind children cannot see the world around them. They cannot see people and faces, cars and trees, aeroplanes and clouds. They may find it hard to relate sounds to objects, and cannot perceive colours, two-dimensional shapes, or objects at a distance. This means that blind children may use a word incorrectly, in a situation where it does not fit.

Because blind children rely mainly on the senses of touch and hearing, it is difficult for them to understand what big or distant objects are. We can divide words into three main types:

- **Close-by words: sock, ball, book, eat.** These are objects or actions that are familiar, can be touched or held in the hand, or perceived directly. It is relatively easy for the blind child to learn them.

- **Far-away words: horse, building, cloud, fly.** These cannot be touched, are too big to be held in the hands, or cannot be perceived directly.
- **Abstract words: time, idea, because**. These cannot be touched (or indeed, seen).



Close-by words.



Far-away words.

3.1.1
Developing language and concepts

You can help a blind child learn concepts and develop their language in various ways. If you are a teacher, you can do some of these at school. If you are a parent, you can do a lot to help your child develop the skills they will need.

Learning by doing

In the kitchen, let them experience cutting vegetables and bread, cooking, and dishwashing. Around the house, they can help with cleaning, tidying, washing, hanging clothes to dry and folding them up. In the classroom, they can sort items, tidy up their desk, and help distribute materials to other children.

Exploring

Find ways to introduce the child to things they may have not experienced before. If it rarely rains in your area, go outside when it is raining so they can experience the sound and feel of raindrops. If it snows, take them outside to touch the snow and feel how it melts on their hands. Explain the weather to them: describe the sun, wind, clouds, moon and stars.

Take them on trips by car, bicycle or train. When walking, stop to let them explore different locations: a garden, stream, street or shop.

In the countryside or in the school garden, take them to the fields at different times so they can feel the crops as they grow and can experience the harvest of grain. They can dig holes, plant seeds in the ground or in pots, and water them. Take them to the farmyard to hear, touch and feed the animals.

Teaching a child how to use a broom.

Discovering what a snail is.

Discovering stones and shells on a beach.

Interactive corner

Create a corner in the classroom with different materials and objects that the child can become acquainted with. Encourage sighted children to bring in tactile objects for the blind child to feel.

A table with tactile objects for children to practise their sense of touch. From a training course in Ghana.

Interactive corner of the classroom, set up to learn numbers.

Using objects and models

You can use objects to teach the meanings of words, in the same way as sighted children use pictures. For example:

- Have a selection of balls of different sizes, firmness and textures so the child learns that a ball can take on different forms.
- Use a collection of bags (cloth, paper, plastic, with and without handles) to teach the word “bag”.
- Use models of items that are too big or faraway to experience directly: elephant, horse, tractor, aeroplane. Explain that the real items are much bigger than the models. Associate each item with a function (“cars carry people”) or sound (“cows go moo!”).

A selection of spoons of different sizes, types and materials. The large braille at the top says “spoon”.

The child is connecting images, objects and words. He names their characteristics and uses, and categorizes them by type. All the items begin with the letter M in Arabic.

Pointing words

Words that refer to a location are particularly difficult for blind children to understand. Examples are “there”, “here”, “this”, “that”, “these” and those”. Avoid using such words. Instead explain where the object is: “at the top of the page” or “at the front of the classroom, by the door”.

3.1.2
Learning to listen and use words

Learning to read depends on being able to recognize the sounds that make up a word, and the words that make up a sentence. The child must learn to do the following.

Distinguishing sounds

Teach the child how to distinguish individual sounds and tell whether sounds are the same or different.

Identifying sounds

- Which sound comes at the beginning of the words "cat", "cook" and "can"?
- Which sound comes in the middle of "cat", "bag" and ""hat"?
- Which of these words rhymes with "cat"? Mat, bag, cook.
- Can you think of a word that rhymes with "pet"?

Combining sounds to make a word

- What word do these sounds make? B... a... t... (You should sound out the letters: "b, a, t", not "bee ay tee".)

Splitting up words into their individual sounds

- What are the sounds in the word "bat"? The child should sound out the letters: "b, a, t", not "bee ay tee".

Putting sounds in the correct sequence

- Can you say these words in the same order as me? "Cat, dog, bird, horse."
- Can you say these numbers in the same order? "1, 3, 6, 4."

3.2 Using the hands

Blind children must learn to use their hands not only to hold and manipulate objects, but also to learn what they are. They must learn how to use both hands in coordination, and to use the fingers independently. They must also learn the right sitting posture for reading braille.

Learning movements depends a lot on sight, so blind children tend to move less on their own than sighted children do. They tend to move less flexibly, more slowly and with less variation than sighted children. They need more time and repetition to learn how to move automatically.

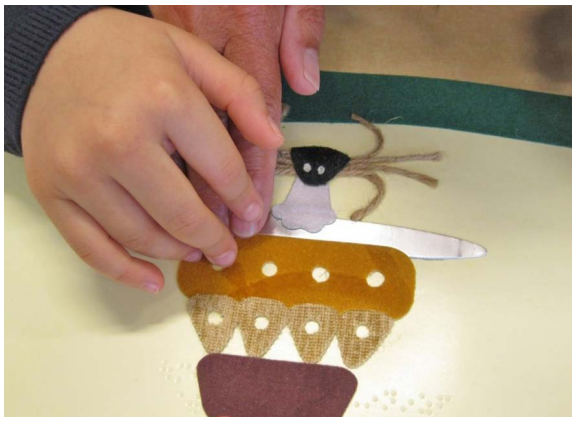
3.2.1 Guidance techniques

Help the child learn how to perform a new skill by demonstrating it to them. You may have to do this several times before the child learns the skill. There are three main approaches:

- Hand under hand
- Hand over hand
- Tactile modelling.

Hand-under-hand technique

1. Sit or stand behind the child so that both persons' hands move in the same direction.
2. Get the child to rest the palms of their hands on yours. Your hands carry out the activity.
3. Move your hands over an object or surface. Describe what you are doing.
4. The child will feel the action and will feel comfortable touching a new object. They can take their hands away whenever they wish.
5. Now switch your hands with the child's (to the hand-over-hand position) so the child can feel what you have done.
6. Ask the child to tell you what they can feel.



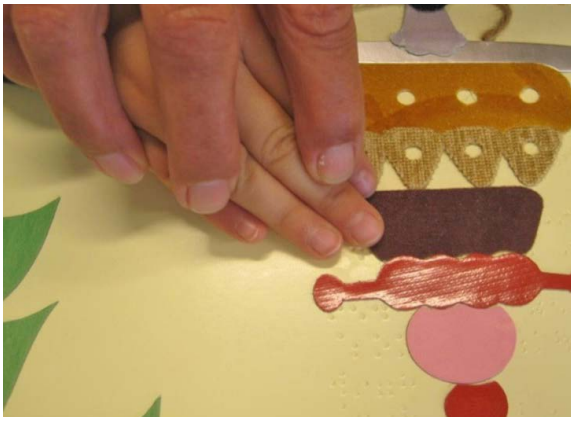
Hand-under-hand technique to feel a tactile image.

Hand-under-hand technique to read braille. The child can slide their hand down to feel the letters.

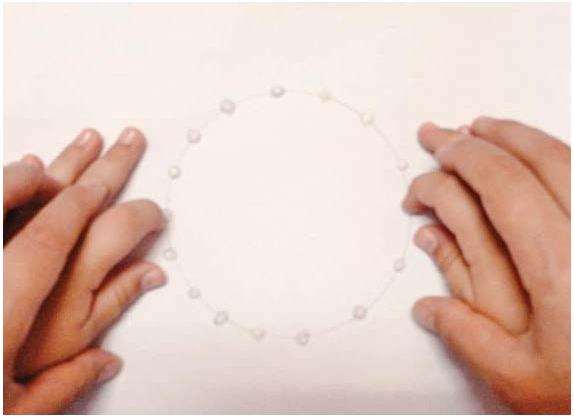
Hand-over-hand technique

1. Sit or stand behind the child so that both persons' hands move in the same direction.
2. Get the child to touch the surface or grasp the object. Guide their hand.
3. When child can do some of the activity independently, reduce the amount of help you provide. For example, guide their elbow or forearm rather than their hand.

Hand-over-hand technique to make a sandwich.



Hand-over-hand technique to feel a tactile image.



Hand-over-hand technique to feel bumps made from candlewax.

Tactile modelling technique

Tactile modelling is useful to teach actions such as making a sandwich, opening a jar, or cutting an apple.

1. Allow the child to feel how you do the activity by moving their hand along with yours.
2. Repeat the action several times, describing what you are doing each time.
3. Each time, allow the child to take over more of the task until they can do it alone.

Modelling washing the hands.

Modelling drying the hands.

Modelling how to open a jar.

3.2.2
Body awareness

Blind children need to learn the various parts of their own body so they can coordinate their movements properly. That includes naming the parts of the body (ear, nose, hand, arm, etc.), the different fingers, and knowing which side is right and which is left. This is important not only for controlling their own movements, but for understanding instructions such as "go to the left side of the page".

Generalizing the concept of body parts. Finding and naming each part of the doll. Use various types of dolls: cloth, plastic and rubber.

3.2.3
Using both hands

Many right-handed blind children prefer to use their left hand while feeling tactile materials such as textures, braille and embossed lines. This is not a problem. But they should learn how to use both hands in coordination.

Using the hands in turns or after each other.

- Kneading dough.
- Turning an object around.

Using one hand to hold an object and the other to feel or manipulate it.

- Holding a musical box and turning the handle.
- Putting clothes pegs on the side of a tin.

Using one hand to move beads from one location to another without leaving a guide path. The other hand traces the same path. This trains the hands to trace horizontal lines – important when reading braille.

Using both hands together.

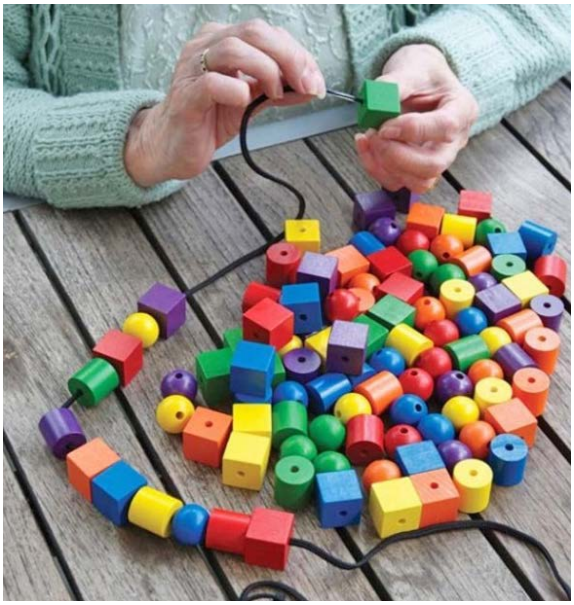
- Stringing beads onto thread. Start with large beads on something rigid, like a wooden stick. Progress to putting smaller beads on a stiff wire and then onto a flexible thread.
- Using scissors to cut out shapes.
- Stacking boxes on top of each other with the largest box at the bottom.

The child should be able to systematically investigate small objects with both hands, and to feel relatively simple relief shapes and structures with their fingertips and thumbs (using 6 or 8 fingers at the same time).

Give them practice in making fast, coordinated hand movements, for example with sticks, materials and embossed lines. This will help them when they encounter braille.

They should learn how to move to the next line and how to turn pages, where one hand does something different from the other.

Stringing buttons on a thread.

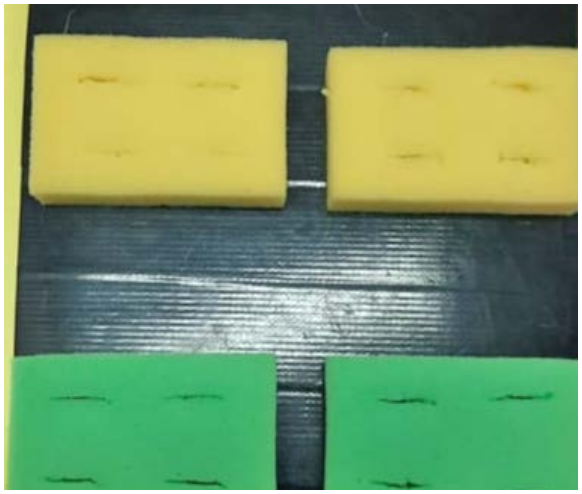


Threading beads.

Making holes with a braille stylus between pushpins showing the location.

Winding nuts onto the correct bolts strengthens the fingers and improves coordination.

Pressing plasticine balls with the fingers of both hands.



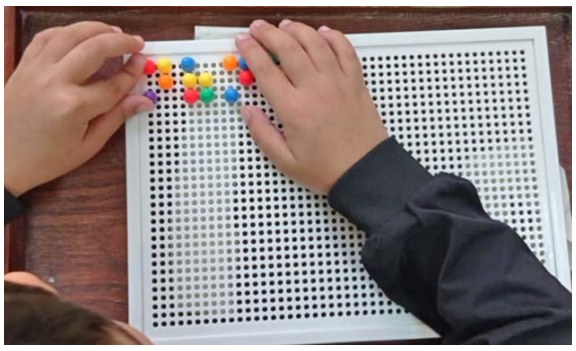
Dishwashing sponges stuck on a board. Get the child to use their thumb and index finger to remove small stones from the slits in the sponges. They should do this is a particular order, such as from left to right and from top to bottom, or only from the middle row of sponges.

3.2.4
Moving the hands and fingers

Reading and writing braille will require the child to develop the strength and coordination in their hands and fingers. When reading braille, the child must be able to use only the smallest amount of pressure. But when writing using a slate and stylus or a mechanical brailler, quite a lot of force is needed. Using a brailler also requires the fingers to move independently of each other to press the keys. This will require a lot of practice.

Encourage the child to:

- Play a keyboard instrument such as a piano, using all the fingers.
- Use scissors to cut different types of paper and card.
- Cut out circles, squares and other shapes following a tactile guide such as a line of wax dots, tape or stickers.
- Punch holes in a card with a punch, then trace the holes with the fingers.
- Play with brailler keys.
- Play finger games.
- Make tactile lines using a pinboard.
- Move beads on an abacus.



Putting beads in holes in a particular sequence and direction. Instruct the child to make lines, shapes or even braille letters.

A card base, the size of the child's hand, with hairbands glued to it. Use this to train the child to move the fingers independently. Say "lift your middle finger" and help the child by pulling on that hairband.

Practice with memory and coordination. The child must take a peg from each of four bowls in turn. No mistakes!

3.3 The seven senses

In addition to the traditional five senses – sight, hearing, taste, smell and touch – humans have various other ways of detecting their environment. These include:

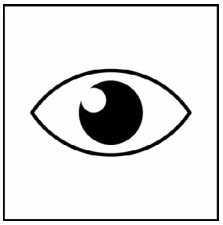
- The **vestibular system**, or sense of balance, which is governed by our inner ears. It helps us keep balance and orient ourselves spatially, so we know which direction we are going.
- **Proprioception** is the sense from our muscles that tells us the position of our body and its movements.

In babies, the sense of touch is the most important. But in sighted people, it is rapidly displaced by vision. For those with limited or no vision, touch and the other senses remain very important as ways to perceive the world.

If a sighted person loses their vision, they must compensate by learning how to use their other senses (especially touch) to make up for the lack of visual information.

Vision and hearing are known as "far senses". They tell us about things that are far away from us. The other senses – taste, smell, touch, the vestibular system and proprioception – tell us about what is close to us.

“Far” senses

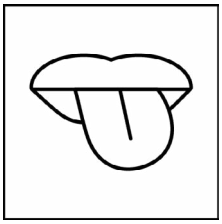


Vision

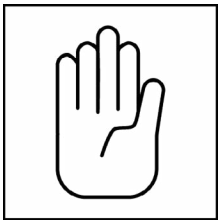
Hearing

“Near” senses

Smell

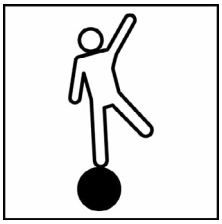


Taste



Touch

Proprioception



Vestibular

3.4 Developing the sense of touch

The sense of touch is vital for blind people both to perceive the world and to read braille. This sense must be trained and learned.

With training, a blind person can read a line of braille quickly and accurately. A blindfolded sighted person who knows braille but who has not developed their sense of touch finds this much harder.

Some children may become hyper-sensitive: they may develop pain in their fingertips or other parts of their body (for example, around the mouth or on the soles of their feet). This may prevent them from concentrating, or they may refuse to touch things. Others may not be able to feel properly, so may press too hard or squeeze objects, and maybe hurt themselves doing so. In such cases, consult a physiotherapist or doctor.

Developing the sense of touch is an important skill for future braille readers.

3.4.1
Helping the fingers feel

Before the child starts feeling, the sensitivity of the fingertips can be increased by:

- Bending and flexing the fingers
- Having all the fingers rapidly touch the thumb
- Playing finger games.

Placing and removing small, flat beads stuck on wide sticky tape increases the feeling of the child's fingertips (left). The tape is sticky-side up; it is secured to the work surface at both ends and in the middle. Dried chickpeas can be used instead of beads (right).

Pressing the buttons on an old phone. Ask the child to use a different finger each time.

3.4.2
General touch skills

Teach the child how to:

- Distinguish familiar objects (comb, spoon, paper) from unfamiliar ones.
- Detect small details, such as the milled edges of a coin or the notches on a key.
- Feel and compare different textures: the rough surface of a nailfile, the fluffiness of a toy animal, the different surfaces of the hooks and fuzz of Velcro.
- Recognize the various forms of the same type of object (different types of cups, shoes, puzzles)
- Organize and match materials in a structured way (such as sorting similar objects into boxes)
- Distinguish different patterns (such as patterns of dots).

Identifying shapes. The child must find all the star-shaped pieces in the box.

3.4.3
The language of touch

Teach the child words that describe how things feel.

- **Size and shape:** round, square, straight, curved, angular, big, small, tiny, thick, thin.
- **Position and direction:** right, left, top, bottom, side, up, down, sideways, corner, edge, upside-down, start, middle, end.
- **Texture:** hard, soft, rough, smooth, soft, jagged, bumpy, sharp, blunt, ribbed, prickly, hairy, fluffy, dashed, interrupted, sticky, lumpy, hot, cold, wet, dry, oily, greasy.

3.4.4
Learning how to explore a page

Teach the child how to explore a surface, such as a tabletop, tray or page.

- **For beginners:** Get the child to start by exploring the whole surface by asking "what can you feel?" Encourage the child to use an organized approach using both hands For example, they should first feel the entire sheet using two hands, then start with both hands at the top in the middle. They should let their hands slowly slide across the sheet, with the left hand feeling the left side of the sheet, and the right hand feeling the right side.

- **For more advanced children:** Give the child a reference point to start from: a prominent mark on the edge of the page or line, or a sign at left upper corner of the page.

3.4.5
Ability to identify, match and sort objects

A blind child must learn how to identify objects by feeling them, to match similar objects, and to sort a pile of objects into different groups according to various criteria:

- **Size** (pencils of different lengths, balls of different sizes)
- **Textures** (such as pieces of fine and smooth sandpaper)
- **Weight** (jars containing different amounts of water)
- **Three-dimensional shapes** (marbles, dice, beans, buttons, Lego pieces of different shapes)
- **Two-dimensional tactile shapes:** triangles, circles, squares, etc.
- **Configurations** (different braille cell patterns or patterns on a pinboard).

Exercises include:

- Identifying the object or shape ("it's a ball" or "it's a cube").
- Sorting similar objects into different boxes.
- Sorting the objects according to some criteria, such as size, roughness or weight.
- Finding two objects that are the same among several different objects.
- Identifying the missing parts (a chair with a missing leg, a cup without a handle).
- Objects with a theme. Give the child a tray with a set of objects relating to a particular theme. For example, a transport theme might have toy cars, lorries, bicycles, etc. Ask the child to identify each one.

As the child masters each skill, you can make it more complex by adding additional shapes or objects, or making the differences smaller.

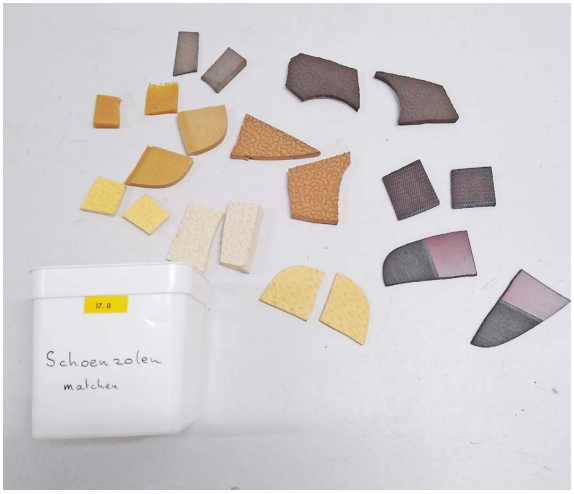
Examples of objects to sort:

- Small toys, Lego bricks
- Pebbles, beans and short sticks
- Different types of buttons
- Nails and screws of different sizes
- Pieces of string of different lengths
- Pieces of card cut into different shapes.

Sorting buttons: "Put the big buttons into the container on the left, and the smaller buttons into the container on the right". Vary the exercise by changing the instructions, the objects to sort, and the positions of the containers.

Matching game: the child must find pairs with the same shape.

Sorting beads by size, plate shape, and direction: “Put the small beads in the circular plate on the right”. Vary the exercise by changing the location of the plates.



Different textures cut from the sole of a shoe.

Objects to feel in a box. A sighted child can put their hand through the hole in the top of the box.

Tactile puzzle. The child must find the right pieces to fill the frame.

Tactile bingo. This can also be played by sighted children who are blindfolded.

Tactile dominoes. The child must put the stones together so the textures on adjacent stones match. Can also be played by sighted children who are blindfolded.

Matching textures. The child must match each of the textures with a texture in large board.

Tactile puzzle. The child must fit all the pieces in the frame.

Sorting objects by shape.

3.4.6
Ability to remember things touched

When we read printed text, we can see the whole line as well as the individual words and letters. When reading braille, however, a blind person must read each letter one at a time, then combine the letters into words and extract meaning from them. This involves the memory more than reading by sight.

You can stimulate this memory ability in various ways using a magnetic board, tray or pegboard.

- **Hide & seek game.** Give the child five different objects to identify. Then remove one of the objects and mix up the positions of the others. Ask the child to say which object is missing.
- **Copying.** Give the child a board set up with different shapes, or a tray with objects in a certain order. Ask them to feel the sequence, then reproduce it, if possible without checking the original. When finished, the child can check the original to see how they have done.

Use toys to set up different arrangements of objects that the child can copy.

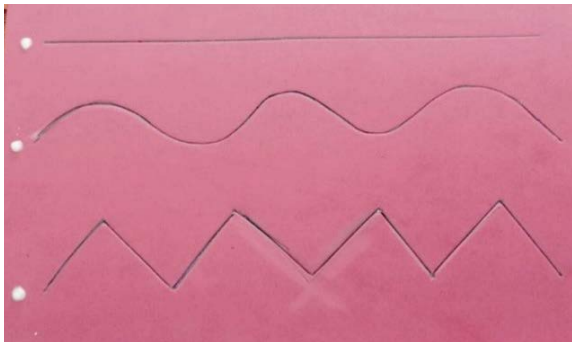
- **Matching.** Set up four alternative patterns of objects or textures, and ask the child to identify which two are the same.
- **Memory game.** Make a memory game with different textures on cards, or with small objects hidden under plastic cups. The child must match pairs of identical textures or objects.

Arrange a small number of objects on a towel in front of the child in a particular order and direction. The child must name each object things and its position: "the square is first from the bottom". Then change the order of the objects and ask the child to recreate the original order.

- **Bingo game.** Make bingo cards with 6–9 different textures (rough, smooth, fluffy, etc.). Make individual cards with a larger set of textures. Put these cards into a bag. Draw one card out at a time. Either name the texture, or get the blind child to feel it. The blind child must say whether the texture is on their bingo card. When all the textures on the bingo card have been matched, the child calls out "bingo!"

3.4.7
Ability to feel tactile drawings

Make tactile lines and simple shapes on card, plastic sheet or paper (see **Chapter 7** for how to do this). Get the child to explore the lines or shapes with their fingertips. Then ask them to trace each line or shape, say where the line begins and ends, and describe it ("It's a zigzag," "It's a square," etc.).



Tactile lines.

- Ask the child to detect which of three tactile drawings of a square is the biggest and which is the smallest.
- Get the child to detect the odd one out of a row of braille signs.
- Put "surprises" in a tactile line: a marker or shape made of cardboard or felt. Ask the child to describe what it is.

Using a card window (a tool to help a partially sighted child overcome the problem of overcrowding in reading texts). The child must redraw the line through the cut-out window. They must name the type of line, its direction and position: "straight line above, zigzag line below the straight line", "the second line", etc.

Tactile patterns made with hot glue on cardboard. Get the child to trace the shape with their fingertips and name the direction and the shapes.

3.4.8
Touching lightly

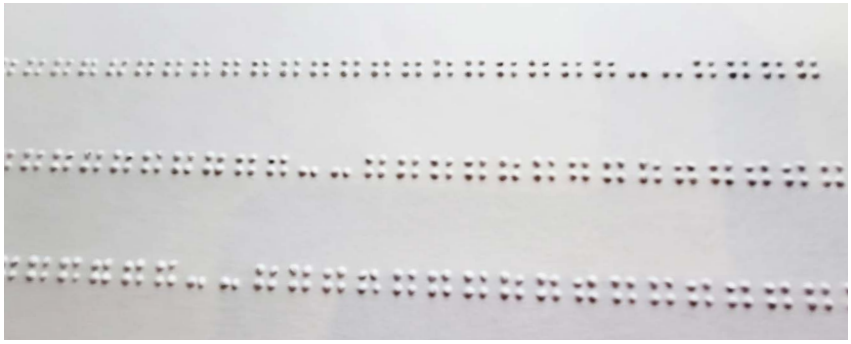
Reading braille requires a very light touch. Teach the child to skim the surface lightly with their fingertips.

- Show the child how to move counters on a tray by touching them very lightly.
- Put some buttons inside a tactile drawing of a square. See how many buttons the child can feel without moving them outside the square.
- Teach the child to detect braille dots with as little pressure as possible.

Get the child to put pieces of banana together – either with the hands or the fingertips – without crushing them.

Here are some ways you can help a child develop their sense of touch so their fingertips become sensitive enough to detect braille patterns.

- Make several lines of braille using the ⠒ sign. Add a different sign such as ⠉ somewhere in each line. Ask the child to find where the different sign is.
- Make a line of braille with several different signs. Ask the child to find where the ⠘ signs are. Then ask them to find all the a signs, then all the ⠸ signs, and so on (without necessarily being able to say which sign it is).



An exercise where the child has to find the "hole in the road" in a line of braille signs.

The child must detect the odd ones out in a line of braille.

3.4.9
Converting from three to two dimensions

Show a sighted child a photo or drawing of a banana, and they will instantly recognize it. But give a blind child a tactile drawing of a banana, and they will find it far harder to recognize it. This is in part because unlike sight, touch gives information about the object from all sides.

You can teach a blind child how to convert from three to two dimensions in various ways.

- Get the child to trace the outline of their hand or an object with their index finger. Then show them a tactile drawing of the same object and get them to trace the outline.
- Point out the distinguishing features on a tactile drawing: "Here is the elephant's trunk. Here are its legs. Here are its ears."
- Give the child three tactile drawings of different objects and ask them to identify each one.
- Collect (or get the child to collect) small items such as shells and pine cones. Teach the child how to use these to make imprints in clay or wet sand. Get the child to feel the outline of the shape formed. You can also use toys and household objects such as cups, spoons and combs.
- Cut out shapes of common objects from cards. Ask the child to match each shape with the real object.
- Find initial braille books with tactile illustrations (drawings that are made of raised dots). Help the child read the illustrations with their fingertips. Get them to describe to you what they feel.

3.5
Understanding where things are

It is important for a blind child to form a mental map of where things are in the classroom, on their desk, and on the page. The starting point is the child's own body, with concepts such as top, bottom, front, back and left and right. Once the child has understood these, they can transfer the concepts to their surroundings.

3.5.1
Learning where things are in the classroom

At the start of the school year, you should spend enough time teaching the blind child where things are in the classroom so they can find their way around independently. The classroom layout should stay the same, with the desks and chairs in the same places, so the child does not bump into things. If it is necessary to make changes, point these out to the child.

3.5.2
Learning where things are on the page

Even if a child is good at navigating around the room, they may not always good at locating things on a page. The reverse may also be true: a child who is good at braille may find it difficult to locate their own desk.

Here is a list of concepts the child will have to learn.

- Top, bottom, side, front, back, corners, middle
- Left, right, top left, top right, centre left, centre right, bottom left, bottom right
- Horizontal row, vertical column
- First, second, third, etc., last
- The same, different
- Behind, next, following, before, after
- Short, long, open, closed
- Upwards, downwards
- Word, letter, sentence.

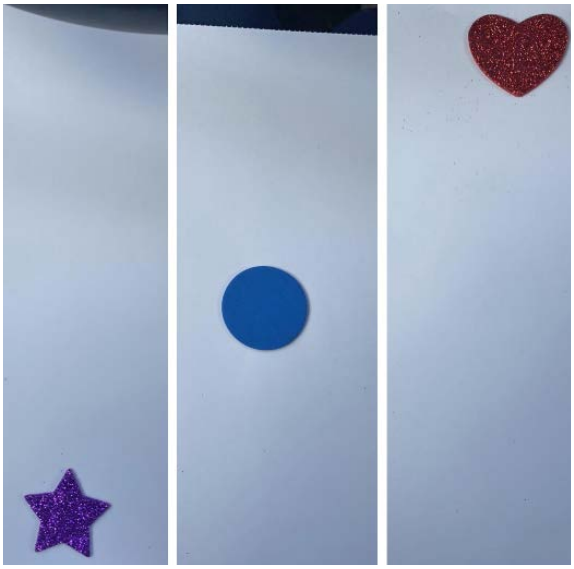
You can help them learn these concepts through exercises and games.

- **Position in relation to the body.** Start with the child's own body: "Put the ball next to you on the table." "Put the bag behind your back."

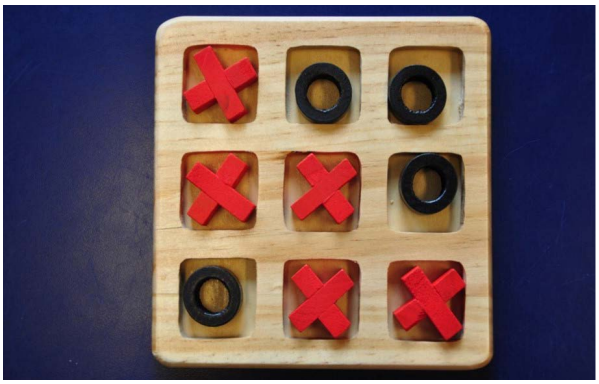
Practising moving objects: "Lift the weight from the right side of your chair and put it on the table next to you."

- **Positioning objects.** Then ask the child to position objects on a tray: "Put the doll beside the horse. Now put it behind the horse."
- **Laying the table.** Get the child to lay the table, putting the plates, knives, forks, spoons and glasses in the right place. Get them to fold napkins and put them next to each plate.
- **Noughts and crosses.** A game of noughts and crosses (tic-tac-toe) is good to practise the memory and sense of location. You can make a board with masking tape, wax sticks or tactile lines. Use beans or buttons as playing pieces.

Table place setting.



Using tactile stickers to mark the bottom, centre and top of the page. You can use smaller stickers to mark lines, page corners and the edges of the paper. Individual braille signs.



Game of noughts and crosses (tic-tac-toe).

3.5.3
Individual braille signs

Braille house

A "braille house" is a doll's house with six rooms, like a braille cell. Ask the child put dolls or other objects in the top left room, the middle right room, etc. Teach the numbering of the rooms: room 1 is top left, room 2 is middle left, as in the braille cell. This numbering will be important when the child comes to learn braille. Put the objects in particular rooms and tell the child you have hidden them. Ask the child to find them and tell you which room or rooms they are in.

1 • • 4
2 • • 5
3 • • 6

A braille house has six rooms, like a braille cell.

Cupcake tray or eggbox
Use a baking tray for 6 cupcakes or an egg carton for 6 eggs to represent the 6 braille cells. You can also make a shallow tray out of wood, divided into six compartments.

To help the child understand the numbering of the braille cell, you can put a number of small objects, such as pebbles or dried beans, into each compartment: one pebble in compartment 1, two in compartment 2, etc.

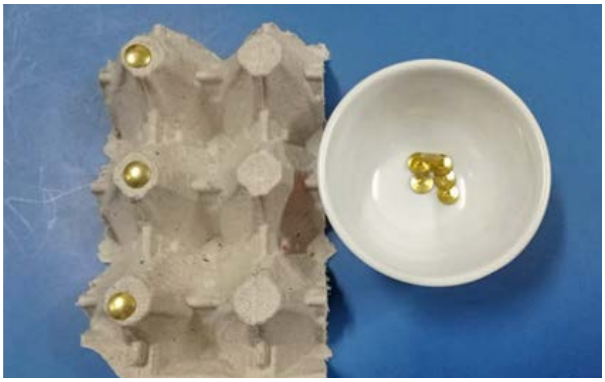
Give the child a pile of these objects and ask them to put the right number in each cell, corresponding to the number of that cell.

Put some plasticine into each cell and make bumps or holes in the cells. Ask the child to tell you which cells have the bumps or holes. Smooth off the plasticine and ask the child to make holes in certain cells.

Put small items such as balls into the cells to teach the child the positions of the bumps in the braille cell. You can put objects or toys that begin with a particular letter into the appropriate cells in the tray or carton.

Using cupcake trays or egg trays to teach the braille dot positions.

Using an egg carton to teach the braille dot positions. You can use objects: here, "e ⠑ is for egg".

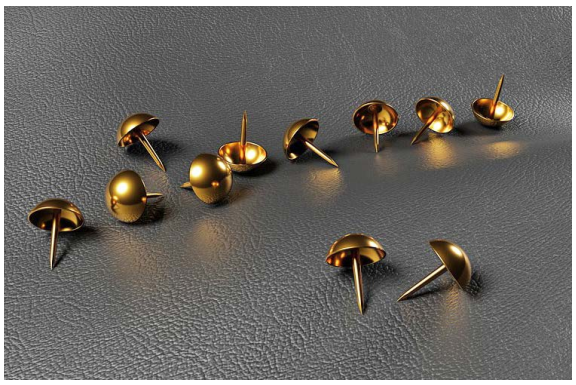


Another way to use egg cartons: use pushpins to form the braille signs.

Nailboard

Once the child has learned about the braille cell, you can shrink the size of the cell so they get used to the idea of different signs and how they are formed.

Drill six holes in the piece of wood to represent the braille cell. Use map pins or upholstery nails (with a rounded head) to represent the bumps. Ask the child to put the pins or nails in the holes to represent each braille sign.



Upholstery nails. Round off the sharp points before using them!

A block used to practise the braille positions.

Home-made nailboard. Drill six holes in a piece of wood. Use round-headed nails or bolts to form the braille signs.

Metal washers glued to a piece of wood. The braille dots are made with magnetic balls.

Beads can be used instead of magnetic balls.

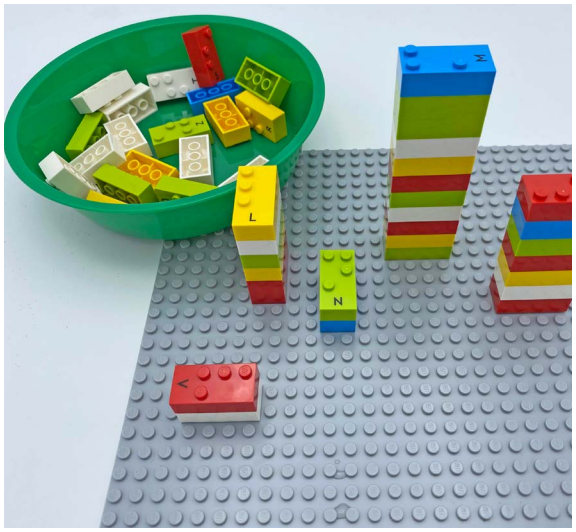
Using drawing pins in a foam sheet, or sewing pins in a sponge to form braille signs.

A braille cell made with plastic bottle caps glued to cardboard. Put beads in the caps to form braille signs.

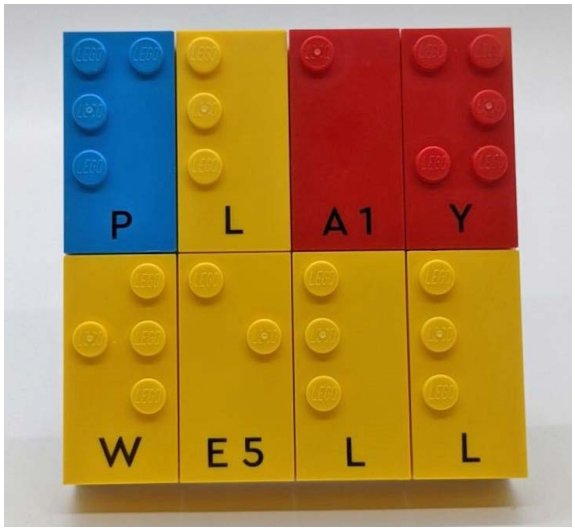
Lego

You can use a knife to cut the surplus bumps off 3 × 2 or 4 × 2 Lego bricks to make braille signs. (You will need a sharp knife – be careful!). Or you can use a combination of thin flat-topped and standard Lego tiles to make the braille signs.

In certain countries, you can apply for a special set of Lego braille bricks from www.legobraillebricks.com/



Lego braille bricks.



The Lego braille bricks use 6 of the 8 studs on a 2 × 4 Lego brick. The meaning of the braille symbol is printed beneath.

Punched holes

Use a hole punch to make braille letters in foam or card.

3.6
Understanding symbols

Sighted children are constantly exposed to a flood of letters and print: on labels, walls, shop signs, packages, books and screens. They come to learn that the shapes they see are letters, and that those letters mean something. Blind children have no such automatic exposure. So you need to actively introduce them to braille, make sure they are aware of it, and teach them how to begin to read it with their fingertips.

Some ideas:

- **Braille corner.** Have an attractive reading corner in the classroom where the blind child can find tactile materials and text in braille.
- **Add labels** to their surroundings. Put braille labels on the classroom walls, windows, doors, chairs, windows, shelves, boxes, books, etc. Label each child's desk with their name (including the desks of the sighted children). Add a tactile line to the left and below the braille to make sure that the child does not read the word upside down.

Put labels on objects used every day: chairs, tables, doors, etc.

- **Physically guide** the blind children to the labels and help them read them. In the preparatory stage, it is not about reading the braille but exposing the child to letters that they can touch.
- If you are the parent of the blind child, label furniture and other objects **around the house** with braille. If you are the teacher, give the parents braille labels they can add to things at home.
- Label the child's **personal possessions** with braille: their bags, books and equipment.

A child's towel with their name in braille. The braille is made by using a paper punch to make holes in foam, then sticking this to the fabric.

- **Read stories.** Read stories to the child, and make the child aware that you are reading from a book. This improves the child's language skills and vocabulary, and emphasizes the importance of the printed word in everyday life. Ask the child questions about the story to exercise their memory and stimulate their imagination.
- **Read from braille.** Guide the child's fingers across some braille and say what it says.
- **Pre-teaching letters.** Once the child can detect the differences between different patterns of braille dots, you (or a teaching assistant) can start teaching the easiest braille symbols (see **Chapter 4**).
- **Telling and reading a story.** Have the child tell you a short story a few sentences long. Type the story in braille, then ask the child to "read" it to you. Let the child pretend to read as they move their fingers across the page, even if they have no idea what the letters and words say.
- **Memory game.** Make a memory game with braille letters on cards.
- **Bingo.** Make bingo cards with 6–9 braille signs. Make small cards, each with one braille sign on it. Put these cards in a bag, then pull them out one by one. Either call out the number, or have the blind child feel the sign and say whether it matches a sign on their bingo card. When all the signs on the card have been matched, the child calls out "bingo!"

3.7 More information

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www.legobraillebricks.com/

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3.7.1
Videos

From braille house to braille letters.
www.statped.no/tactile-reading-2021/recordings-29th-and-30th-april-2021/#plenary-reading-concepts-from-braille-house-to-braille-letter

Braille song: Part 1
www.statped.no/contentassets/7b2d100a22474cabaac538f852a8fcda/braille-song--hokey-cokey-1-sound-and-text.mp4

Braille song: Part 2
www.statped.no/contentassets/7b2d100a22474cabaac538f852a8fcda/braillesong-hokey-cokey-2-sound-and-text.mp4

Videos by Amton Mbangeni of working with individual children in the classroom in South Africa.
https://www.youtube.com/playlist?list=PL9HD6EGAaDRziVdWSM9mgPtUDzL4umqEs $$$VISIO

3.8
Appendices

Appendix 3.1
Checklist for starting to learn braille

Use this list to check the child's skills before they start initial braille, and to identify any areas where the child needs additional support.
Mark each item with a tick if the child can do it. For some items, you will need to test the child by giving them a task to do.

Adapted from: Visio. 2021. Curriculum braille

Checklist for starting to learn braille

Name of child: .....

Date of birth: .....

Age: .....

Setting/group: .....

Vision: Blind ☐ Low vision ☐

Date of completing this list: .....

List completed by: .....

A: Developing the sense of touch:

Ability to identify objects

- Recognizes objects and can name more than one feature (e.g., a large, soft ball) ☐
- Names missing parts of an object (e.g., a chair with 3 legs) ☐
- Recognizes and names objects as being:
  - large or small ☐
  - dry or wet ☐
  - hard or soft ☐
  - warm or cold ☐
- Recognizes and names shapes such as circle, triangle, square ☐
- Recognizes three-dimension shapes such as pyramid, cube, sphere ☐

Ability to match and sort objects

- Can make 1-on-1 relationships (e.g., box with 12 compartments, 1 marble in each compartment) ☐
- Matching objects
  - Matches 4 clearly distinguishable objects (e.g., car, comb, cup, pencil) ☐
  - Matches 4 objects with minimal differences (e.g., spoon, fork, knife, scissors, or 4 animal models) ☐

- Matches 4 objects with the same texture ☐
- Matches 2 equal weights ☐
- Matches 3 objects of the same shape (e.g., dice, buttons) ☐
- Matches 4 objects based on their length (sticks, pieces of rope) ☐
- Matches gross grades of sandpaper ☐
- Matches fine grades of sandpaper ☐

■ Sorting
- Sorts 4 objects based on length (shortest - longest) ☐
- Sorts tactile material based on length (rope, line of braille) ☐
- Sorts familiar objects into categories (toys, clothes, animals, food) ☐
- Sorts cards with braille letters, numbers (without naming them) or different edges (wavy, jagged, smooth) ☐

Ability to remember things they have touched

■ Give the child 3 objects, then take one away. The child can say which is missing ☐
■ Give the child a shape, then ask which of 4 different shapes it was. The child can say which one it was ☐
■ Give the child an object, then ask which of 4 different objects it was. ☐
■ Give the child a line figure, then ask which of 3 different line figures it was. The child can say which one it was ☐
■ Give the child a pattern (e.g., of objects in an egg carton), then ask which of 3 different patterns it was. The child can say which one it was ☐
■ Give the child a bag containing 6 objects. The child can remember at least four of the objects ☐
■ The child can reproduce a simple pattern from memory (e.g., on a pinboard) ☐

Ability to use touch to explore

■ The child uses touch to systematically explore a tray when doing an exercise ☐

B: Using the hands:

Knowledge of their own body

■ Can identify their own body parts by touching them:
- Ear, nose, mouth, chin, eye (face) ☐
- Arm, hand, leg, elbow, knee ☐
- Wrist, thigh, forearm, upper arm, shoulder ☐

■ Can indicate the different fingers of each hand ☐
■ Can name the different fingers of each hand ☐
■ Knows which is their own left and right hand ☐

Ability to use the hands

■ Uses two hands when manipulating objects ☐
■ Uses two hands in a systematic, organized way when:
- Touching objects ☐
- Touching a simple relief ☐

■ Can move the fingers independently ☐

- Spreads fingers while the thumb touches the fingers one by one ☐
- Can drive in nails with a hammer (4 cm long nails with a wide head) ☐
- Can cut a round shape (5 centimetres diameter) along a relief line ☐
- Can hang something on a washing line with a peg ☐
- Can make a ball out of clay ☐
- Can solve a shape puzzle (8 pieces) ☐
- Can thread beads according to a certain pattern (15 beads, 3 different shapes) ☐
- Can make horizontal or vertical lines with pins on a pinboard ☐
- Can put paper into a brailler ☐

Understanding of positions

- Use a ball or another object to test whether the child understands these ideas in relation to their own body.
  - Above, under ☐
  - In front of, behind ☐
  - At the side, in the middle ☐
  - Left, right ☐

Following lines

- Uses 2 hands to find a relief line ☐
- Can follow a line from left to right using both hands (e.g., a line of sandpaper, line of pins, braille line) ☐
- Can find the beginning and end of a relief line ☐
- Can search for the next relief line in a systematic way ☐

C: Language and listening:

Sound and language

- Listens in a focused way for a short period (5 to 10 minutes) ☐
- Can locate a sound source on the table (e.g., a musical box) ☐
- Can locate a sound source in the room (e.g., a radio or alarm clock) ☐
- Recognizes familiar environmental noises (e.g., doorbell, car) ☐
- Recognizes sounds made by objects (e.g., microwave, phone) ☐
- Can tell similarities and differences in sounds (e.g., voices, hard/soft) ☐
- Can imitate a sound on request ☐
- Follows simple instructions ☐
- Understands what these mean:
  - "the same" and "different" ☐
  - "first" and "last" ☐
  - "next" or "following" ☐
- Can express their own ideas or thoughts ☐
- Can understand the relationship between a letter and the sound it makes ☐

Listening

These skills are the same for blind and sighted children.

- Ability to tell the differences between sounds
  - Hears the differences between the letters (e.g.: i-a) ☐
  - Hears the differences between words (e.g., cap-cat, ship-chip) ☐
- Ability to combine and separate sounds
  - Can combine sounds into a word (gluing). E.g., "'b-oo-k'. Which word does that make?" ☐
  - Can separate sounds in a given word (chopping) E.g., "Can you chop up this word into different pieces/sounds?: 'meat'" ☐
- Ability to recognize sounds in words
  - The first sound in a word ☐
  - The last sound in a word ☐
  - Words that start with the same sound ☐
  - Words that end with the same sound ☐
- Rhyming
  - Recognizes rhyming words ☐
  - Can create rhyming words ☐
- Ability to remember sounds
  - Can repeat 4 numbers in the right order ☐
  - Can repeat 4 words in the right order ☐
  - Can repeat sentences of about 6 to 8 words ☐
  - Can remember a specific sequence of sounds ☐

D: Understanding symbols:

- Enjoys playing with and handling tactile books ☐
- Knows that:
  - Written language can be read out loud (is introduced to braille text that is read out to the child) ☐
  - Things don't just have a spoken name but that they can also be written (in braille) ☐
  - Words consist of letters ☐
  - A word can be long or short ☐
  - A sentence consists of multiple words (e.g., can put down a playing block for every word in a sentence) ☐
- Already has some experience with feeling (not yet reading!) braille letters (such as his/her own name, braille labels on familiar objects like his/her own chair or braille books) ☐
- Can step away from the meaning of a word. In other words, can listen to a word as a combination of sounds ☐
- Can repeatedly indicate when a certain word belongs in the sentence ☐
- Can make the distinction between long and short words (e.g., car, refrigerator) ☐

E: Understanding where things are:

Understanding of spatial relationships

- Knows the following spatial concepts and shows this by pointing, touching or putting objects in the right place

	Object	Pinboard or magnetic board	Tactile book	Sheet of paper
- top, bottom	☐	☐	☐	☐
- side, front, back	☐	☐	☐	☐
- corners, middle	☐	☐	☐	☐
- left, right	☐	☐	☐	☐
- top left, top right	☐	☐	☐	☐
- centre left, centre right	☐	☐	☐	☐
- bottom left, bottom right	☐	☐	☐	☐
- horizontal row, vertical column	☐	☐	☐	☐
- first, second, third, etc., last	☐	☐	☐	☐
- the same	☐	☐	☐	☐
- behind	☐	☐	☐	☐
- next, following	☐	☐	☐	☐
- short, long	☐	☐	☐	☐
- open, closed	☐	☐	☐	☐
- upwards, downwards	☐	☐	☐	☐
- word, letter, sentence	☐	☐	☐	☐

- Can copy spatial patterns by sticking pins in a board

- corner	☐	☐	☐	☐
- row	☐	☐	☐	☐
- column	☐	☐	☐	☐
- rectangle	☐	☐	☐	☐
- cross	☐	☐	☐	☐
- diagonal	☐	☐	☐	☐
- triangle	☐	☐	☐	☐

Understanding of braille cell positions

- Understands the spatial positions of the 6 braille patterns. Shows this by placing a ball or wooden pin in an egg carton (or putting doll into the braille house)

☐ top left ☐ top right
☐ middle left ☐ middle right
☐ bottom left ☐ bottom right

- Can name the spatial positions of the 6 braille patterns

☐ top left ☐ top right
☐ middle left ☐ middle right
☐ bottom left ☐ bottom right

F: Numbers and amounts:

- Can count to 20 from memory ☐
- Can count to 10 while pointing ☐
- Can count backwards from 10 ☐
- Can add and subtract up to and including 3 with the help of three objects ☐
- Knows these concepts
  - large/big, small (also larger/smaller/smallest) ☐
  - empty, full ☐
  - more, less/fewer ☐
  - first, second, third, etc. ☐
  - many, little/few ☐

G: Time:

- Can indicate whether it is morning, afternoon, or evening/night ☐
- Knows the days of the week in the right order ☐
- Can use the concepts of yesterday, today, and tomorrow ☐

H: Points to observe:

- Enjoys touching something ☐
- Preferred/dominant hand Left ☐ Right ☐
- Uses both hands ☐
- Uses which index finger Left ☐ Right ☐ ☐
- Uses 6 to 8 fingertips ☐
- Orienting hand (the hand that does the fine manipulation of objects) Left ☐ Right ☐
- Fixing hand (the hand that holds or restrains the objects) Left ☐ Right ☐
- Dosing strength (ability to apply appropriate force: strong when working clay, light when feeling texture) ☐
- Can recognize a simple tactile drawing ☐
- Can recognize and use tactile words such as “soft”, “rough” and “ribbed” ☐
- Uses residual vision ☐
- How long the child can concentrate
  Motivation for learning to read High ☐ Medium ☐ Low ☐

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3.9 Why braille?

I am 53 years old and I have two children. I started to learn braille at the age of 6 years. Because I lost my sight at the age of 3, I had to learn braille as my medium of communication, education and being able to read educational and other materials.

I learned braille with the support of a special-needs teacher specialized in teaching braille using braille slates and braille board at infancy, and I graduated to using a Perkins braille machine.

It is important to learn braille for a person with visual impairment because of the following:

- It is a medium of communication.
- It supports in reading and writing skills.
- It enriches the spelling ability and the ability to write in short form.

It is a good medium especially for those who face challenges in accessing electricity to charge computerized machines especially in developing countries in Africa and other parts of the world.

I use braille for reading and writing various documents related to work or outside work. I also use braille when I am facilitating a workshop or presenting a paper in a meeting or function. I use it at least on a daily basis.

We should not disregard the use of braille even when we have softcopy materials. This is because it checks the reading speed and skills of a person with visual impairment. Instead we need to improve the standard of braille but not introdu introduce so many signs which may confuse the reader.

4. Initial braille

"The child is the syllabus." Each child has different abilities and needs, and these (rather than a set curriculum) should guide you as you start teaching them braille. If a child is not yet ready for initial braille, they may need to stay in the previous class a little longer to build their tactile skills.

It generally takes longer for a blind child to learn braille than for sighted children to learn to read. So if possible, pre-teach the required braille skills before the child starts with the same reading and writing lessons as their sighted classmates.

If this is done right, blind children can close the gap in learning until they are more or less at the same level as sighted children – though they will read more slowly. Braille readers should always be given twice the time to read as sighted children.

Braille readers can catch up with their sighted peers for several reasons:

- **Braille is simpler.** Sighted children have to learn a greater variety of symbols: capital and lowercase letters, handwriting and different printed fonts. Braille is identical for reading and writing (though writing with a slate and stylus is a mirror image of the braille signs).
- **Blind learners train their memory.** Braille learners must exercise their short-term memory much more than sighted children. As a result they often develop a better short-term memory for verbal information.
- **Blind learners spell better.** Blind learners must also rely more on their sense of hearing, which (coupled with a better short-term memory) tends to make them better at spelling than their sighted peers. This may also be because braille is a sequential process: it must be read letter by letter.

4.1 What to teach when?

When teaching initial braille, you must make some basic decisions early on: what order should you teach the braille signs, and should you start with Grade 1 or include contractions (Grade 2) from the beginning?

4.1.1 Reading and writing

Teach reading and writing at the same time. You can first introduce a new letter by showing the child how to read it. Once they have understood this, you can immediately get them to type the letter on the brailler or write it using the slate and stylus.

4.1.2 What order to teach the letters?

Some teachers, and braille reading schemes, teach them in alphabetical order, in groups of five letters: **a–e, f–j, k–o, p–t,** and **u–z**. This has the advantage that the basic upper braille signs (**a–j**), which use the two top rows of dots in the braille cell (dots 1, 2, 4 and 5), are taught first. The other letters (**k–z**) are formed by modifying these letters by adding one or two dots in the bottom row (dots 3 and 6). The punctuation marks are formed by dropping the letters **a–j** down one row.

The problem with introducing the letters in alphabetical order is that the first letters, **a** to **j** all use only the top two rows of the braille cell, That makes them hard for a beginner to tell apart by touch. That is why most teaching schemes introduce the letters in a different order, based on how common they are and how easy it is to distinguish the braille signs. RNIB's *Hands On* teaching series (in the UK) and Visio (Netherlands) use the following order:

Letter order	Braille
abgikl	
cdhot	
emnps	
fruxy	
jqvwz	

The first braille signs in this sequence, **abgikl**, are especially easy to tell apart. This is important because it gives the child a sense of achievement and makes braille seem easy (which, with the right technique, it is).

You can remember this order using the following mnemonic:

abgikl	**A** **b**ad **g**rade **i**mplies **k**nowing **l**ess.
cdhot	**C**ome **d**own **h**ere **o**n **t**ime.
emnps	**E**very **m**an **n**eeds **p**aper **s**ometime.
fruxy	**F**ried **r**ice **u**ses e**x**tra **y**oghurt.
jqvwz	**J**ust **q**uestion **V**iolet: **w**hy **z**ero?

4.1.3
Start with Grade 1, or straight to Grade 2?

Grade 1 braille covers the letters of the alphabet and basic punctuation, while Grade 2 English braille uses wordsigns and other contractions.

Some teachers and reading schemes start off with Grade 1 braille because they argue that this gives a child a better mastery of spelling. And for children who never progress beyond Grade 1 for whatever reason, Grade 1 will give them the basic skills they will need to read signs and labels.

Other teachers point out that almost all braille books in English use contractions, and that most children have no problem learning them. Plus, using contractions makes it easier to produce more interesting reading materials early on, since words such as **and, go, have, like, the** and **you** are all represented by single characters.

If you are teaching braille in a language other than English, you should teach the letters in the order most appropriate for that language.

Box 1. Hands On

The *Hands On* series produced by the Royal National Institute of Blind People in the UK teaches a combination of Grade 1 and parts of Grade 2 braille from the start. It groups the letters into five levels. It introduces the signs in the following order.

Level 1

Letters	a	b	g	i	k	l	
Wordsigns		but	go			like	for
			good			little	

Level 2						
Letters	c	d	h	o	t	
Wordsigns	can	do	have		that	and
Level 3						
Letters	e	m	n	p	s	
Wordsigns	every	more	not	people	so	the
Level 4						
Letters	f	r	u	x	y	
Wordsigns	from	rather	us	it	you	
Numbers	1	2	3	4	5	
Punctuation	capital	full stop	question mark		comma	

Level 5					
Letters	j	q	v	w	z
					
Wordsigns	just	quite	very	will	as
					
Numbers	6	7	8	9	10
					
shop.rnib.org.uk/hands-on-braille-course-teachers-handbook-89866					

4.1.4
Sight words before alphabet?

Sighted children often recognized common words, such as their own name, before they have mastered the alphabet. The same is true of blind children learning braille. They can recognize the word from its shape rather than by identifying the individual letters it contains. This makes the teaching of the individual letters easier, as you can point out that the child already knows a particular letter because it is part of their name.

4.1.5
Guidelines on what to teach when

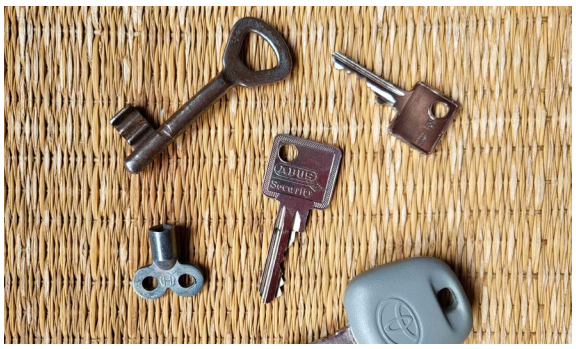
The answers depend on several factors.

- What are the child's abilities and interests? If a child has other disabilities, they may find it difficult to learn quickly. If they have strong early literacy skills, they may be ready to take on more challenging tasks earlier.
- What does the curriculum in your country or school specify?
- What are the other children in the class learning? While blind children are normally taught braille separately from a mainstream class, they should participate as far as possible in all other class activities, including reading and writing. Where possible, the braille teaching should enable them to take part in these activities. You may decide to teach the braille signs in the same order that the sighted children learn so that the blind children can take part in the same lessons.
- What teaching materials (such as braille reading books) do you have available? If you have early reading books that use contractions, you should teach these from the beginning.

4.2
Teaching letters

4.2.1
Introducing objects

Make a collection of small objects or toys that the child can grasp and feel their shape and texture. Some objects are themselves small enough to use. Examples are pebbles, dried beans, shells, pieces of string, and pencils. Make sure that the objects you choose are not sharp or easily broken. For small children the objects must be large enough so they cannot be swallowed.



Make a collection of small objects that the child can use to learn shapes and letters.

To represent larger items, you may be able to find toy animals, fruit and vegetables, vehicles, etc. Dolls come with miniature clothes and accessories. Search around the house or classroom for objects you can add to your collection.

You can also make your own figures out of clay, plasticine or wood, or a mixture of flour and water baked in the oven. Ask someone skilled in woodwork to carve objects for you. Appendix 4.2 lists some suggested items to include.

Introduce these objects gradually and tell the child what they are. Encourage them to explore the objects and familiarize themselves with each one. Make sure they know that the models or toys are smaller versions of the real thing. For familiar items (a real banana compared to a toy), this is easy for a child the appreciate. For unfamiliar objects, you will need to explain more ("A real elephant is very big!").

Associate each object with its name ("This is a carrot"), the sound it makes ("A cow goes moo") or other characteristic ("A lion is fierce!", "A cake is yummy").

4.2.2
Tactile drawings of objects

Make simple tactile drawings on pieces of wood or card. Start with familiar shapes or objects, and help the child to match the 3D object to the 2D representation of it. Useful items to start with:

- Simple geometrical shapes (circle, square, rectangle, triangle, X)
- Faces, parts of the body
- Human figures, animals, common household objects (cup, banana)

Remember that a blind child who has never experienced something directly may find it very difficult to understand a 2-dimensional representation of that object.

4.2.3
Relating objects to their initial letters

Once the child is familiar with what the first few objects and shapes are, you can start associating them with the sounds of their initial letters.

- Introduce each object by its initial sound: "A is for apple", "B is for bag".
- Put a set of objects that begin with the same letter in a group. Explain that "elephant", "egg" and "envelope" all begin with the sound e (use the letter's sound rather than its name: say "eh" rather than "ee").
- Put a selection of objects in a group and ask the child to find all those that begin with a particular sound.
- Ask the child to sort a pile of objects into separate piles for each sound.
- Ask the child to name several items in the classroom that begin with a particular letter (**desk, door, drawer; pen, pencil, pot, paint**)

Some letters can represent different sounds, and English spelling is famously irregular.
Some examples:

- **C** may be hard (as in **cat**), soft (as in **cell**), or part of the **ch** sound.
- **G** may be hard (as in **get**), soft (**gem**) or silent (**thought**).
- **S** may sound like an s (**see**), a z (**is**), or part of the **sh** sound.
- Vowels are especially tricky as they may change their sound (**cat, car, cane; do, dot, door, dome, done**).
- You can explain that vowels are "magic" letters that can change the sound they make. **H** is also magic because it changes the sound of a C, G, P, S or T when it follows one of these letters.

Learning these differences is a challenge for sighted children too. It is best to avoid words with non-standard sounds in the initial stages of teaching children to read.

4.2.4
Introducing letters

Introduce the braille sign in association with the first letter of an object: "This is a **b** for **ball**". Say the sound the letter makes, not the name of the letter (b is **beuh**, not **bee**).

Introduce each braille sign on its own, without any other signs. Then give the child a line of the same sign so they can practise feeling it.

First, use the braille house, cupcake tray, nailboard or Lego bricks to teach the child the positions of the dots in the new sign (see **Chapter 3**). Then present the sign itself in normal braille, for example on a flashcard.

From there you can progress to exercises where the child can practise feeling the sign, distinguish the new sign from other braille signs, and name the new sign along with signs they already know. See the sections on Flashcards and Worksheets for ideas.

As you teach each letter, also teach the child how to write it on the brailler or on the slate and stylus. This is vital reinforcement for the child to remember the pattern of each braille sign.

Use the same procedure when introducing each new letter so the child knows what to expect and can build on and practise their existing knowledge.

Demonstrating braille reading using the hand-over-hand technique.

4.2.5
Letters and dot positions

Help the child learn the dot positions for each letter.

"Dot 1 is **a**" ⠁

"Dot 1, 3, 4 **m**" ⠍

Memorizing the dot positions is important to enable the child to write using a brailler and to learn new braille signs as they are introduced.

4.2.6
Letter descriptions

You can help the child to learn the dots by using memory aids:

"One dot all alone" is an **a** ⠁

"Two dots next to each other" is a **c** ⠉

Appendix 4.1 lists some descriptions of what braille letters feel like. Some of them draw attention to the relationships between the letters **a–j** with **k–t** (with the extra dot 5) and **u–v** and **x–z** (extra dots 5 and 6).

4.2.7
Distinguishing letters

Teach the child identify letters and distinguish them from each other. You can do this by preparing worksheets with particular tasks, such as finding a particular letter in a row.

Avoid introducing letters that are mirror images of each other at the same time. When you do introduce the second letter, point out the similarity and give the child extra practice in recognizing them.

e	i	d	f	h	j		
m	u	n	z	p	v	r	w

Other signs in advanced braille (see **Chapter 5**) are also mirror images of letters that the child will already know. For example:

y	&	q	er	s	wh	t	ou

Mirror images are particularly a problem:

- If the child is using a slate and stylus to write (since the mirror images of the signs must be written)
- With numbers, since unlike in words, the child cannot rely on the context to work out what the correct number might be.

Punctuation signs may be confused with the letters **a–j** since they are lowered versions of the same patterns.

4.2.8
Letters and words

With a few letters, you can start making words. The words you can make will depend on the order in which you teach the letters. After you introduce each letter, give the child practice in reading it as part of words. At first, there are only a few words you can make with the small number of letters you have introduced. You can ask the child to identify "silly" words instead of real words (**Table 1**).

Table 1. First words and silly words

Words including only these letters:		
	abgikl	**abcde**
Real words	a, ali, all, baa, bag, ball, bib, big, bill, gag, gall, gig, i, ill, lab, lag	a, ace, add, baa, bad, bade, be, bead, bed, bee, cab, dad, dead, dee
"Silly" words	aaa, ab, aba, abi, ag, aga, bab, bibi, gabi, gaga, gib, gigi, kab, kag, kai, kali, la, lala, lib	aaa, ab, aba, baba, bebe, caba, ca, caca, cad, daba, daca, dada, dede

As the child learns more letters, the number of real words you can make will increase. See **Appendices 4.1** and **4.6** for lists of words you can make with a limited selection of letters.

4.2.9
Using a controlled vocabulary

Try to avoid introducing words with irregular spelling (such as **one** and **knife**) until the child had grasped the concept of each letter relating to a sound.

English uses certain combinations of letters to form sounds that do not appear in the alphabet. Examples are **ch**, **sh** and **th**. Many of these combinations are represented by a single braille sign in Grade 2 braille.

English spelling is also irregular. For example, the combination ea may sound like **ee** (as in **bead**) or **e** (as in **dead**). Introduce this idea separately, as you would in a reading class for sighted children.

4.2.10
Repeating exercises

Practice makes perfect. Repeat exercises with the child so they become familiar with and internalize the concepts taught.

4.2.11
Contractions

A child may come across a word that uses letters you have not yet covered, or that uses grade 2 contractions even if you are not teaching them. For example, they may find them in a story book or in the braille labels around the classroom. Explain the letter, sign or word to them and give them examples of how to use it. Keep a running list of contractions that the child has learned so you can reinforce them.

4.2.12
Single or double spacing

To begin with, emboss each letter individually, with one or two spaces separating it from the next letter. Double- or triple-space the lines of braille. This enables the child to concentrate on the new letter without any distractions.

Later on, you can reduce the amount of space between the letters and the lines, as in normal braille.

4.3
Making words

4.3.1
Break words down, then build them up again

When you introduce a word, break it down into its individual sounds:

> bag is b... a... g...
> big is b... i... g...

Then build the word up again from its parts:

> What word does b... i... g... make?
> What word does b... a... g... make?

4.3.2
Make it real, make it fun

Make learning braille fun! While it is important to have a routine, do not let this become monotonous and boring. Vary the materials you use, and make your own materials as required. Braille sessions should be short but frequent.

Combine reading and writing with activities and games. For example, when you are teaching the word ball, do not just teach the letters **b**, **a** and **l**. Give the child balls of different types to feel and to play with to reinforce the word. If a story is about cookies, promise the child a cookie at the end.

Where possible, match the words the child is learning with a physical object (**ball, bag**), action (**kick, lick, tap**) or position (**on, up, left**). Or use tactile objects to represent certain words. A furry shape can represent the word **cat**; a large tactile square can represent **big**.

When reading a story, ask the child to find a particular word in the braille version:

> "Where is the word "ball" in this line?"

This exercise, made using swell paper, says "big bag, little ball, little bag, big ball". It uses the ⠇⠇ contraction ("ll", meaning "little").

4.3.3
Finding initial sounds and rhymes

Ask the child to tell what other words begin with a particular letter.

> "What words begin with b..., like ball?" (big, bad, balloon, bell, Betty)
> Which of these words begins with the sound b? Big, cat, ball."

You can also ask the child to identify rhymes, or give you other words that rhyme with a particular word.

> "What other words rhyme with cat?" (bat, mat, sat, fat...)
> "What other words have an "e" sound in them?" (get, bell, jelly...)
> "What other words end in "m"? (warm, him, thumb)

4.3.4
Matching objects to braille

Have a set of small objects (see the list in **Appendix 4.2**), Prepare a set of cards with the names of each object in braille. Ask the child to match the objects with the correct card.

Make a box full of small objects and cards with their names in braille. Get the child to match the objects with the braille text.

4.4
Making phrases and sentences

With a few letters, it is possible to build simple phrases and sentences. Appendix 4.5 and 4.7 list some sentences you can make with the first few letters taught. The more letters that the child has learned, the more words it is possible to make.

4.4.1
Using wordsigns

In Grade 2 braille (see **Chapter 5**), almost all the letters of the alphabet are used as common words when they stand alone. The exceptions are **a**, **i** and **o**, which are also words in their own right.

If you teach wordsigns at the same time as the letters (as in the RNIB *Hands On* series, Box 1), you can make more interesting sentences, such as:

> a [little] ball
> a big ball [for] ali
> i [like] bill
> a [little] bag [for] ali

If you teach wordsigns from the start, you should also teach the child how to spell out the words they represent. This will be possible only after you have introduced all the letters in the word.

4.5 Capitals and punctuation

4.5.1 Initial punctuation

Several braille signs are essential at an early stage in learning braille. These are:

capital	full stop	comma	question mark	number sign
.	,	?	#	
				
	lowered d	lowered a	lowered h	backwards v

Teach the child that a capital letter  always comes at the beginning of a sentence. If you find a capital sign in the middle of a sentence, the next word is a name.

A full stop  comes at the end, and is always followed by a capital letter.

4.5.2 Other punctuation

You can introduce the remaining punctuation marks as needed – for example when they appear in reading material.

Help the child learn these as lowered versions of the corresponding letters.

The  sign can be a question mark (if it follows a word) or an open quote mark (if it comes at the beginning of a word).

semicolon	colon	exclamation mark
;	:	!
		
lowered b	lowered c	lowered f (or backwards full stop)

parenthesis (open and close)	open quote (or question mark)	close quote
(or) 	" or ? 	" 
lowered g	lowered h	lowered j
apostrophe	hyphen	dash
' 	- 	– 
a on bottom row	c on bottom row	a c on bottom row

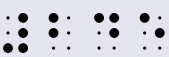
4.6 Numbers

4.6.1 The number sign

Sighted children generally first learn the number symbols first, before they learn the letters. With blind children this is the other way around, since the numbers are formed by the number sign  followed by one or more letters **a**–**j**.

1	2	3	4	5
				
#a	#b	#c	#d	#e
6	7	8	9	0
				
#f	#g	#h	#i	#j

Numbers higher than 9 are formed by a single number sign followed by two or more braille signs.

10	11	20	245	2022
				
#aj	#aa	#bj	#bde	#bjbb

Numbers can be confusing for the child because the number of dots bears no relation to the number being represented.

Accuracy with numbers is particularly important as it is not possible to correct mistakes from other clues in the text.

Explain that the number sign ⠼ is a magical sign because it turns the letters after it into a number.

4.6.2
Teaching numbers

If you are following the **abgikl** order, you can introduce the numbers 1–5 after you have reached the letter **e**. You can introduce the numbers 6–10 when you get to the letter **j**.

If you are teaching the letters in alphabetical order, you can teach the number signs after you have reached the letter **j**.

You can use objects, flashcards and mini-worksheets to teach the numbers.
After you have taught the numbers from 1 to 10, you can go on to teach 11 to 20, and so on. You can also introduce the concept of zero as part of arithmetic.
See **Appendix 4.10** for some exercises on numbers and simple arithmetic.

4.6.3
Arithmetic

For arithmetic, the child will need to learn the following braille signs.

Explain that the arithmetic operators consist of the ⠢ sign (in Unified English Braille) plus a lowered letter or punctuation sign (if they have already learned these).

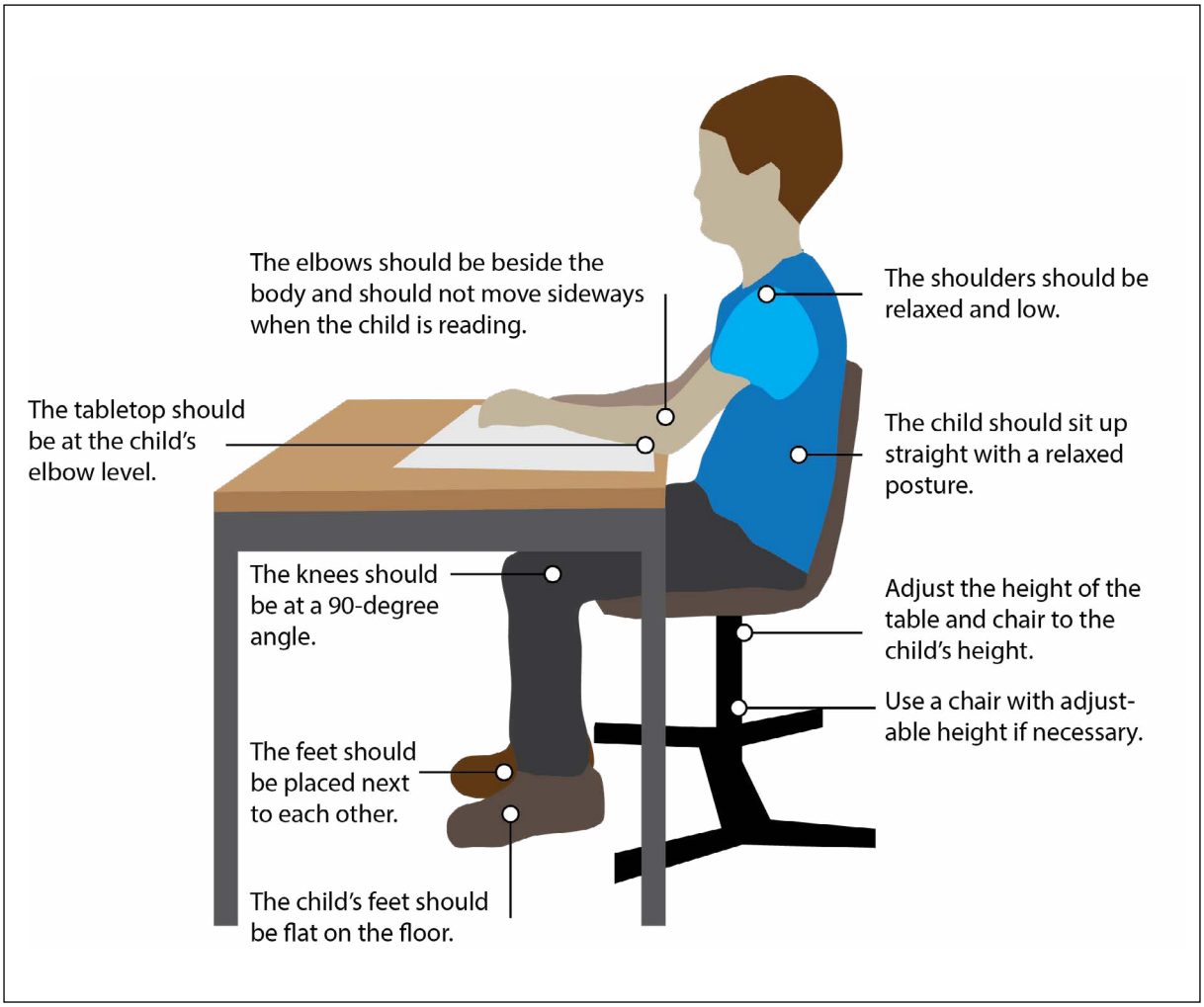
In British braille, the ⠔ sign is used instead of ⠢

number	plus	minus
#	+	–
⠼	⠢⠖	⠢⠤
backwards v ⠩	⠢ with lowered f ⠋ (or exclamation mark)	⠢ with c ⠉ on the bottom row (or hyphen)
multiplied by	**divided by**	**equals**
×	÷	=
⠦	⠲	⠶
⠢ with lowered h ⠓ (or question mark)	⠢ with lowered d ⠙ (or full stop)	⠢ with lowered g ⠛ (or parenthesis)

4.7
Practising reading

4.7.1
Sitting posture

Reading braille does not just involve the fingertips. It is important to have the right posture to avoid strain on the back, neck, shoulders, arms, wrists and hands. It also helps the child concentrate.



The correct sitting posture.

A blind child cannot see the correct posture, so you must tell and show them how to sit properly. Help them become aware of their posture and develop a habit of checking it and practising it. Altering the posture can lead to mistakes when reading or writing braille. Such mistakes are mainly position errors, like confusing the **k** ⠅ with two **a** signs ⠁ ⠁

4.7.2
Warm fingers

Cold fingers are less sensitive, so if necessary, get the child to warm up their fingers before starting to read. Teach them to do finger exercises – flexing the fingers, touching each finger in turn to the thumb, etc.

It is important for the fingers to be warm before starting to read braille.

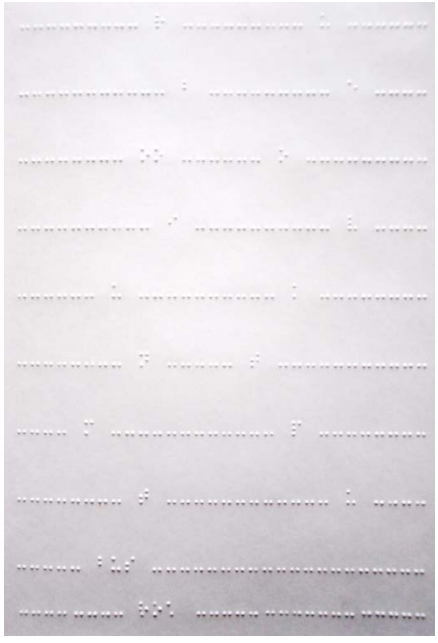
4.7.3
Movements while reading

Guide the child to read the letters in the right order, from left to right in each row. The finger movement should be from left to right, though a child may need to backtrack to check on a letter they have forgotten or misunderstood.

Guide the child's hand using the hand-over-hand technique, and by giving instructions and explanations as the child is reading.

Make sure that the child first explores the page with their fingers to discover what in general it contains. They should then start at the top left, moving from left to right along the row of text. When they reach the end of the line, they should track back with the fingers to find the start of the next row. To make this easier, double- or triple-space the early reading materials.

Reinforce this habit by practising concepts like **first, next, last, behind, after, left, right, front, end, and down**.



Finding and reading letters and words on a line.

4.7.4
Using both hands

The fingers should apply only a light pressure. The fingertips beneath the nail must not turn white.

It is best to read braille with both hands. Blind children are often late in developing the ability to move their hands separately. They should start reading with symmetrical hand movements, moving both hands along the line of braille, feeling with six (or eight) fingers (the thumbs are not used).

When they are older, the child can learn how to move from one line to the next by moving the hands separately: the left hand reads the first half of the line, then reading the second half with the right hand while the left hand moves to the start of the next line.

Teach the child to read with both the left and the right hand, for example by occasionally getting them to read with one hand only.

With practice, while the right hand reads the rest of the previous line, the left hand can move back to the start of the next line.

4.7.5
Backtracking and scrubbing

Reading braille fluently requires a smooth movement along the line. It may be necessary to backtrack sometimes to check on the meaning: this may mean that the child is focusing on the meaning of the text. If the child does not recognize a letter or word, they should not make vertical or circular movements (called "scrubbing") but move the fingers to the left and try again.

Too-frequent backtracking may mean that the reading material is too difficult for them. Scrubbing movements may mean that the child needs more practice in recognizing particular braille signs.

4.7.6
Correct finger position

Show the child the correct finger position – all in a line so each finger can feel the same line of braille characters. You can use a ruler or the edge of a book to help the child learn the correct curvature for their fingers.

Show how to read braille using the hand-under-hand or hand-over-hand techniques as you move the hands down the page.

The fingers should all in a line so they can track the braille characters.

4.7.7
Reading out loud

Ask the child to read a text out loud in front of their classmates. Doing this correctly will build the child's confidence and gain the respect of their classmates.

4.7.8
Memory

Blind children in particular may come to rely on their memory. For example, they may recite a story from memory rather than by actually reading the braille signs. After a child has read a story or done an exercise several times, get them to turn to a random page and tell you what it says. Check that their fingers are actually on the correct word when they say that word.

Shuffling flashcards also forces the child to read what is written rather than repeating it from memory.

4.7.9
Pace and accuracy

Accuracy with braille is more important than with printed text because braille is sequential: it is much more difficult for a blind child to go back to check something, and to get an overall impression of the meaning of a text. The child must learn to be accurate and methodical. Set the bar high. Praise the child for their care and accuracy in reading and writing, and in themselves checking and correcting any errors they make.

Once the child has learned how to read braille accurately, you can shift the focus to increasing the speed with which they read.

4.7.10
Paper or refreshable display?
It is important for the child to learn to read multiple lines of braille, and learns the concepts of sentence, paragraph, page, chapter, and book. So give the child as much practice as possible with reading braille on paper and in books rather than on a refreshable braille display.

4.7.11
Managing reading materials
If you use a ring binder to hold braille materials, take each sheet out of the binder before giving it to the child. Mark each item in printed text and in braille to make it easy to find. Organize items in sections in the binder, and mark the sections with braille and text.

Use a bookmark or paperclip to mark the place where the child has reached.
Cover part of the text with a piece of carboard to make it easier for the child to find their place.

4.7.12
Organizing work and space
Help the child organize the items on their desk. This is especially important if they are reading and writing at the same time (for example, copying text from an exercise).

4.8 Writing

Sighted children generally begin writing by forming shapes and symbols as part of their drawings. They may scribble while drawing, and sometimes they the tell you what they have "written". This scribbling develops the finger strength and control that will allow them to make recognizable shapes.

The same is true for writers of braille. Just as sighted children benefit from scribbling, blind children need the same opportunity. They can use a Perkins brailler or a slate and stylus to start "scribbling". You can start teaching the braille signs when the child starts to form recognizable shapes in their scribbling. This shows their fingers are now strong and they can control them. It is important for the child to have developed the sensitivity and fine motor coordination so they can write braille.

4.8.1
Brailler or slate and stylus?
A brailler and slate and stylus are different tools for writing, like a pencil, pen and keyboard for sighted children. Just like sighted children should learn how to write with different tools, so should blind children.

Pencils, pens and keyboards are used in different situations. The same is true of brailler and the slate and stylus: a slate and stylus is useful to make notes (like a pencil), while the brailler is used to write longer texts (like a keyboard).

If a brailler is available, it is best to teach it first. You can introduce the slate and stylus when they have learned the basics of the brailler.

Once the child has mastered the brailler or slate and stylus, you can introduce electronic input and

display devices such as a computer keyboard. The tactile display of an input device shows only one line at a time. This brailler and slate and stylus both give the child a much better idea of braille being written in the form of text written from left to right and from top to bottom, in the form of paragraphs on pages in books.

Chapter 7 has details on the various types of equipment used to write and read braille.

4.8.2
Brailler

Introducing the brailler

The Perkins is the most common type of brailler (see **Chapter 7**). Explain the parts of the brailler, and show the child how to feed the paper in and take it out, and how to position the embossing head.

Show them how the brailler works: that pressing a key embosses a mark in the paper. Demonstrate that pressing different keys embosses dots in different positions, and that several keys can be pressed at the same time to create several dots in the same braille cell.

Explain the margin knobs towards the back of the brailler. These knobs make the bell ring at the end of the paper. It is important to set these correctly because otherwise the last part of the sentence will go off the end of the paper and will be lost.

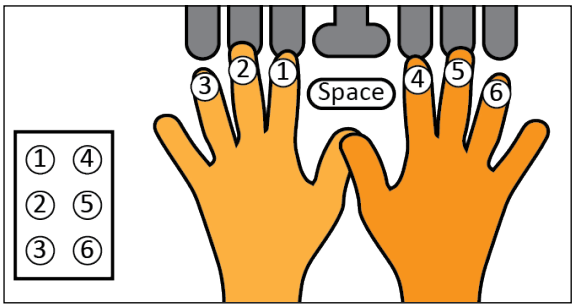
Put a felt pad under the brailler to dampen the noise it makes.

Using a Perkins brailler.

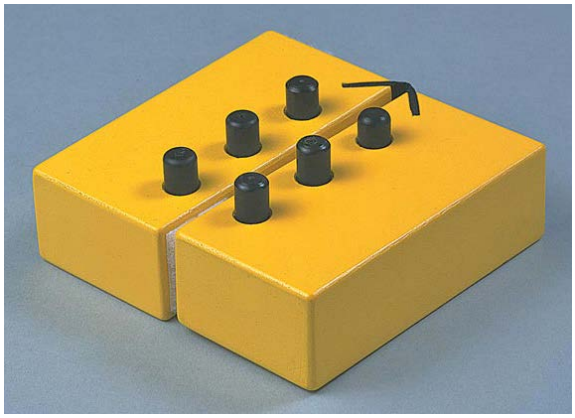
Scribbling
The child can start using the brailler before they have learned the braille signs – in the same way that sighted children learn how to use a pencil long before they learn how to write letters. Playing or "scribbling" with the brailler is a good way to introduce a child to the braille dots and the functioning of the brailler.

Get the child to type a few lines on the brailler. Ask them to tell you what they have written.

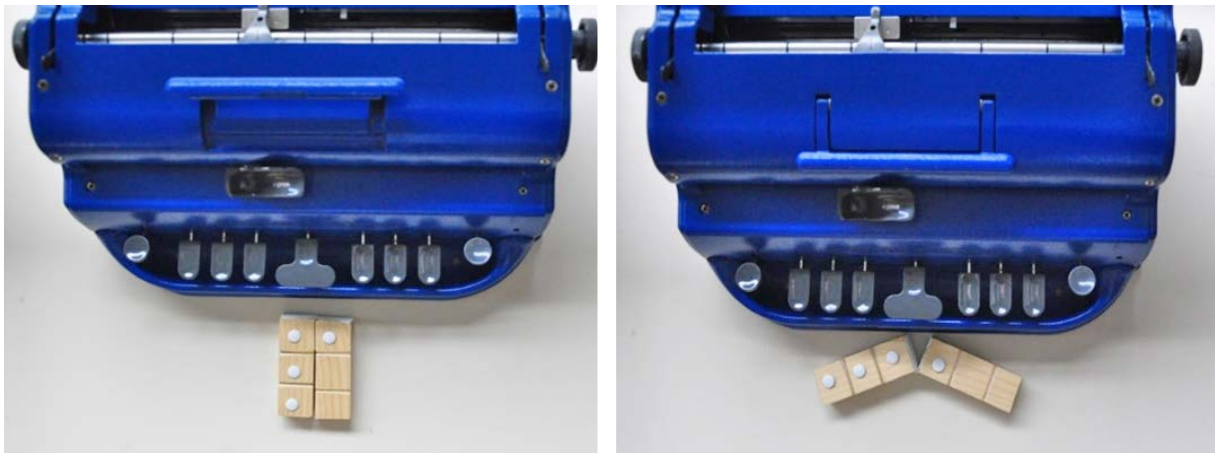
Relating dot positions to brailler keys and fingers
The child must learn that each key relates to a particular dot position, and that they must use a particular finger to press each key.



Fingering for the Perkins brailler.



This braille cell block opens up to show the relationship between the braille dots and the keys on the brailler. The pegs are removable to depict different braille signs.



Using a braille block together with a brailler.

Practise this with exercises: get the child to type a row of dot 1 with the index finger of the left hand, then dot 4 with the index finger of the right hand, and so on.
Then get them to write a line alternating dots 1 and 4, and then more lines alternating other combinations of dots.

The child can then practise pressing particular combinations of two keys at once, then three key, and so on up to all six keys.

Braille song
Children enjoy practising using the brailler by following the "braille song". This guides the child to press each key on the brailler in a rhythm: dot 1, dot 2 etc. up to dot 6. This song helps the child to become familiar with the keys and the fingers to use for each key. See the *References* section for where to find these songs online.

Finger exercises
Using the Perkins brailler requires a certain amount of finger strength and coordination. It will take time before the child can develop the necessary strength in all the fingers especially the ring fingers, which tend to be weaker. Moving the fingers independently of each other is also a skill that they must learn.

Electronic braillers such as the Mountbatten require a lot less finger strength to operate. Braille signs that use dots 1 and 3 (such as **k** ⠅) or 4 and 6 (such as **x** ⠭) can be difficult to type because the middle fingers (on keys 2 and 5) does not press a key. Teach the child to put the middle finger "in the basement" (below the key) rather than trying to hold it up above the key.

Adults use their thumb to press the spacebar, but this is difficult for small children. They often choose to use an index finger instead. They can switch to using their thumb later when it has grown larger and stronger.

Give the child exercises to do, both in using the brailler and in exercising and flexing the fingers.

Teaching the letters
Once the child has mastered the mechanics of the brailler, you can use it to teach the letters. Start teaching the child how to write the letters at the same time as they are learning to read them. Teach how to write the letters in the same order as the child learns to read them.

Give the child writing exercises: type a line of **a** ⠁, then **b** ⠃, and so on. See **Appendix 4.8** for exercises using the abgikl order, and **Appendix 4.9** for alphabetical order.

Once the child has mastered how to write the individual letters, they can start writing numerals, words and sentences. They can practise by copying letters or words on (mini) worksheets. Give dictation exercises with letters, words and sentences, as you would with sighted children.

Correcting work
Teach the child how to check and correct their work on the brailler – either by typing a full braille cell over the mistake, or by using a braille eraser.

Show how to remove the paper from the brailler, read and check the text, detect and mark mistakes, put the paper back into the brailler and correct the error.

4.8.3
Slate and stylus

Introducing the slate and stylus
Start with a small "pocket" slate rather than a full-size A4 slate.

Show the child the slate and stylus and explain how it works. Show them how to put in the paper and close the slate so the paper is held by the pins the slate. Teach the child not to open the slate too wide to avoid breaking the hinge.

Show the child the windows in the top of plate of the slate, and the indentations in the bottom plate (these are hard to feel with the fingertips but easy to detect with the stylus).

Show them how to load paper into the slate and press it shut so the pegs on each side hold the paper in position. Show them how to use these pegs to reposition the paper in the slate, either to make corrections or (on pocket slates) to move the paper up to braille more lines.

Show the child how to hold the stylus vertically and punch holes in the paper. Show them how to choose which of the six holes in each cell to punch.

Don't say "backwards"
The slate and stylus require the write to write on the reverse of the paper, and then turn it over to read what they have written. This can be confusing and lead to the child mixing up asymmetrical letters. Despite this, most children pick up the idea quickly and have no problem applying it correctly.

Do not use the word "backwards" to describe writing with the slate and stylus. The braille is written in exactly the same order as it is read, but in mirror image, starting from the right side of the slate. Teachers of sighted children do not explain a **d** as a backwards **b**.

Instead, explain that you "write first what you read first". Use words like the "starting side", "first column" (or "first side" – dots 1, 2 and 3), "second column" (or "second side" dots 4, 5 and 6), and "direction of travel".

Practising writing
The child can start practising with the slate and stylus before they start learning the letters.

Teach them to locate and emboss each of the six dots individually and in combination. Teach them the positions of the dots in relation to the direction of travel.

Reading braille	Writing with slate and stylus
Direction of travel →	Direction of travel ←
1 • • 4 2 • • 5 3 • • 6	4 • • 1 5 • • 2 6 • • 3

Get the child to write lines with certain individual dots: all dot 1, all dot 2, alternating dots 1 and 2, a combination of dots 1 and 5, etc.

Get them to practise punching all six dots in a braille cell. Get them to punch a whole line of all six dots ⠿

After each exercise, take the paper out and turn it over so they can read their work.

Teaching the letters
Start teaching the child how to write the letters at the same time as they are learning to read them. Introduce each letter in turn, in the same order as they are learning to read them.

Ask the child to punch one dot per cell – in the top right corner. Take the paper out and show them that this is the letter **a** ⠁

Get them to punch one, two or three dots per cell in a vertical column on the right side of the cell. Take the paper out and show them that they have written the letters **a** ⠁, **b** ⠃, **k** ⠅, and **l** ⠇

Practise producing other letters, both symmetrical letters such as **g** ⠛ and **c** ⠉ and asymmetrical upper letters: **d** ⠙, **e** ⠑, **f** ⠋, **h** ⠓, **i** ⠊, and **j** ⠚

Introduce writing the other letters as the child learns to recognize and read them.
Encourage the child to scribble using the slate and stylus, and to use it to make tactile pictures: a line of dots, a square covering several rows, a triangle, and so on.

Finding the place
Teach the child to start brailling in the same place each time (on the top row at the far right). Then how to work their way across counting the windows (slates have raised dots every four or five cells to help with navigation). Show them how to count the dots and rows so they can remember where they have got to in writing.

Worksheets will require the child to fill in an answer in a specific place. Teach the child how to locate this and find the correct place in slate to start writing the answer.

Correcting work
Show the child how to remove the text from the slate, check it for accuracy, and erase mistakes, either using a braille eraser or by brailling all six dots over the error.
Some exercises require the child to skip lines so the teacher, or the child, can write corrections on the empty lines. Teach the child how to do this.

Writing words and sentences
Once the child has mastered how to write the individual letters, they can start writing numerals, words and sentences. They can practise by copying letters or words on flashcards, mini-worksheets or worksheets. Give dictation exercises with letters, words and sentences, as you would with sighted children.

As they gain proficiency, they can start taking notes in class and using the slate and stylus in daily life.

4.8.4
Correcting work

Teach the child how to check and correct their writing immediately after they have written something.

Discuss the exercise with the child and explain the errors they have made. At first, do not expect the child to produce perfect copy. Just like sighted children, they may use invented spelling, cross out what they have written, repeat words or sentences. Focus on a few points that are important for the child's stage of development.

If appropriate, ask the child to retype the exercise to correct the mistakes. When they have produced a fair copy, punch holes in it and add it to a ring binder of their work.

Correction techniques

Ask the child to double-space exercises and text so you can add corrections above the line.

You can use sticky labels of various shapes to show where the corrections are needed. Either enter the corrections yourself above the line using braille, or get the child to do so. Table 2 has some suggestions for tactile correction marks you can use.

You can cover unwanted words and sentences with masking tape and you (or the child) can braille new text directly on it.

Where possible add the labels within the line of braille itself so the child will notice it when they are brailling the final copy.

If you are the teaching assistant, transcribe the text above each line of braille so the classroom teacher can read it and mark it, and so the parents can see what their child has done.

Table 2. Tactile correction marks

Correction:		Mark:
Capital letter		Wide graphic art tape
Punctuation mark		Small circular sticker
New paragraph		Star sticker
Corrected spelling		Label
Space needed		Narrow graphic art tape
Insert		Wide graphic art tape
Cross out		Piece of masking tape

4.9 Teaching aids

4.9.1 Flashcards

Flashcards are a good way to learn braille signs and words. You can make your own or buy commercially available cards. You can make flashcards out of index cards. To make them more durable, use plastic cards or affix adhesive braille labels. Trim the top right corner (or punch a hole in it) so the user knows which way up to read the card. Write the letter or word on the card in ink so parents can help their children learn. You can make flashcards containing individual letters (**a, b, c,** etc.), syllables or letter combinations (**at, all, ba, ck...**) or whole words (**cat, ball, gab, back**).

Adding braille

- **Candlewax.** Make your own flashcards with large tactile braille signs using a Q-tip dipped in melted candlewax.
- **Braille labels.** Use a Dymo brailler to print braille onto sticky tape, then stick this onto the cards.
- **Slate and stylus.** Use a brailler or a slate and stylus to add braille to the flashcards.
- **Commercial flashcards.** You can buy commercially made braille flashcards from various sources online. One source is www.braillebookstore.com/

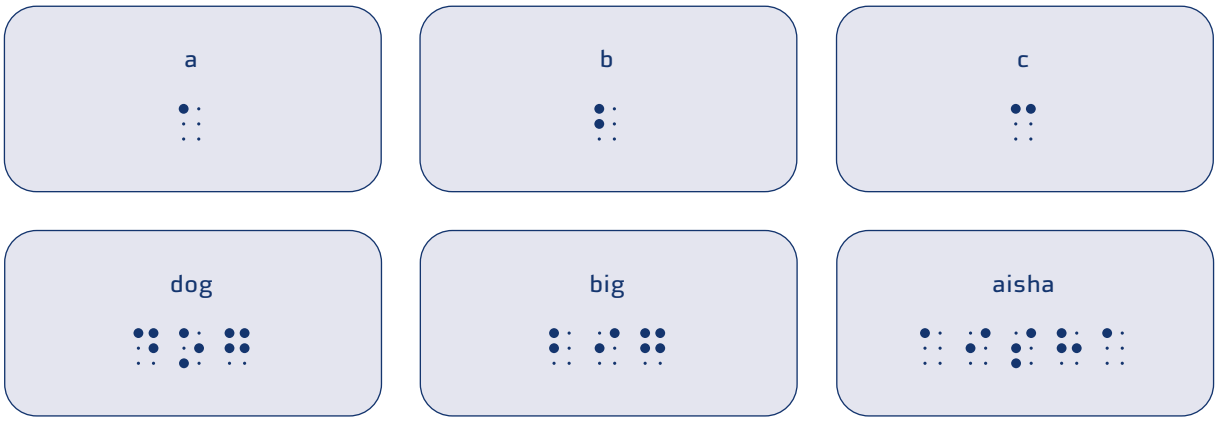
Keeping flashcards in place

It is easy to brush against flashcards and move them unintentionally. Some ideas to prevent this:

- **Post-It notes.** Make sticky flashcards from Post-It notes, or add re-stickable glue to the back of flashcards.
- **Masking tape.** Fix the flashcards that are not supposed to be moved to the tabletop with a piece of masking tape. You can roll up small pieces of tape to stick to the back of cards that have to be repositioned.
- **Velcro.** Add Velcro hooks to the back of the cards, and use Velcro fuzz (or some other material) as a surface to lay them out on.
- **Magnets.** Attach a magnetic strip to the back of the cards, and lay them out on a metal surface.
- **Pockets.** Fix a row of paper pockets or envelopes to a backing sheet. Put one flashcard in each pocket. Make the pockets so the braille can be read while the card is in the pocket.
- **Paperclips or clothes pegs.** Attach a row of paperclips or clothes pegs to a strip of card or cloth. Use these to fix flashcards in place. The child can then find cards in a duplicate set that match them.

Ideas for flashcards
You can use flashcards in many ways. We give some ideas below.

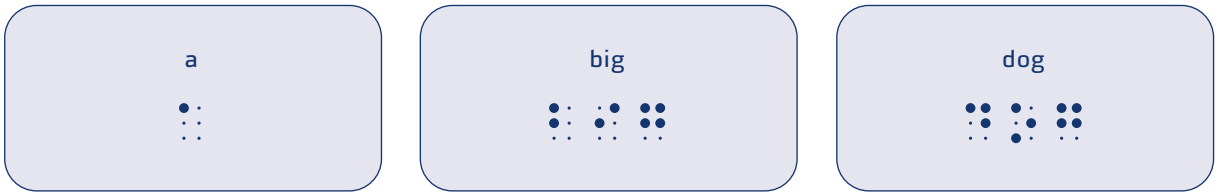
New letters or words
You can use flashcards to introduce new letters and words.



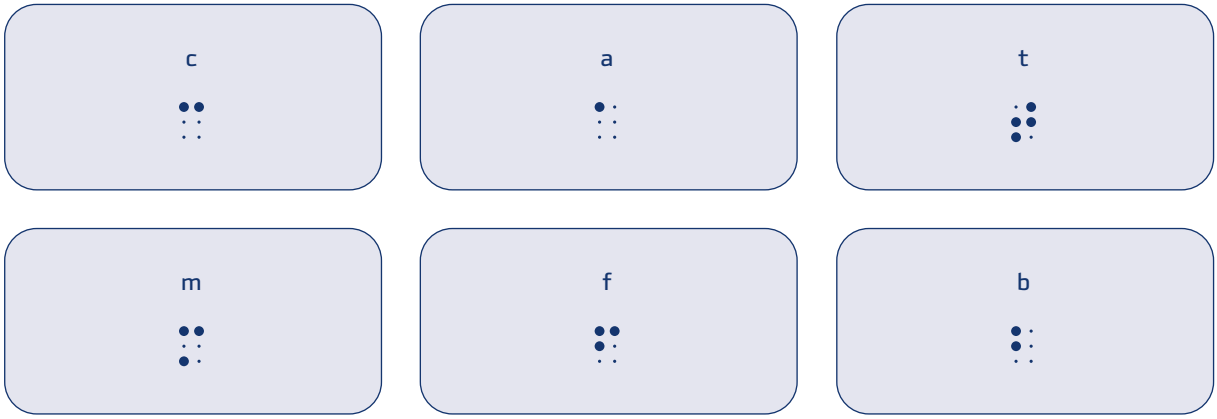
Add written text to flashcards so non-braille readers can use them with the blind child

Reading practice
Once the child has learned several letters or words, give them a set of flashcards and ask them to tell you what they contain. Shuffle the cards to mix up the order.

Building words and sentences
Ask the child to sort the flashcards into the right order to make a word or sentence. You will need duplicate cards for letters or words that appear more than once. The child can either find the cards to make a word you give them, or they can use them to make their own words.



Mix and match
Give the child a set of flashcards and ask them to make new words. Examples: **c-a-t, b-a-t, m-a-t, t-a-b**.



Matching

Lay out a line of five or six flashcards on a tray. Give the child a duplicate set of cards and ask them to find the matches.

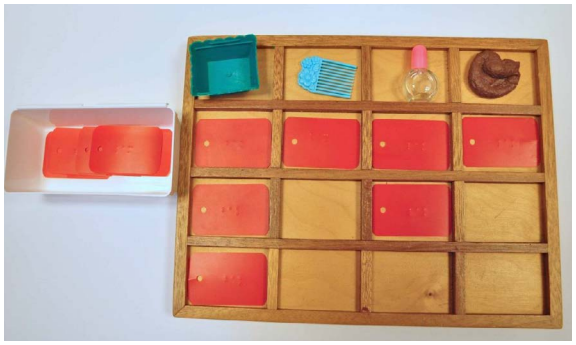
Memory game

Prepare two identical sets of cards, each card with a different braille letter or word on it. Mix the cards and spread them out on the table. Ask the child to find the pairs of matching cards.

Sorting

Get the child to sort cards into piles:

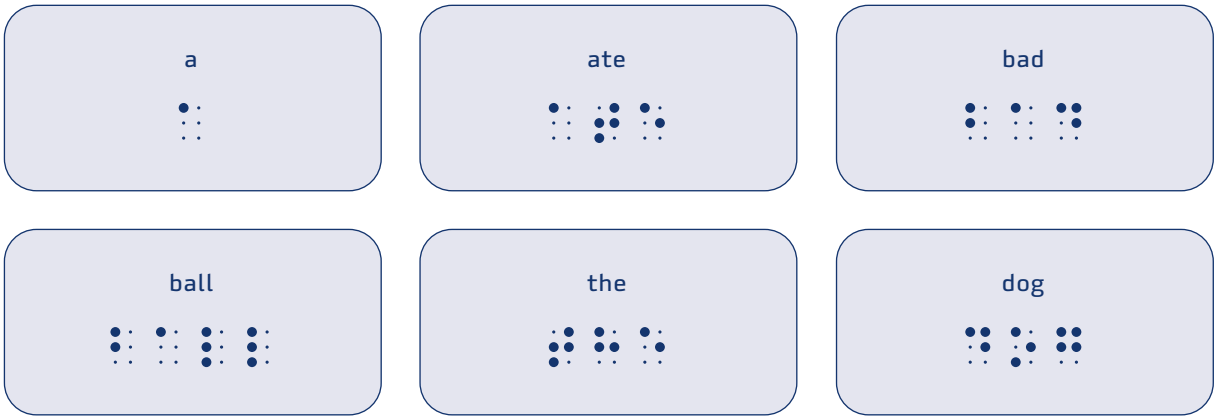
- Words (or letters) that are the same
- Girls' names and boy's names
- The names of people at school and at home
- Colour words, number words, food words, furniture words
- Letters and numbers.



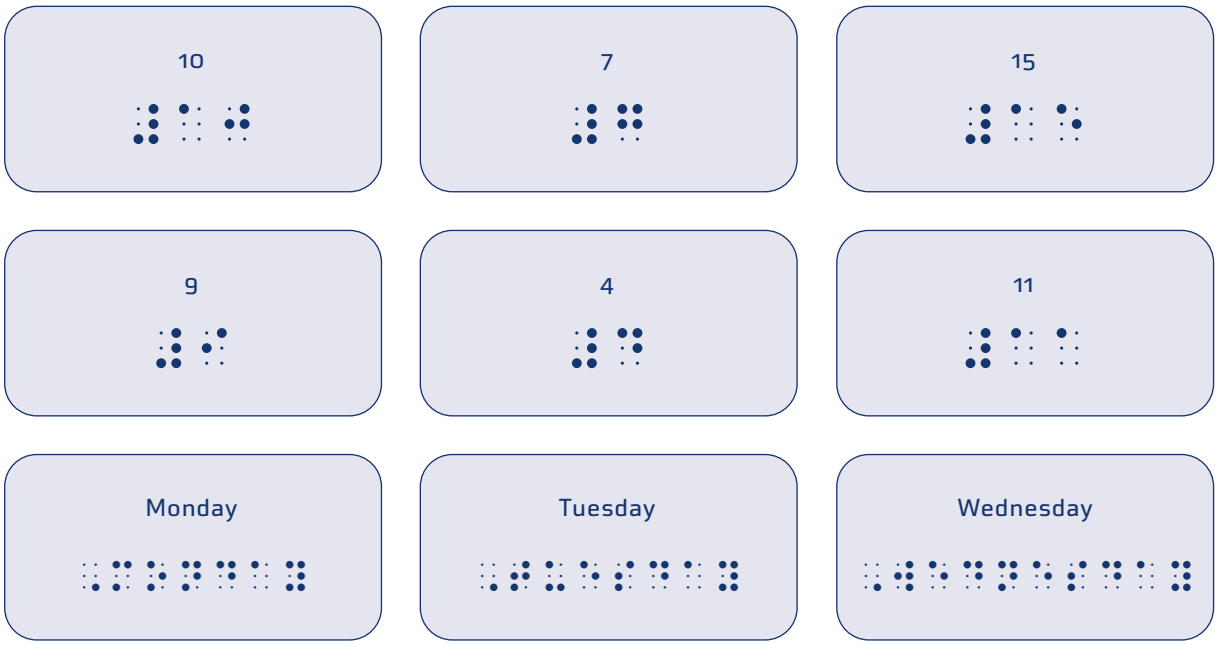
Sorting flashcards to match objects.

Scrambled sentence

Write a sentence with the words on separate flashcards. Tell the child what the sentence is, then mix the cards up and ask the child to put the sentence into the right order.



Sequencing
Ask the child to sort flashcards with numbers into ascending order. This also works with letters or words (put them in alphabetical order), the names of days or months, or sentences that tell a story (see *Scrambled sentence* above).



Teaching sighted people
Parents and teaching assistants can use a visual alphabet to learn braille. It is not necessary for them to learn tactile braille – though they can experiment by closing their eyes and feeling the braille with their fingertips. Flashcards are a good way for them to practise recognizing letters and words by touch.

4.9.2
Worksheets for reading

Worksheets to give the child practice with particular types of activities, such as identifying letters and words, distinguishing between easily confused letters. Worksheets should focus on one type of exercise. They can be easily replicated and varied if the child needs more practice.

Sorting flashcards cards takes a lot of time. Exercises on sheets of A4 paper are more convenient. The child can put a sticky note on the requested words.

Worksheets should not be an end in themselves. They should be a supplement to other activities, such as reading, writing or discussion, and not a replacement for them.

Preparing worksheets
Double-space the lines on worksheets to make reading easier for beginners. The teaching assistant can transcribe the text and the child's answers above each line for the classroom teacher to read. Put the key letter or word at the top left of the worksheet as a reminder.

Explain to the child what they should do to complete the task.

Finding

On a worksheet, get the child to find the words that have:

- Words containing a particular letter (**big, get, go**) or sound (**dream, eat, peace, meat**)
- Words that rhyme with each other (**get, pet, set**)
- Words that mean the same as (or the opposite of) a particular word (**large, big, huge**)
- Words that contain one syllable (or two, or three).

Marking worksheets

The child can mark their answers on the worksheet in various ways:

- Writing the answers on a page using the brailler.
- Using pushpins (fix the worksheet on a backing of cardboard or corkboard).
- Using small pieces of waxed string that stick to the paper.
- Using magnets (put the worksheet on a magnetic board).
- With rolled-up pieces of masking tape.
- With glitter crayons (which can be felt).
- Put the worksheet on top of a piece of sandpaper and ask the child to use a crayon to mark the sheet. The sandpaper lets the child can feel where they have marked with the crayon.

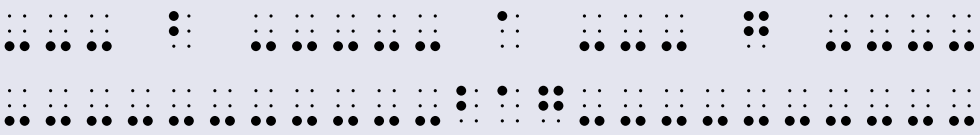
Ideas for worksheets

This section contains suggestions for various types of worksheets to use at different stages of teaching braille reading. Adapt the worksheets to suit your own needs and to teach other letters and words.

Where necessary, the printed version is given to the right of each worksheet.

Stimulating the correct reading movement

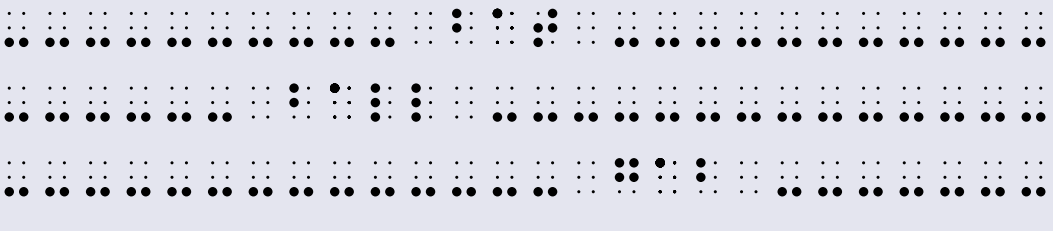
- Read the letters in the first line, then in the second line.



b a g

bag

- Find and read these words.



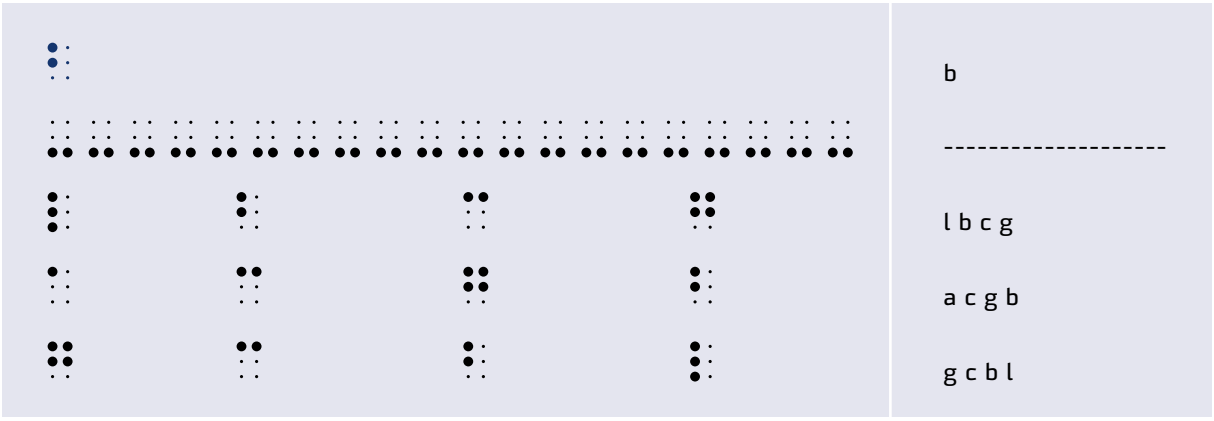
bat

ball

gab

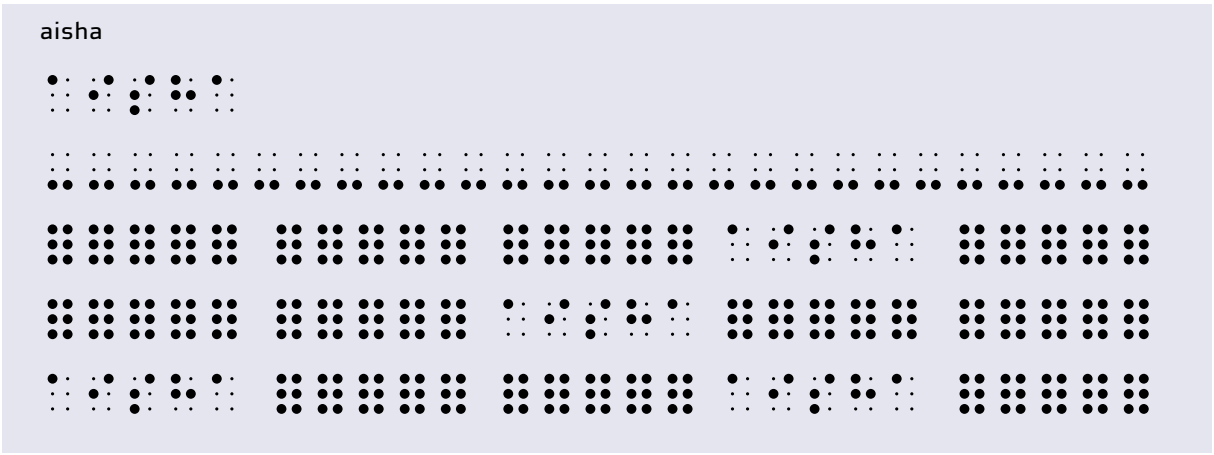
Distinguishing letters
Put the letter to be identified at the top of the worksheet.

- Find the one **b** ⠃ in each row.



Find your name
Ask the child to find their own name and read it (or mark it). To begin with, you can mix up their name with a row of five full cells to represent "Mr Nobody". Or later, you can include other children's names instead of Mr Nobody.
Put the word to be found at the top of the worksheet.

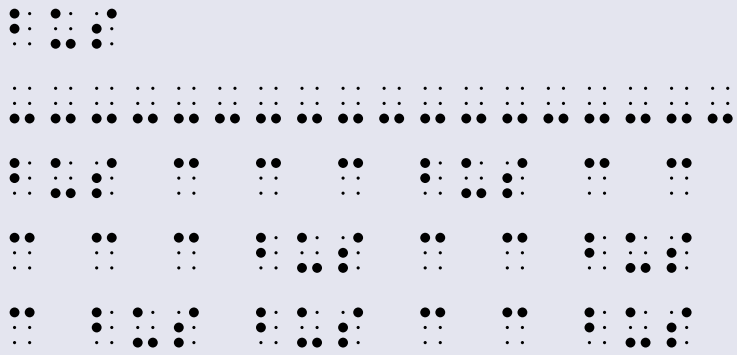
- Find your name (here: **aisha**) on this sheet.



Counting

Put the word to be counted at the top of the worksheet.

- Count the buses in each line of cars (c).



bus

---

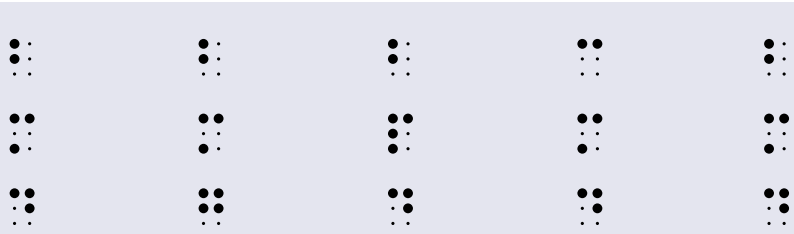
bus c c c bus c c

c c c bus c c bus

c bus bus c c bus

Odd one out

- Find the odd one out on each line.



b b b c b

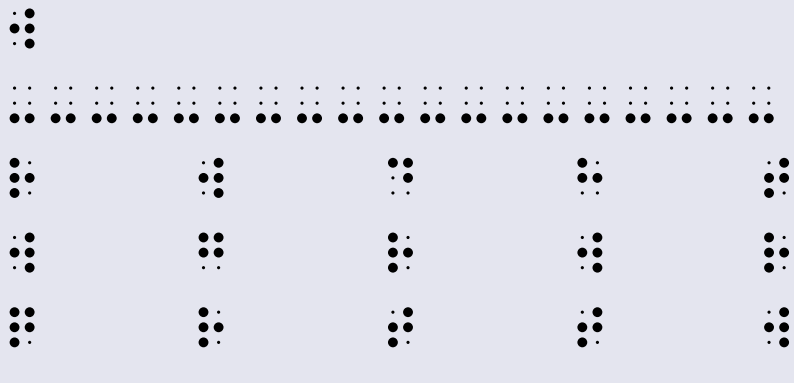
m m p m m

d g d d d

Finding letters (spaced)

Put the letter to be found at the top of the worksheet.

- Find all instances of the letter **w** ⠺



w

---

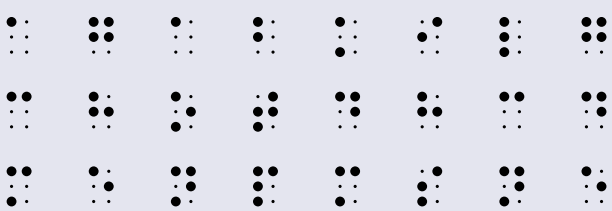
r w d h t

w g r w r

q r t t w

Name the letters

- Name all the letters.



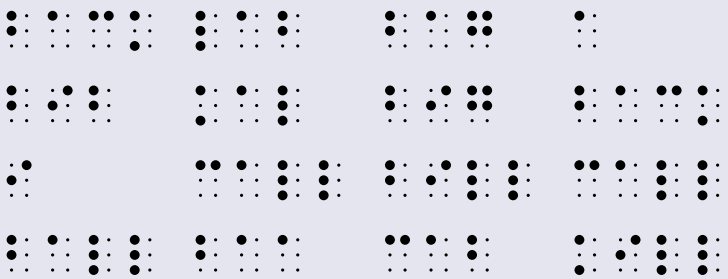
a g a b k i l g

c h o t d h c d

m e n p m s n e

Name all the words

- Say all the words.

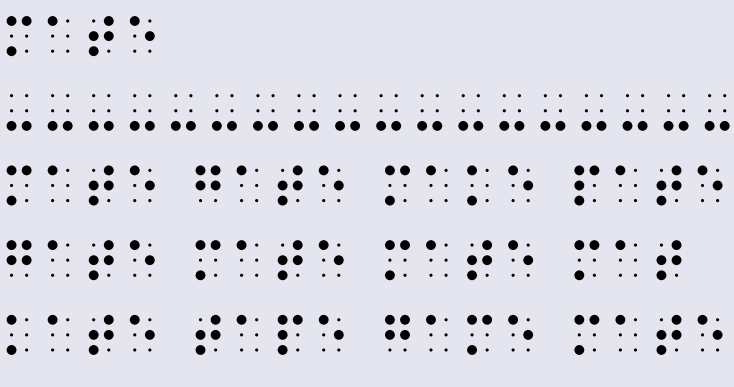


back	lab	bag	a
bib	kal	big	back
i	call	bill	call
ball	baa	cab	kill

Finding words

Put the word to be found at the top of the worksheet.

- Find all the instances of the word **mate**



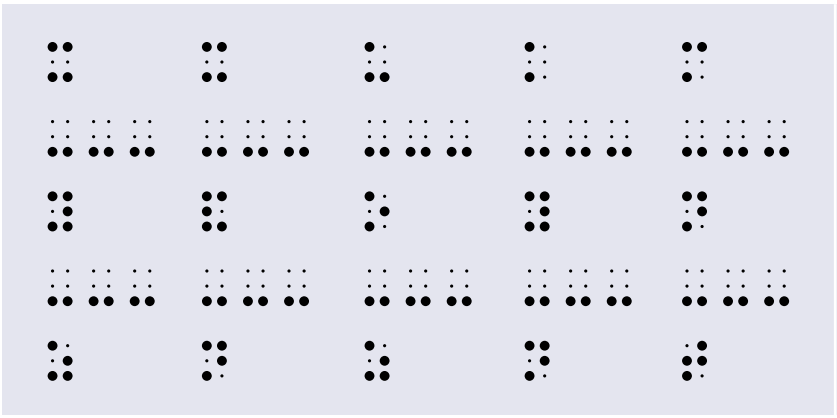
mate

---

mate	gate	make	pate
gate	mate	mate	mat
kate	tape	game	mate

Matching the letters

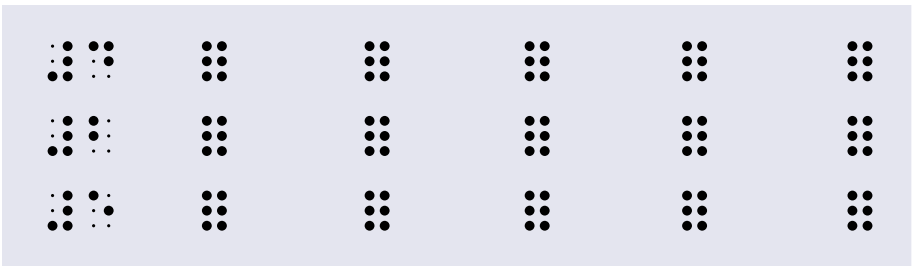
- Find the sign on the far left of each line.



x	x	u	k	m
---	---	---	---	---
y	&	o	y	n
---	---	---	---	---
z	n	z	n	t

Identifying numbers

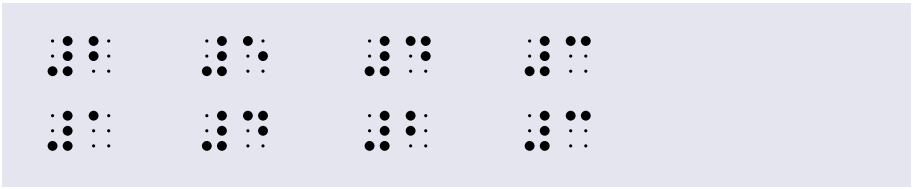
- Colour in the correct number of full braille cells in each row.



4
2
5

Ordering numbers

- Put the numbers in order, from smallest to biggest.



2 5 4 3
1 4 2 3

4.9.3
Worksheets for writing

You can use worksheets to give writing exercises. Tape the sheet next to the brailler so the child can check it.

Copying letters and words

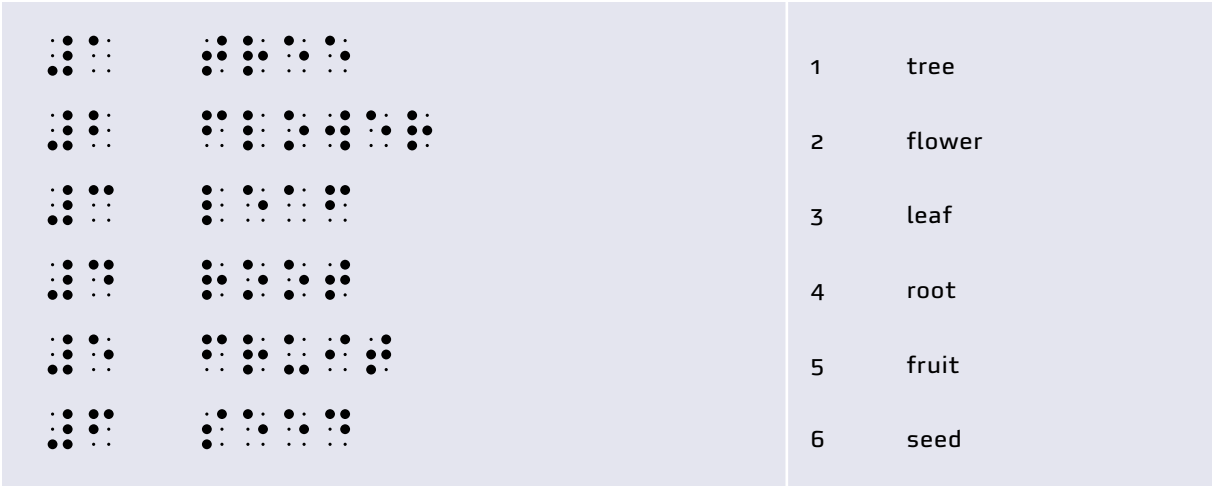
Give the child a flashcard or worksheet with letter or word to practise brailling. Get them to write it 10 or 20 times to practise the fingering and use of the brailler.

Copying lists

Make a worksheet with a list of words to copy. Choose words that are related to each other, such as names, colours, number words or rhyming words.

Number the items in the list so the child gets used to numbered lists. The child can use a paperclip or a clothes-peg to mark where they have got to in the master list.

- Copy this list.



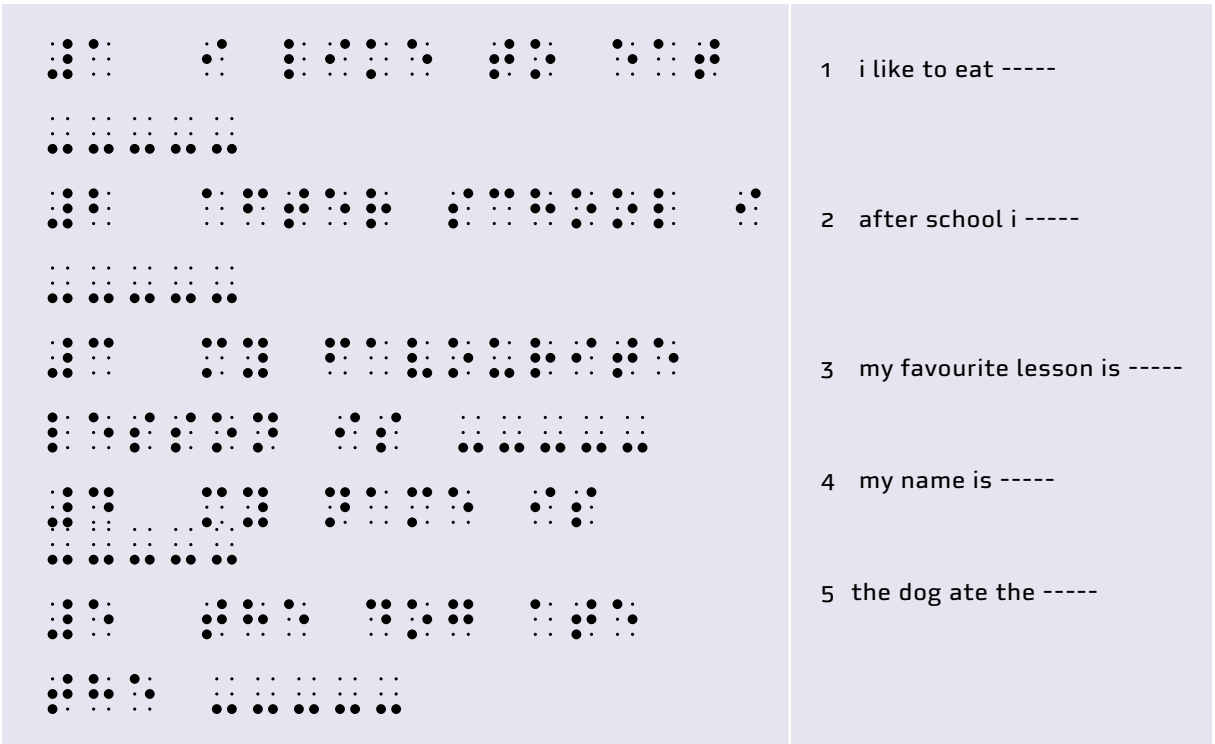
1 tree
2 flower
3 leaf
4 root
5 fruit
6 seed

Finishing sentences

Give the child sentences to complete. These sentences can be taken from a story or build on class discussion or the child's imagination.

The child should braille the whole sentence on a separate sheet.

- Finish these sentences.



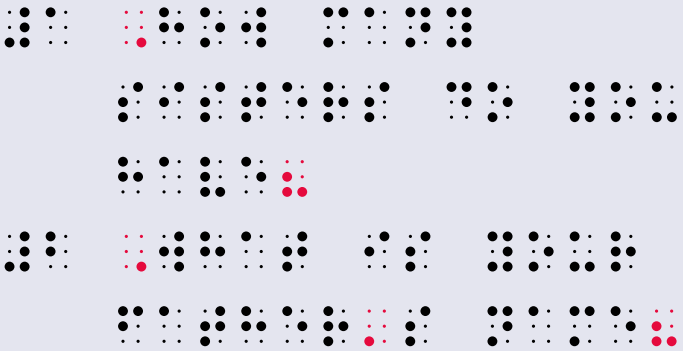
1 i like to eat -----
2 after school i -----
3 my favourite lesson is -----
4 my name is -----
5 the dog ate the -----

Answering questions

Give the child questions to answer. The questions may be drawn from a story discussed in class, or draw on the child's experience.

Note: the examples below use the capital letter ⠠, question mark ⠦ and apostrophe ⠄ signs.

- Answer these questions.



1 How many sisters do you have?

2 What is your father's name?

4.9.4

Mini-worksheets for writing

Mini-worksheets are cards with a single task. The child brailles the answer on the card itself, in the space beneath or next to the question. You can prepare a set of these mini-worksheets for the child to complete. Put them in a basket on one side of the brailler. Explain the task, and tell the child to put the completed cards in another basket on the other side. All the mini-worksheets in a session should practise the same task.

Mini-worksheets practise both the concept in question and the task of loading the brailler and writing braille.

You can also prepare a worksheet with several tasks. The child copies each question onto a separate page, then writes the answer beneath it. The worksheet can then be reused.

Copying letters and words

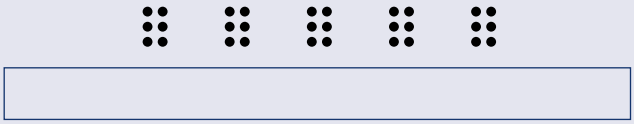
- Copy this letter the number of times shown by the full braille cells.

- Copy this word.

Writing numbers

This exercise can be used to practise the number signs, or to spell out the number words.

- Write the correct number.



Writing the next (or previous) number

Put three ⠉ characters on the mini-worksheet next to the braille.
⠉⠉⠉ to the right means the child should braille the next number onto the sticker.
⠉⠉⠉ to the left means they should braille the previous number.

- Write the next number.

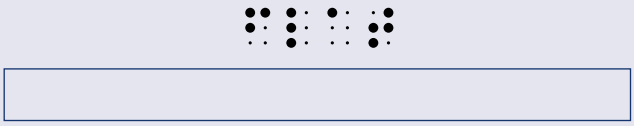
⠼⠁⠉	⠼⠉⠉	13 (=14)

- Write the previous number.

⠼⠉⠉	⠼⠃⠁	24 (=23)

Rhyming words

- Write a word that rhymes.



4.9.5

Books

Reading books

Sighted children need as much exposure as possible to books from an early age if they are to become eager and fluent readers. The same is true of blind children. Read them stories, and let them feel the pages in the book. Show them how to hold the book, where the start it, and how to turn the pages. Explain that the book has words and pictures. Stick braille labels on the cover and on the pages so the child can read the key words on each page. With smaller books, you may be able to take the book apart and feed each page into the brailler to add braille text to it.

Obtain as much braille reading material as you can. You may be able to obtain books for free from a supplier in your country. Contact the publisher of learning materials to find out if they can make materials available in braille. See **Chapter 7** for more.

Writing books
Make tactile books for them to "read". Create books with different shapes, textures, patterns or lines. Make tactile mazes for them to follow with their fingertips to find the prize.

A page in a tactile book with the word "ball" ⠃⠁⠇⠇ in different textures.

Children can also make their own tactile books. Show them how to cut out shapes, select patterns and textures, make tactile graphics, and staple or glue them to the pages of a book to tell a story.

When the child starts writing braille with a brailler or slate and stylus, put their compositions together in a book for them to take home to show their parents. Transcribe the braille so the parents can also read what their child has written.

4.10 Rehabilitation braille

People who can already read printed text may lose their eyesight through an accident or disease. Teaching them braille can make the written word available to them once more. The techniques used to teach these learners are called "rehabilitation braille".

If someone is about to lose their sight (for example, through a disease), it may be useful to teach them braille while they still have some eyesight.

Rehabilitation braille is in some ways simpler than teaching braille to learners who have always been blind or did not learn to read before losing their sight. The learners are typically older. It is not necessary to teach many of the skills covered in Chapter 3 (preparatory braille). But the same methods as in Chapters 4 (initial braille) and 5 (advanced braille) can be used, though in a more concise form. It is not necessary to teach about rhyming, for example.

The braille learning programme must be tailored to the needs of the learner. Someone may lose their sight for various reasons, which may affect their ability or motivation to learn. If they have a progressive illness, it may be difficult to know when the best time is to start teaching braille. With

older learners, it is possible to jointly agree on a learning strategy, and to adjust it if necessary.

Depending on the learner and the situation, it can take around 3 months for someone to learn to read braille tactually, and 1–2 years to build up a reasonable reading speed.

See the chapter on *Rehabilitation braille* (in Visio's *Curriculum braille* guide) for more information.

4.11 More information

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4.12 Appendices

Appendix 4.1
Memory aids for braille characters

Print	Braille	Dots	Memory aid
a		1	One dot all alone
b		12	Two dots, one above the other
c		14	Two dots next to each other
d		145	A little hole on the bottom left
e		15	Two dots pointing down
f		124	A little hole on the bottom right
g		1245	Four dots!
h		125	A little hole on the top right
i		24	It climbs up Two dots, like an e but pointing up
j		245	First a button (dot 2) on my jacket A little hole on the top left
k		13	Two dots with a gap in the middle
l		123	A line
m		134	Like an open mouth Like a c  but with an extra dot
n		1345	Like a d  but with an extra dot
o		135	Like a e  but with an extra dot
p		1234	Like a pipe A big hole at the bottom right, like a long f 
q		12345	All the dots, but a little hole in the bottom right

Print	Braille	Dots	Memory aid
r		1235	Like an h ⠓ but with an extra dot
s		234	Like an l ⠇ but with an extra dot
t		2345	Like a j ⠚ but with an extra dot
u		136	Like a b for bus: the wheels are below An upside-down m ⠍
v		1236	Like an upside-down p ⠏
w		2456	The headlight of the car Like an r ⠗ but backwards
x		1346	A hole all the way through the middle
y		13456	A hole on the left side
z		1356	Like an upside-down n ⠝
number sign		3456	First dot 3
for		123456	All the dots, full

Appendix 4.2

Objects beginning with A–Z

Caution: Items in italics do not begin with the basic sound of that letter (e.g., **chair = ch** sound, not a hard **c** as in **cat**).

	Small objects, shapes	Familiar items, toys	Places, vehicles	Food	Animals	Parts of the body, clothes
a 		air, anchor, arrow	aeroplane, ambulance	apple, avocado	animal, ant, antelope	ankle, apron, arm
b 	bag, ball, balloon, bead, bolt, bracelet, brick (Lego), button	bell, book, bottle, bowl, box, boy, brush	balcony, bank, bath, bathroom, bed, bedroom, bench, bicycle, building, bus, bus stop	banana, beans, beef, biscuit, bread, butter	bear, bee, bird, butterfly	back, beard, blouse, body, boot, bra

		Small objects, shapes	Familiar items, toys	Places, vehicles	Food	Animals	Parts of the body, clothes
c	⠉	card, **circle**, coin, comb, cork, cross, cube, cup	camera, can, cap, carpet, **chair**, cloth, cooker, computer	car, castle, **church**, classroom	cabbage, cake, carrot, cassava, **cheese**, **chocolate**, **chicken**, coconut, coffee, cookie, curry	cat, **chicken**, cow, crocodile	calf, **cheek**, **chest**, **chin**, coat
d	⠙	diamond (shape), dice	desk, dish, doll	door	date, doughnut	dinosaur, dog, dolphin, duck	dress
e	⠑	elastic, envelope	**eight**, eleven	**Eiffel tower**	egg, eggplant	elephant	ear, **earring**, elbow, **eye**, **eyebrow**
f	⠋	fork, funnel	family, father, five, fire, flannel, floor,flower, football, four, frying pan	farm, fire engine	falafel, fish, flour, fruit	fish, flamingo, fly, frog	face, finger, flipflop, foot, forehead
g	⠛	glass, grass	girl, glue, grandfather, grand-mother, guitar	garage, garden	garlic, grape, gravy, guava	**giraffe**, gnu, goat	glasses, glove
h	⠓	half (of circle), heart, hexagon	handbag, helicopter	home, house	ham, honey	horse, hyena	hair, hand, hat, head, helmet
i	⠊	I (**shape**)	**iron**	inside	**ice**, **ice** cream	insect	

		Small objects, shapes	Familiar items, toys	Places, vehicles	Food	Animals	Parts of the body, clothes
j		J (shape), jar, jewellery	jug		jackfruit, jam, jelly, juice	jellyfish	jacket, jaw
k		key, **knife**	kettle, kite	kitchen	kale, kohlrabi, kebab	kangaroo, kitten	**knee**, **knickers**
l		**L (shape)**, leaf, lid (of jar), lightbulb		living room, lorry	lamb, lemon, lentils	ladybird, leopard, lion, lizard	leg, lips, lungs
m		maize (kernels), marble, medicine, moon (crescent shape), money, mouse (computer)	man, mat, mother	mosque, motorbike	macaroni, mango, matoke, meat, milk, millet, mushroom	mouse,	mask, moustache, mouth
n		nail, nut	nine, numbers		noodles, nuts		nail, neck, necklace, nose
o		**O (shape)**, octagon, oval	one	office, **outside**	olive, **onion**, orange	octopus, owl	
p		paper, paperclip, pen, pencil, pentagon, plaster, plug	**phone**, pillow, plate, purse	park, patio, pavement, playground	paprika, pasta, peas, pepper, pie, pizza, pineapple, pork, potatoto	panda, penguin, pig	palm, pants
q		quarter (of circle)	question mark				

r		Small objects, shapes	Familiar items, toys	Places, vehicles	Food	Animals	Parts of the body, clothes
r		rectangle, ribbon, ring	radio, rose scissors,	road, room	radish, raisins, rice	rat, rhino	
s		**S (shape)**, saucer, screw, seed, **shell**, spoon, square, star, stick, stone, string	seven, **sheet**, six, saucepan	school, **shop**, stairs, station, street, supermarket	salt, sausage, sorghum, soup, spaghetti, spinach, strawberry, **sugar**, sweet, sweet potato	snail, snake, spider	**shirt**, **shoe**, **shoulder**, sock, stocking, stomach
t		T (shape), tape, tennis ball, **thread**, tomato, toothpaste, top (of bottle), triangle	table, telephone, ten, tin, tissue, **three**, towel, tree, two	toilet, tractor, train	tea, tilapia, tofu, tuna, turkey	tiger, turtle	**thigh**, **thumb**, toe, tooth, trousers
u		**U (shape)**, umbrella (cocktail)	umbrella		**ugali**	**unicorn**	underpants
v		V (shape), Velcro	vacuum cleaner, vase, violin	van	vegetables, vinegar		vest
w		wood, wire, washer (from tap), watch	washing machine, wastebin, watch, wheel (Lego), wheelbarrow, wing, woman	window	water, watermelon, wheat	warthog	windpipe, wrist
x		X (shape)	xylophone				

		Small objects, shapes	Familiar items, toys	Places, vehicles	Food	Animals	Parts of the body, clothes
y		**Y (shape)**	yarn	yacht	yam, yoghurt		
z		Z (shape)	zigzag (lines)	zoo	zucchini	zebra	

Appendix 4.3
The 100 most common words in English

Abgikl order

abgikl	a, all, I,
cdhot	at, call, did, had, do, go, it, look, oil, that, to,
emnps	an, and, as, be, been, can, come, each, get, has, he, him, his, in, into, is, its, like, long, made, make, no, not, on, one, people, said, see, she, so, some, than, the, their, them, then, these, this, time,
fruxy	about, are, but, by, could, day, find, first, for, from, her, if, many, may, more, my, number, of, or, other, out, part, there, they, up, use, you, your
jqvwz	down, have, how, now, two, was, water, way, we, were, what, when, which, who, will, with, word, would, write,

Alphabetical order

abcde	a, be
fghij	did, each, had, he, I, if
klmno	all, an, and, been, call, can, come, do, find, go, him, in, like, long, look, made, make, no, of, oil, on, one
pqrst	about, are, as, at, but, first, for, from, get, has, her, his, into, is, it, its, more, not, or, other, part, people, said, see, she, so, some, than, that, the, their, them, then, there, these, this, time, to
uvwxyz	by, could, day, down, have, how, many, may, my, now, number, out, they, two, up, use, was, water, way, we, were, what, when, which, who, will, with, word, would, write, you, your

Appendix 4.4
Examples of words you can make if you introduce the letters in the abgikl order

New letters	Simple words	Silly words, other words
a	a	aaa
b	baa	ab, aba, bab, baba
g	bag, gag	ag, aga, gaga
i	bib, big, gig, I	abi, bibi, gabi, gib, gigi
k		kab, kag, kai, kali, kib, bik, baka, gaka, gika, kaka, kiki
l	ali, all, ball, bill, gall, gill, kick, kill, lag	gali, kali la, lala, lib, lili,
c	back, black, cab, call, lick	ca, caba, clab, clib
d	add, bad, dad, bid, did, dig, kid, lid	dada
h	ah, aha, chalk, child, chill, had, hag, hi, hic, hid, hill	Words with -ch-
o	ago, boil, book, coal, cold, cool, do, dog, go, god, good, ho, loco, log, look, odd, oh, oil, old	
t	at, bat, bath, bit, boat, both, cat, cot, dot, got, hat, hit, hot, it, lit, tag, that, thick, to	Words with -th-
e	ace, age, ate, bade, bake, be, beach, bead, beak, beat, bed, bee, beg, bet, bike, cage, cake, coke, date, dead, dee, dice, die, each, eagle, eat, egg, eight, gate, gee, get, hate, he, head, heal, heel, hide, ice, idle, lake, lead, leg, lie, like, table, tea, the, tie, toe	Words ending in -ed the
m	am, came, camel, climb, come, game, ham, him, home, mad, made, magic, make, mama, mat, mate, me, meal, meat, meet, mice, mike, mile, milk, them, time	
n	amen, an, and, ant, band, bang, bank, band, bang, bank, bean, been, began, begin, bent, bin, blank, blind, bone, can, cane, cannot, clean, dance, din, dine, doing, done, end, hand, in, inch, ink, into, kind, king, knee, line, lion, long, man, men, mend, mine, moan, nail, name, neck, need, nice, nine, no, not, on, one, ten, tin, than, then	Words ending in -ing and

New letters	Simple words	Silly words, other words
p	ape, apple, cap, lip, open, page, pan, pain, papa, pat, pea, peg, pen, pencil, people, pet, pie, pig, pin, pit, pot, tap, tape, top	
s	as, best, boss, cheese, cost, desk, does, goes, has, his, is, its, nest, nose, pass, please, sad, said, sand, sat, seat, see, sell, send, sent, she, sheep, sing, sit, snake, so, sob, some, son, song, spoon, these, this, those	Plurals, words ending in -s Words with -sh- Words ending in -est
f	beef, café, deaf, face, fed, feed, feel, fence, fib, fig, find, fine, flag, flame, if, knife, leaf, of, off	
r	air, are, arm, bar, barn, bear, bird, braille, calendar, car, carpet, cart, chair, dark, dear, dirt, drop, ear, father, first, for, fork, from, girl, grandma, grandpa, green, her, more, mother, near, or, other, part, rain, ran, rang, rate, read, red, ring, road, rode, room, rope, sore, star, tear, their, there, three, tree	Words ending in -er
u	about, but, button, could, daughter, four, hundred, number, thousand, out, under, up, use	
x	box, extra, next, six	
y	boy, by, day, eighty, fifty, forty, many, may, my, ninety, sixty, they, thirty, yell, yes, you, your	
j	haji, jab, jaffa, jail, jam, jib, jig	
q	equal, quack, queen, quick, quit	
v	eleven, ever, five, have, live, love, seven, seventy, van, vase	
w	cow, down, how, low, new, now, sew, twelve, twenty, two, was, water, way, we, were, what, when, which, who, will, with, why, word, would, write, yellow	Question words
z	lazy, maze, quiz, size, zap, zero, zigzag, zoo, zoom	

Appendix 4.5
Examples of phrases with the first 16 letters taught in abgikl order

abgikl	a big ball i bag a ball all a big ball a big ball bag	bill a ball bill bag ali bag big bill big ali
cdhot	bill call a cab bill got a cab ali got a big ball a kid got a big bag aha a black cat a dog had a ball	kick a ball dad had a big black book hot black coal dad dad go back look a hotdog a cold dog i had a hot bath
emnps	i like a big apple he goes to the school the camel climbs the sand hill the lion eats the big snake the boss sits at the des	tea and milk please the eagle chick is in its nest eggs beans and toast she sells seashells at the seaside the people sing a song

Appendix 4.6
Examples of words you can make if you introduce the letters in alphabetical order

New letters	Simple words	Silly words, other words
a	a	aaa
b	baa	ab, aba, baba
c	cab	ca, caba, caca, cad
d	add, bad, dad	daba, daca, dada
e	ace, bade, be, bead, bed, bee, dead, dee	Words ending in -ed bebe, debe, dede
f	beef, café, deaf, face, fed, feed	fafa
g	age, bag, beg, egg, gag, gee	ag, aga, gaga
h	ah, aha, beach, each, had, hag, he, head	Words with -ch-
i	bib, bid, big, die, dice, did, dig, fib, fig, hi, hic, hid, hide, i, ice, if	gig, gib, gigi

New letters	Simple words	Silly words, other words
j	haji, jab, jaffa, jib, jig	
k	back, bake, beak, bike, cage, cake, kick, kid	
l	ali, all, ball, bill, black, call, chalk, child, chill, eagle, feel, flag, gall, gill, heal, heel, idle, jail, kill, lag, lake, lead, leaf, leg, lick, lid, lie, like	
m	am, came, camel, climb, flame, game, ham, him, jam, mad, made, magic, make, mama, me, meal, mice, mike, mile, milk	
n	amen, an, and, band, bang, bank, band, bang, bank, bean, been, began, begin, bin, blank, blind, can, cane, clean, dance, din, dine, end, fence, find, fine, hand, in, inch, ink, kind, king, knee, knife, line, man, men, mend, mine, nail, name, neck, need, nice, nine	Words ending in -ing
o	ago, boil, bone, book, coal, coke, cold, cool, come, do, dog, doing, done, go, god, good, ho, home, lion, loco, log, long, look, moan, no, odd, of, off, oh, oil, on, old, one	
p	ape, apple, cap, lip, open, page, pan, pain, papa, pea, peg, pen, pencil, people, pie, pig, pin	
q		None (q is always followed by u)
r	air, are, arm, bar, barn, bear, braille, calen-dar, car, chair, dark, dear, drop, ear, for, fork, from, girl, grandma, grandpa, green, her, more, near, or, rain, ran, rang, read, red, ring, road, rode, room, rope	Words ending in -er
s	as, boss, cheese, does, has, his, is, nose, pass, sad, said, sand, see, sell, send, she, sheep, so, sob, some, son, song, sore, spoon	Plurals, words ending in -s Words with -sh-
t	ant, at, ate, bat, bath, beat, bent, best, bet, bird, bit, boat, both, cannot, carpet, cart, cat, cost, cot, date, dirt, dot, eat, eight, father, first, gate, get, got, hat, hate, hit, hot, into, it, its, lit, mat, mate, meat, meet, mother, nest, not, other, part, pat, pet, pit, pot, rate, sat, seat, sent, sit, star, table, tag, tap, tape, tea, tear, ten, than, that, the, their, them, then, there, these, thick, this, those, three, tie, time, tin, to, toe, top, tree	Words ending in -est Words with -th-

New letters	Simple words	Silly words, other words
u	about, but, button, could, daughter, equal, four, hundred, number, out, quack, queen, quick, quit, thousand, under, up, use	
v	eleven, ever, five, have, live, love, seven, van, vase	
w	cow, down, how, low, new, now, sew, twelve, two, was, water, we, were, what, when, which, who, will, with, word, would, write	Question words
x	box, extra, next, six	
y	boy, by, day, why, eighty, fifty, forty, many, may, my, ninety, seventy, sixty, they, thirty, twenty, way, yell, yellow, yes, you, your	
z	lazy, maze, quiz, size, zap, zero, zigzag, zoo, zoom	

Appendix 4.7
Examples of phrases with the first 15 letters taught in alphabetical order

abcde	a bed a bad bed a bad bee	a bad dad dad add a cab a dead bee
fghij	he had a dice i hid a face i dig ice he had a big head	feed a bee a bad face did a bee die
klmno	i like milk i go home an old man died a dog had a big bone	i need a cake and a cold coke dad can dig in an old mine come and dig in a coal mine a good man and a bad man

Appendix 4.8
Writing and reading exercises: abgikl order

These exercises introduce the letters in the order of reading ease recommended by RNIB's *Hands On* series: **abgikl** **cdhot** **emnps** **fruxy** **jqvwz**

Exercise 1. Writing abgikl

The child becomes familiar with the working of the Perkins brailler ("finger memory") and practises writing the letters **abgikl**.

- **Coaching points**

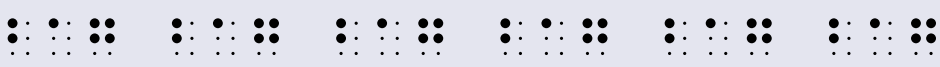
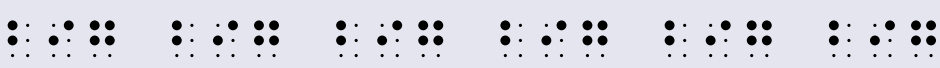
Letter	Dots	Braille
a	1	
b	1, 2	
g	1, 2, 4, 5	
i	2, 4	
k	1, 3	
l	1, 2, 3	

- **Practice**

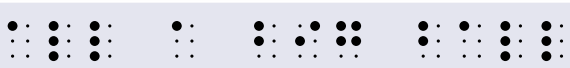
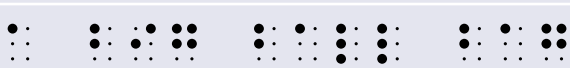
Write the letters **abgikl** across the page, with a space between each letter and double-spacing between lines.

	a
	b
	g
	i
	k
	l

Write these words. One space between the words, and double-spacing between the lines.

	baa
	bag
	gag
	bib
	big
	ball
	add
	ali

Write these sentences.

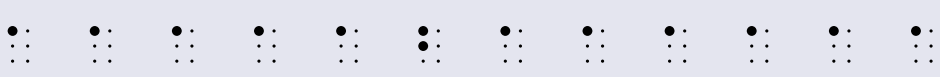
	a big ball
	i bag a ball
	all a big ball
	a big ball bag
	bill a ball
	bill bag
	ali bag
	big bill big ali

Exercise 2: Reading abgikl

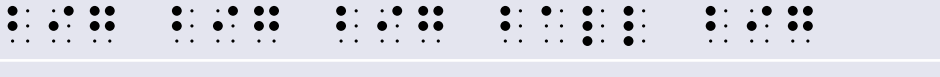
The child learns to read letters **abgik**l and can identify the odd letter in a row.

- **Practice**

  Read these letters and identify the odd one out in the row.

	a a a a a b a a a a a a
	b b b b b b b b k b b b
	g g g g g g g g g l g g
	k k k k k k l k k k k k
	l l k l l l l l l l l l

Read these words and identify the odd one out in the row.

	big big big ball big
	all all all all baa all
	baa baa baa bib baa baa
	bag bag big bag bag bag

Exercise 3: Writing cdhot

The child learns to write the letters **cdhot**.

- **Coaching points**

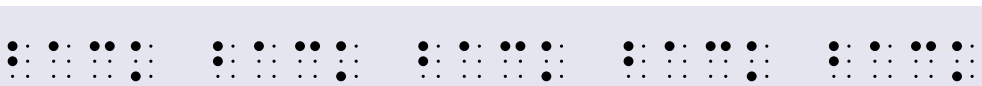
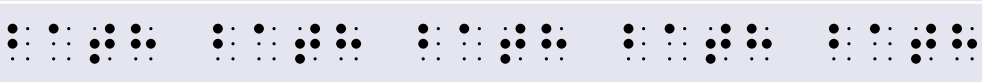
Letter	Dots	Braille
c	1, 4	
d	1, 4, 5	
h	1,2, 5	
o	1,3, 5	
t	2, 3, 4, 5	

■ **Practice**

Write the letters **cdhot** across the page, with a space between each letter and double-spacing between lines.

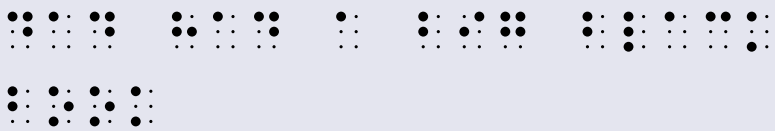
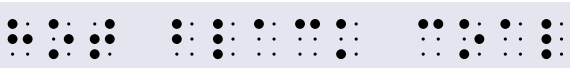
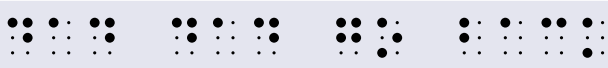
	c
	d
	h
	o
	t

Write these words. One space between the words, and double-spacing between the lines.

	back
	black
	dad
	child
	cold
	bath

Write these sentences.

	bill call a cab
	bill got a cab
	ali got a big ball
	a kid got a big bag
	aha a black cat
	a dog had a ball

	kick a ball
	dad had a big black book
	hot black coal
	dad dad go back
	look a hotdog a cold dog
	i had a hot bath

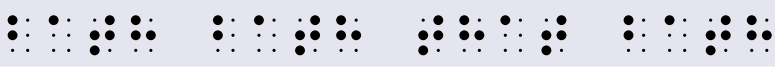
Exercise 4: Reading cdhot

- **Practice**

Read these letters and identify the odd one out in the row.

	c
	d
	h
	o
	t

Read these words and identify the odd one out in the row.

	aha aha aha oho aha
	hot hot cold hot hot
	bath bath that bath
	oil odd oil oil oil
	good good good bad

Exercise 5: Writing emnps

The child learns to write the letters **emnps**

- **Coaching points**

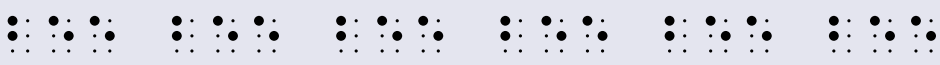
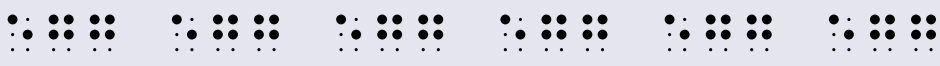
Letter	Dots	Braille
e	1, 5	
m	1, 3, 4	
n	1, 3, 4, 5	
p	1, 2, 3, 4	
s	2, 3, 4	

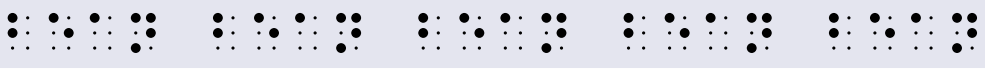
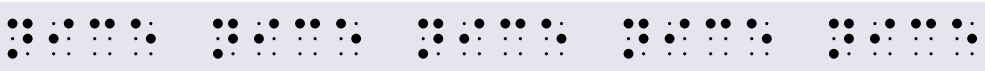
- **Practice**

Write the letters **emnps** across the page, with a space between each letter and double-spacing between lines.

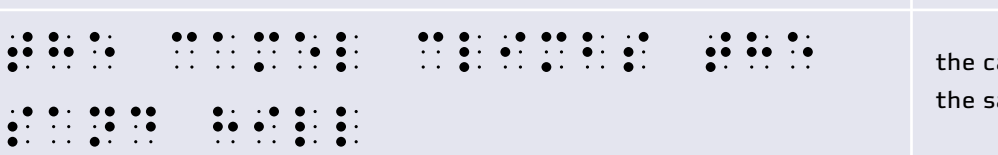
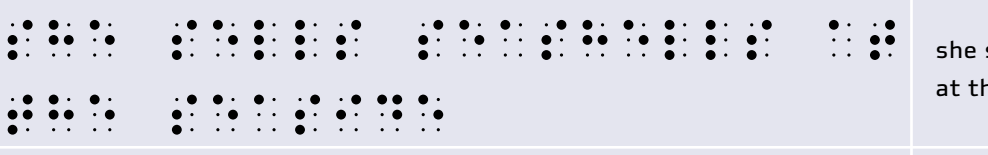
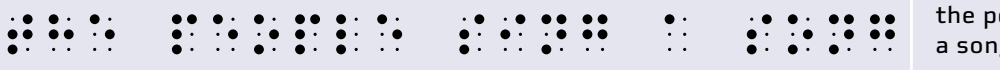
	e
	m
	n
	p
	s

Write these words. One space between the words, and double-spacing between the lines.

	bee
	egg
	mama
	magic
	milk

	bean
	nice
	pig
	pencil
	sheep
	song

Write these sentences.

	i like a big apple
	he goes to the school
	the camel climbs the sand hill
	the lion eats the big snake
	the boss sits at the desk
	tea and milk please
	the eagle chick is in its nest
	eggs beans and toast
	she sells seashells at the seaside
	the people sing a song

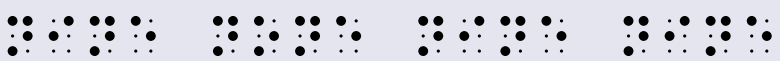
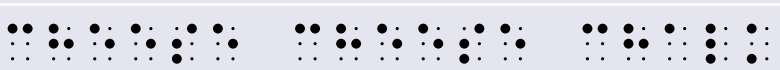
Exercise 6: Reading **emnps**

- **Practice**

  Read these letters and identify the odd one out in the row.

	e e e e e n e e e e e e
	m m m m m m m m m l m
	n n t n n n n n n n n
	p p p p p p p m p p p
	s s s s s s s t s s s

Read these words and identify the odd one out in the row.

	get get got get get
	began began bean began
	nine none nine nine
	cheese cheese chalk

Exercise 7: Writing **fruxy**

The child learns to write the letters **fruxy**.

- **Coaching points**

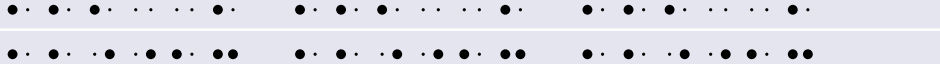
Letter	Dots	Braille
f	1, 2, 4	
r	1, 2, 3, 5	
u	1, 3, 6	
x	1, 3, 4, 6	
y	1, 3, 4, 5, 6	

■ **Practice**

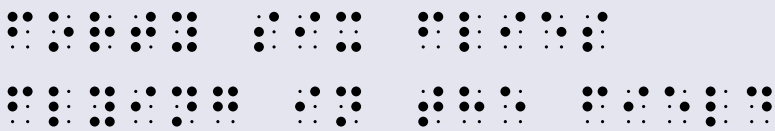
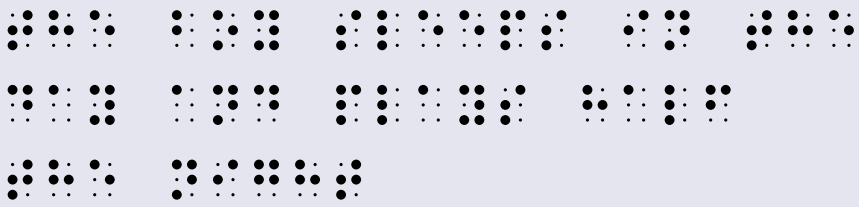
Write the letters **fruxy** across the page, with a space between each letter and double-spacing between lines.

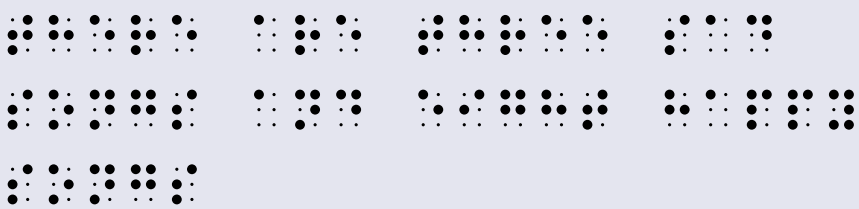
	f
	r
	u
	x
	y

Write these words. One space between the words, and double-spacing between the lines.

	face
	arm
	mother
	button
	six
	many

Write these sentences.

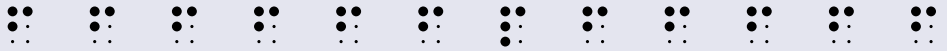
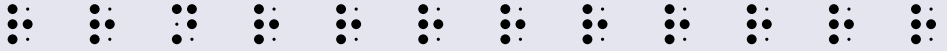
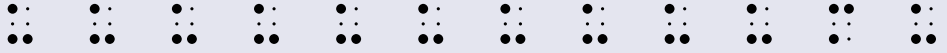
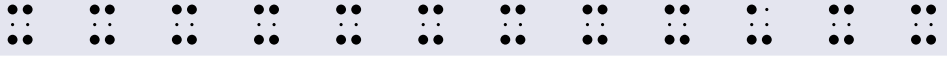
	forty six flies flying in the field
	the boy sleeps in the day and plays half the night

	there are three sad songs and eight happy songs

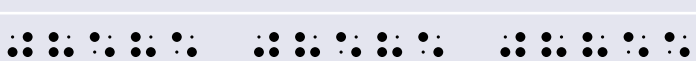
Exercise 8: Reading fruxy

- **Practice**

  Read these letters and identify the odd one out in the row.

	f f f f f f p f f f f f
	r r n r r r r r r r r r
	u u u u u u u u u u m u
	x x x x x x x x x u x x
	y y n y y y y y y y y y

  Read these words and identify the odd one out in the row.

	carpet carpet carp
	there there three
	out out rout out out
	box boy boy boy boy boy
	eighty eighty fifty eighty

Exercise 9: Writing jqvwz
The child learns to write the letters **jqvwz**.

Coaching points

Letter	Dots	Braille
j	2, 4, 5	
q	1, 2, 3, 4, 5	
v	1, 2, 3, 6	
w	2, 4, 5, 6	
z	1, 3, 5, 6	

Practice

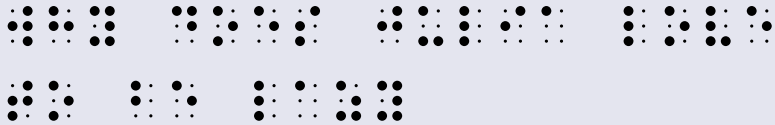
Write the letters **jqvwz** across the page, with a space between each letter and double-spacing between lines.

	j
	q
	v
	w
	z

Write these words. One space between the words, and double-spacing between the lines.

	jam
	quack
	eleven
	water
	zigzag

Write these sentences.

	the duck went quack
	james saw the queen
	why does julia love to be lazy

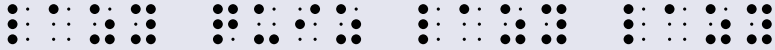
Exercise 10: Reading jqvwz

- **Practice**

Read these letters and identify the odd one out in the row.

	j
	q
	v
	w
	z

Read these words and identify the odd one out in the row.

	write write right
	yellow green yellow
	lazy quiz lazy lazy
	zoo zoo zoo zoo zoom

Appendix 4.9
Writing and reading exercises: Alphabetical order

These exercises introduce the letters in alphabetical order in batches: **a–e**, **f–j**, **k–o**, **p–t** and **u–z**.

Exercise 1. Writing a to e

The child becomes familiar with the working of the Perkins brailler ("finger memory") and practises writing the letters **a** to **e**.

- **Coaching points**

Letter	Dots	Braille
a	1	
b	1, 2	
c	1, 4	
d	1, 4, 5	
e	1, 5	

- **Practice**

Write the letters **a** to **e** across the page, with a space between each letter and double-spacing between lines.


a


b


c

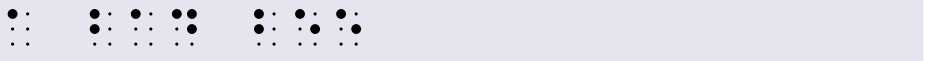
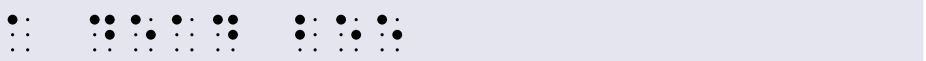

d


e

Write these words. One space between the words, and double-spacing between the lines.

	bad
	bed
	cab
	dead
	dad
	bade
	bee
	bead
	add
	ace

Write these sentences.

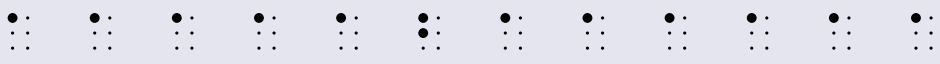
	a bad bee
	a dead bee
	a bad dad
	a bad bead
	a bad dead ace

Exercise 2: Reading a to e

The child learns to read letters a to e and can identify the odd letter in a row.

- **Practice**

  Read these letters and identify the odd one out in the row.

	a a a a a b a a a a a a
	b b b b b b b b c b b b
	c c c c c c c c c e c c
	d a d d d d d d d d d d
	e e e e e e e e e e d e

Read these words and identify the odd one out in the row.

	bed bed dead bed bed
	cab abd aad deed cab
	bad bad bad bad bead
	bee dead bee bee bee

Exercise 3: Writing f to j

The child learns to write the letters **f** to **j**.

- **Coaching points**

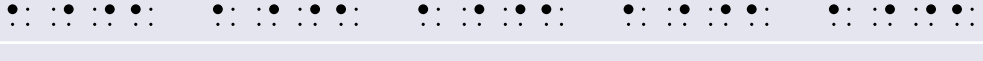
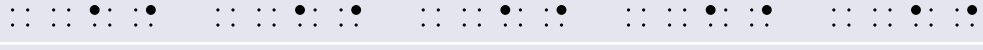
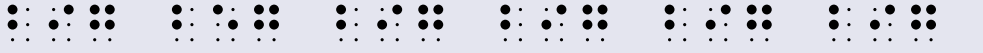
Letter	Dots	Braille
f	1, 2, 4	
g	1, 2, 4, 5	
h	1, 2, 5	
i	2, 4	
j	2, 4, 5	

■ **Practice**

Write the letters **f** to **j** across the page, with a space between each letter and double-spacing between lines.

	f
	g
	h
	i
	j

Write these words. One space between the words, and double-spacing between the lines.

	beef
	acid
	big
	hide

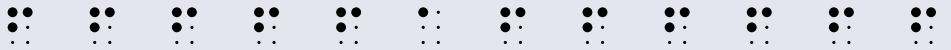
Write these sentences.

	he had a dice
	i hid a face
	i dig ice
	he had a big head
	did dad die

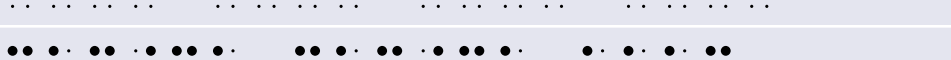
Exercise 4: Reading f to j

- **Practice**

Read these letters and identify the odd one out in the row.

	f f f f f a f f f f f f
	g c g g g g g g g g g g
	h h h h h h h h h h h i h
	i i i i i i i b i i i i
	j j j j j e j j j j j j

Read these words and identify the odd one out in the row.

	hide hide face hide
	decide decide decide head
	face face face fig face
	dig dig adage dig dig
	abide abide beef abide
	fig fig badge fig fig

Exercise 5: Writing k to o

The child learns to write the letters **k** to **o**.

- **Coaching points**

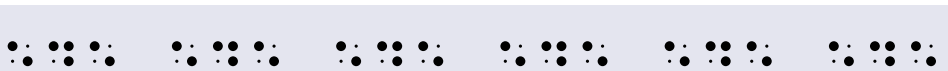
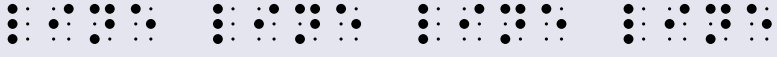
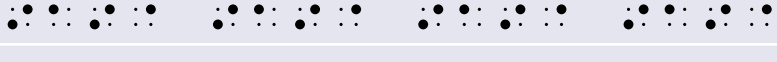
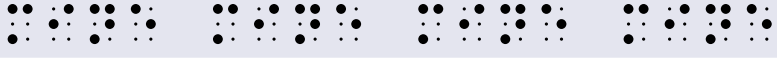
Letter	Dots	Braille
k	1, 3	
l	1, 2, 3	
m	1, 3, 4	
n	1, 3, 4, 5	
o	1, 3, 5	

■ **Practice**

Write the letters **k** to **o** across the page, with a space between each letter and double-spacing between lines.

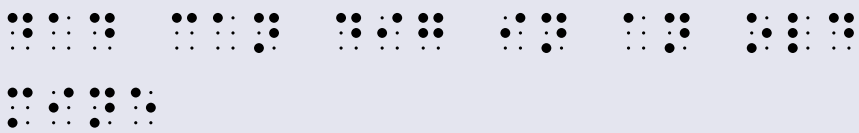
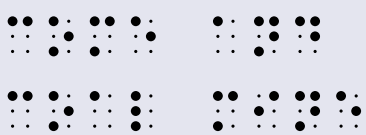
	k
	l
	m
	n
	o

Write these words. One space between the words, and double-spacing between the lines.

	one
	line
	home
	nine
	mine
	book
	milk

Write these sentences.

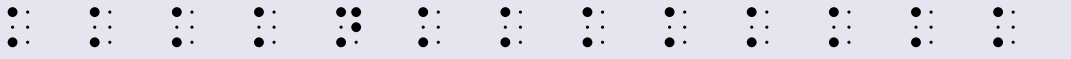
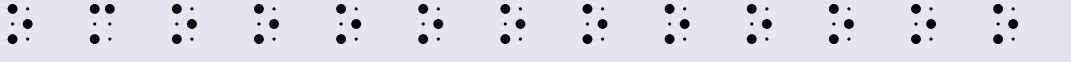
	i like milk
	an old man died
	a dog had a big bone
	i need a cake and cold coke

	dad can dig in an old mine
	come and dig in a coal mine

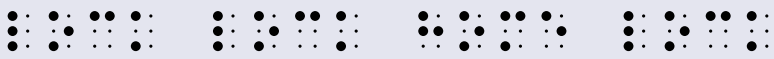
Exercise 6: Reading k to o

- **Practice**

  Read these letters and identify the odd one out in the row.

	k
	l
	m
	n
	o

Read these words and identify the odd one out in the row.

	lock lock home lock
	gold gold cook gold
	food noon food food
	mobile mobile hole
	moon moon laid moon
	kill kill melon kill

Exercise 7: Writing p to t

The child learns to write the letters **p** to **t**.

- **Coaching points**

Letter	Dots	Braille
p	1, 2, 3, 4	
q	1, 2, 3, 4, 5	
r	1, 2, 3, 5	
s	2, 3, 4	
t	2, 3, 4, 5	

- **Practice**

Write the letters p to t across the page, with a space between each letter and double-spacing between lines.

	p
	q
	r
	s
	t

Write these words. One space between the words, and double-spacing between the lines.

	pit
	rot
	red
	ten
	sit
	pot
	room

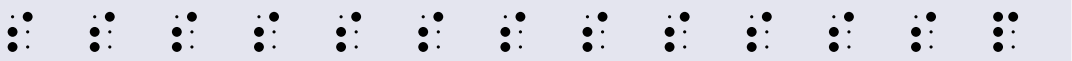
Write these sentences.

	this is a big room
	i like to bake cakes

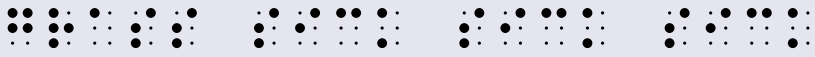
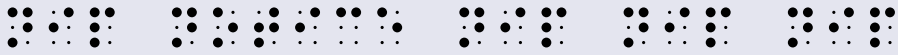
Exercise 8: Reading p to t

- **Practice**

  Read these letters and identify the odd one out in the row.

	p
	q
	r
	s
	t

Read these words and identify the odd one out in the row.

	pick pick kettle pick
	orange tap orange
	grass sick sick sick
	tea tea animal tea tea
	nip notice nip nip nip
	iron iron iron describe
	camp camp camp broke

Exercise 9: Writing u to z

The child learns to write the letters **u** to **z**.

- **Coaching points**

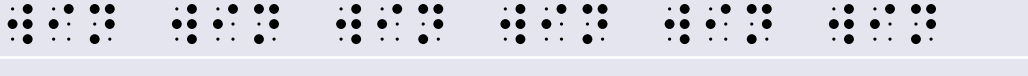
Letter	Dots	Braille
u	1, 3, 6	
v	1, 2, 3, 6	
w	2, 4, 5, 6	
x	1, 3, 4, 6	
y	1, 3, 4, 5, 6	
z	1, 3, 5, 6	

■ **Practice**

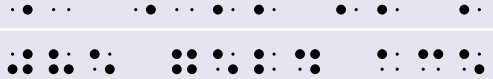
Write the letters **u** to **z** across the page, with a space between each letter and double-spacing between lines.

	u
	v
	w
	x
	y
	z

Write these words. One space between the words, and double-spacing between the lines.

	zip
	up
	van
	win
	axe
	you

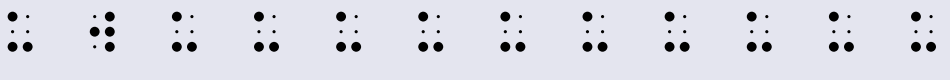
Write these sentences.

	we went to town by van
	the gold axe

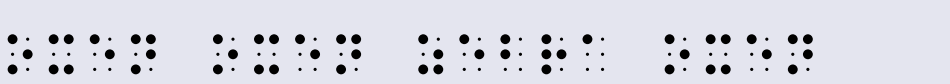
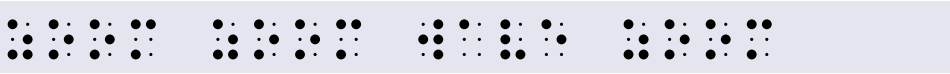
Exercise 10: Reading u to z

- **Practice**

  Read these letters and identify the odd one out in the row.

	u w u u u u u u u u u u
	v v v v v v v v v v v x
	w w w w w u w w w w w w
	x x x x x y x x x x x x
	y y x y y y y y y y y y
	z z z v z z z z z z z z

Read these words and identify the odd one out in the row.

	oxen oxen zebra oxen
	van van van wheel van
	news news axe news
	zoom zoom wave zoom
	vote vote write vote

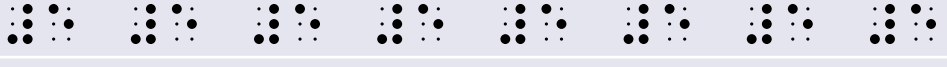
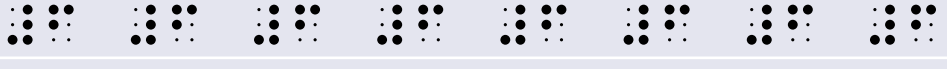
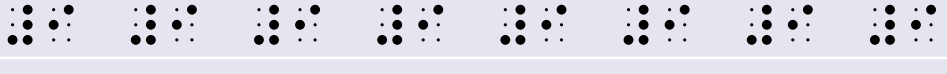
Appendix 4.10
Teaching numbers and basic mathematics signs

Exercise 11. The numeral sign and numbers

- **The number sign**
  Practise writing the number sign.

	#

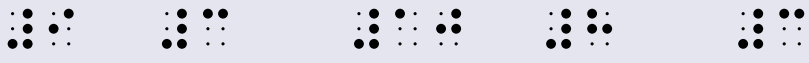
- **Writing numbers**
  Write the numbers 1–9 and 0 across the page.

	1
	2
	3
	4
	5
	6
	7
	8
	9
	10

- **Reading and writing numbers**
  Read, and then write, these numbers.

	1 2 3 4 5
	6 7 8 9 10

Read, and then write, these numbers.

	8 9 6 7 4
	1 5 2 10 2
	6 5 7 1 10
	9 3 10 8 3

- **Numbers from 10 to 20**

Read, and then write, these numbers.

	11 12 13 14 15
	16 17 18 19 20

Exercise 12. Arithmetic

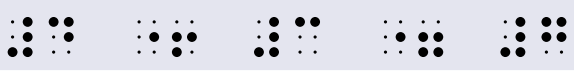
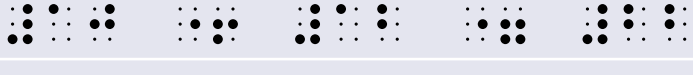
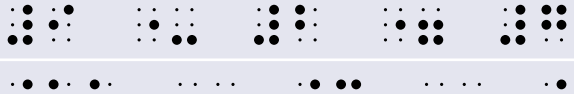
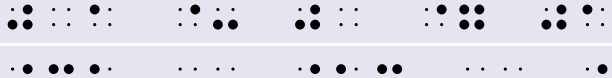
Learn basic arithmetic operators.

- **Coaching points**

Signs	Dots	Braille structure
Plus +	5 followed by 2, 3, 5	
Minus –	5 followed by 3, 6	
Multiplication ×	5 followed by 2, 3, 6	
Division ÷	5 followed by 2, 5, 6	
Equals =	5 followed by 2, 3, 5, 6	

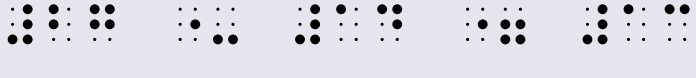
■ **Practice**

Write these equations in braille

	4 + 3 = 7
	6 + 3 = 9
	8 + 6 = 14
	10 + 12 = 22
	9 − 2 = 7
	12 − 3 = 9
	45 − 13 =32
	5 × 8 = 40
	10 × 12 = 120
	42 ÷ 6 = 7
	65 ÷ 5 = 13

Exercise 13. Reading numbers

Read these equations.

	25 + 36 = 61
	18 + 22 = 40
	73 + 9 = 82
	102 + 20 = 122
	27 + 14 = 41
	19 − 4 = 15
	45 − 15 = 30
	27 − 14 = 13

	2 × 9 = 18
	6 × 8 = 48
	10 × 10 = 100
	10 × 9 = 90
	25 ÷ 5 = 5
	72 ÷ 9 = 8
	56 ÷ 7 = 8
	49 ÷ 7 = 7

Appendix 4.11

Initial braille assessment: Letters and numbers

Use these forms to record the child's ability to read and write the braille signs. Put a tick against each sign that the child can read or write. Sum the scores at the bottom.

Letters: Abgikl order											
Name of child:											
Date:											
Braille	Print	Read	Write	Braille	Print	Read	Write	Braille	Print	Read	Write
⠁	a			⠑	e			⠚	j		
⠃	b			⠍	m			⠟	q		
⠛	g			⠝	n			⠧	v		
⠊	i			⠏	p			⠺	w		
⠅	k			⠎	s			⠵	z		
⠇	l										
⠉	c			⠋	f						
⠙	d			⠗	r						
⠓	h			⠥	u						
⠕	o			⠭	x						
⠞	t			⠽	y						
									Total a–z (out of 26)		

Letters: Alphabetical order											
Name of child:											
Date:											
Braille	Print	Read	Write	Braille	Print	Read	Write	Braille	Print	Read	Write
⠁	a			⠚	j			⠎	s		
⠃	b			⠅	k			⠞	t		
⠉	c			⠇	l			⠥	u		
⠙	d			⠍	m			⠧	v		
⠑	e			⠝	n			⠺	w		
⠋	f			⠕	o			⠭	x		
⠛	g			⠏	p			⠽	y		
⠓	h			⠟	q			⠵	z		
⠊	i			⠗	r						
					Total a–z (out of 26)						

Numbers											
Name of child:											
Date:											
Braille	Print	Read	Write	Braille	Print	Read	Write	Braille	Print	Read	Write
⠼⠁	1			⠼⠋	6			⠼⠖	+		
⠼⠃	2			⠼⠛	7			⠼⠤	–		
⠼⠉	3			⠼⠓	8			⠼⠦	×		
⠼⠙	4			⠼⠊	9			⠼⠌	÷		
⠼⠑	5			⠼⠚	0			⠼⠶	=		
								Total 0–9, + – × ÷ = (out of 15)			

Shatha Abusrour
Executive director of the Arab Forum for the Rights of Persons with Disability and rapporteur for the Palestinian Disability Coalition
facebook.com/AFRPD.DPIarab

4.13 Why braille?

I was born in 1985, which puts me around 37 years old. Sometimes I feel I am younger, other times older, depending on the moments and what they carry. I have been working and volunteering in the field of disability since 2005, assuming different roles in advocacy, research, empowerment, knowledge production, trainings and activism.

I believe I started learning braille at the age of 3 or 4. I learned it in two ways: one the use of tools like nails and boards with holes; the other was the practice on how to develop the touch skills that allow me to read braille written on a paper.

It is important for people to have the option to learn braille for so many reasons. Many people, including myself, like to have the chance to carry a book around and read it through the use of fingers, while listening to a breeze, or a bird, or low music. This excitement cannot be gained if we read through listening to an audio book or a book in any other format. In addition, it is better if we do note-taking in braille: if we use a laptop, we will not be able to solely concentrate with people because our hearing will be scattered between our device and the people around us. Moreover, there is something about hands being our window or gate to knowledge, either to gain it or express and share it something that has no words, something that is missing when we read or write through listening. Finally, it seems like braille learning and using has a lot to do with one or more components shaping our identity. Braille lovers like myself do not want to imagine a world without this piece or journey, it is one of so many things that make a group of individuals different.

Sometimes I use braille in note-taking. I also use it when I want to write something coming from the depth of my being.

Besides, I use it when I have a speech to make and I need information summarized between my hands and under my fingers. Finally, I use it when I find a book in braille that I care about.

I will not claim that I use it often because it is less of a way which allows for sharing information taking into account the fact that very few people know braille. Furthermore, the majority of us unintentionally fell for what is faster, more practical and more convenient. Additionally, very few organizations or libraries care to make books in braille available.

Braille is a way of reading and knowing that must continue to exist. Not only for the sake of what feels more beautiful and intimate, but also because there are people who do not see and do not hear, for whom braille could be their way to access information: a significant and basic right that should not be violated on the basis of individual different characteristics. On another note, people have the right to exist in a world that offers them choices, where they can experience it based on their own preferences, not just what is decided by someone else.

5. Advanced braille

Initial braille, covered in Chapter 4, gives someone the skills to read simple texts, make notes, and communicate in writing. For some people, this will be enough.

But braille can offer much more. The next step, known as “advanced braille”, consists of three major aspects.

- Grade 2 braille: teaching additional braille signs.
- Increasing reading and writing speed and fluency.
- Learning how to use new equipment.

5.1
Grade 2 braille

Grade 2 braille in English includes a range of signs and combinations of signs that are not part of Grade 1 braille. These include punctuation signs, wordsigns, contractions and mathematical signs. Grade 2 braille is sometimes called "contracted braille" because it uses contractions rather than spelling everything out letter by letter.

While Grade 2 braille saves space and time, it has disadvantages:

- The contractions diverge from the printed form of the word, and they do not give the reader a good feel of how words are spelled.
- It is necessary to memorize the contractions and the rules that go along with them. This may be beyond the capabilities of some learners.
- It can take several months or years to learn Grade 2 braille.
- Grade 2 braille has too many rules to cover all of them in this manual, and the specific contractions and rules may vary, depending on the particular variety of braille used in your country.

5.1.1
Varieties of braille

The major varieties of English braille are:

- Unified English Braille.
  iceb.org/Rules%20of%20Unified%20English%20Braille%202013.pdf
- Standard English Braille (British braille).
  www.ukaaf.org/wp-content/uploads/2020/03/Standard-English-Braille-PDF-file.pdf
- English Braille, American Edition.
  brailleauthority.org/formats/formats2011.html

This book uses Unified English Braille. It has been officially adopted by all English-speaking countries, but it is not yet used universally. Many teaching and learning materials, and many books, are still available in the older varieties of braille.

The main differences between these previous versions and Unified English Braille are:

- Some contractions are no longer used in Unified English Braille.
- UEB puts a space before and after all wordsigns, such as **and** ⠯ and **the** ⠮
- Some punctuation and composition and general symbols are not used in UEB.
- UEB uses a different system for numbers from Nemeth braille, a system commonly used in the United States for mathematics notation.
- Other versions of braille have special codes for mathematics, science, computer notation and other technical subjects.

See **Appendix 6.2** for a list of symbols used in British braille but not in UEB.
Make sure you know which version of braille you need to use before you develop or buy teaching materials.

Braille written in some other languages (including French and German) also use contractions – though different ones to English. Others (including Dutch) do not use contractions.

5.1.2
Teaching techniques for Grade 2 braille

You can use many of the same techniques used in teaching Grade 1 braille for teaching Grade 2 braille. See especially the sections in **Chapter 4** on:

- Teaching letters
- Making words
- Making phrases and sentences.

For example, if you already use flashcards to teach the braille signs and words, you can make extra cards with the contracted forms.

Additional ideas:
Memory game. Use the alphabet flashcards as a memory game. Give a card with an alphabet symbol to the child and ask them what whole word that letter stands for.

Or make an extra set of cards with the alphabet wordsigns spelled out in Grade 1 braille. Then ask the child to match the individual letters with the spelled-out words.

Bingo game. Make bingo cards with 6–9 different spelled-out words in Grade 1 braille. Make individual cards with the Grade 2 equivalents. Put these cards into a bag. Draw one card out at a time. Get the child to read it. The child must say whether the word is on their bingo card. When all the words on the bingo card have been matched, the child calls out "bingo!"

Writing. Make sure that the child learns to write the new signs and contractions in Grade 2 braille. This will reinforce their ability to remember the signs and rules, as well as strengthen their reading abilities.

5.1.3
Teaching contractions in batches

The contractions fall into various logical batches or sets. Most of the signs in each set have something in common: they stand for similar letter combinations, and using them must follow a similar set of rules.

That means you can teach each set in turn, explaining these similarities and rules as you cover each one. Give the child plenty of practice with each set before moving on to the next set.

The sets are as follows (in rough order of teaching):

- Alphabet wordsigns
- Punctuation signs (introduced as they arise)
- Composition signs (introduced as they arise)
- Upper braille signs
- Lower braille signs
- Two-character wordsigns
- Abbreviations

Specialized fields have their own braille signs. These include:

- Mathematics
- Science
- Foreign languages
- Music

5.1.4
Covering contractions as they arise

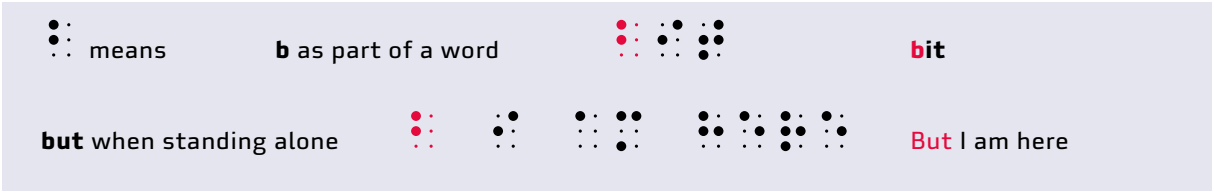
It will probably not be possible to introduce all Grade 2 contractions in a systematic way. If the child is reading braille texts, they will come across contractions they have not yet learned. Explain what these are, and make exercises with the new signs to help the child remember them. Make a checklist of the contractions the child has learned to make sure that all are being covered.

5.1.5
Distinguishing between meanings

Many Grade 2 signs mean different things depending on where they appear in a word or sentence.

Example

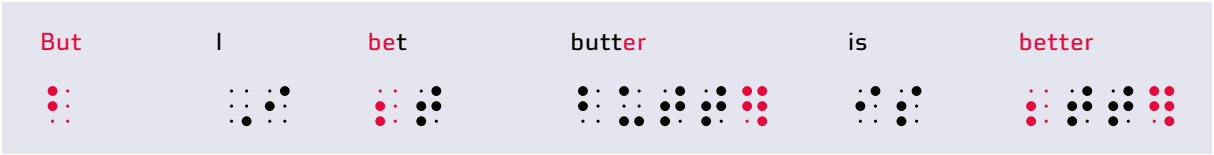
Grade 2 contractions in red.



You can make word games and exercises to help the child identify each set of contractions.

Example

Grade 2 contractions in red.



5.1.6
Alphabet wordsigns

If it stands by itself, each letter of the alphabet stands for a complete word. There are 23 signs like this. The remaining three letters (**a**, **i** and **o**) are already words in their own right.

All the words begin with the relevant letter except **x** (**it**) and **z** (**as**).

Because the child already knows the letters, it is easy for them to learn the new rule and the meaning.

The *Hands On* series produced by the Royal National Institute of Blind People in the UK teaches these alphabet wordsigns along with Grade 1 braille.

									
a a	b but	c can	d do	e every	f from	g go	h have	i I	j just
									
k knowledge	l like	m more	n not	o O	p people	q quite	r rather	s so	t that
									
u us	v very	w will	x it	y you	z as				

All these wordsigns can stand as independent words in a braille sentence. They should not be used as part of another word in a braille sentence.

Example
Grade 2 contractions in red.

I	rather	have	knowledge.
			

5.1.7
Punctuation signs

Most of t common punctuation signs use the bottom two rows of the braille cell. These are called "lower signs" because they do not use the two top dots, 1 and 4. To help the child learn them, you can explain that they are like letters that have been moved down a row.

			
a	comma (,) lower a	b	semicolon (;) lower b

Along with teaching the braille sign, you will need to teach the meaning of the punctuation signs. Some are easy to understand: "A full stop always comes at the end of the sentence." Others, such as the colon and semicolon, are less obvious and more difficult.

The sign  (open quote or question mark) has two meanings, depending on where it appears in relation to other signs.

The lowered g sign ⠶ is used in British braille for both open and close parentheses. It is not used in this way in UEB.

comma	semicolon	colon	full stop	exclamation
,	;	:	.	!
⠂	⠆	⠒	⠲	⠖
lower a	lower b	lower c	lower d	lower f
open parenthesis	close parenthesis	open quote	close quote	hyphen
(	)	“ or ?	”	-
⠐⠣	⠐⠜	⠦	⠴	⠤
		lower h “ before a word ? after a word	lower j	bottom c

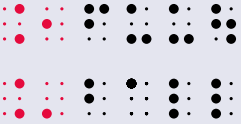
5.1.8
Composition signs

“Composition signs” are symbols that are not found in print. They indicate things like capitals, italics and numbers.

You can explain that they work like “on” switches: they turn the next letter (or word, or series of words) into a special form. You may need a special “terminator” sign to turn the switch off again.

The number sign affects all the signs that follow it up to the next space (or other sign that cannot be part of a number).

Braille sign	Meaning	What it does	Example	Meaning
⠠	Capital letter	Makes the following letter a capital	⠠⠁	A
⠠⠠	Capital word	Makes the following word all capitals	⠠⠠⠁⠃⠉	ABC
⠠⠠⠠	Capital passage	Makes the following passage all capitals	⠠⠠⠠⠺⠑ ⠮ ⠀⠏⠑⠕⠏⠇⠑	WE THE PEOPLE
⠠⠄	Capitals terminator	Reverts to lowercase	⠠⠠⠁⠃⠠⠄⠉⠙	ABcd

Braille sign	Meaning	What it does	Example	Meaning
	Italic symbol	Makes the following letter italics		*x*
	Italic word	Makes following word italics		*xyz*
	Italic passage	Makes the following passage italics		*et al.*
	Italic terminator	Stops italics		*foot*ball
	Number	Turns following letters into numbers		123
	Letter	Turns following signs into letters		1a

The rules for composition signs are different in British braille.

5.1.9
Upper braille signs

"Upper" signs are signs that have one or both of the two top dots (dots 1 and 4). All 26 letters from **a** to **z** are upper signs. Grade 2 braille uses the remaining upper signs to stand for common words, syllables or letter combinations.

These are new signs for the child, so you should introduce them gradually and give the child plenty of practice.

The upper braille signs fall into four groups.

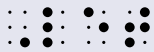
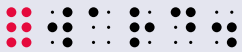
Group 1: Whole words.

and	for	of	the	with
				

These wordsigns can stand on their own as words in a braille sentence. They can also be used as part of other words in any position, whether beginning, middle or at the end.

When they come in a sequence in a meaningful braille sentence, they can be written unspaced from each other. (In Unified English Braille, they must be spaced apart as they are in print.)

■ **Example**
Grade 2 contractions in red.

Let	me	go	forward.
			

Group 2: Combinations with H.

ch	gh	sh	th	wh
child		shall	this	which
				

These signs can be used in any part of a word. Four of the signs stand for certain whole words if they stand alone or are next to a punctuation mark.

■ **Examples**
Grade 2 contractions in red.

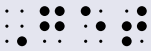
That	is	my	child.
			
I	shall	go	home.
			
This	book	is	nice.
			
Which	book	is	this?
			

Group 3: Syllables

ed	er	ou out	ow
			

These signs can be used in any part of a word: beginning, middle or end.
The sign OU stands for out when it stands alone or touches a punctuation sign.

- **Example**
  Grade 2 contractions in red.

Get	out	of	my	house!
				

Group 4: Syllables

st	ar	ing
		

5.1.10 Lower braille signs

The "lower signs" use only combinations of the lower four dots in the braille cell. You can help the child remember them by saying they are like the equivalent letters, but lowered down one row. They stand for contractions: either syllables or short words.

You can teach these signs as "lower" forms of the equivalent letters.

Some of these lower signs are the same as punctuation marks. The rules for using the signs tell you whether a sign is one of the contractions or a punctuation mark.

For example,  standing by itself is the word **be**; at the start of the word it is the prefix **be-**; in the middle of a word it is **-bb-**; and at the end of a word it is a semicolon.

This can be very confusing. It is not enough for the child to learn to identify the sign. They must also learn the rules for when it can be used and for what it means in which situation.

- **Examples**

	Alone	be		To be or not to be
	At the start of a word	be-		believe
	In the middle of a word	-bb-		rubber
	At the end of a word	; (semicolon)		go; went; gone

Some of the braille signs in the example above are Grade 2 contractions described elsewhere in this chapter.

Group 5: Any part of a word

en enough	in
	
Lower e	Lower i

These two signs can be used in any part of a word. They should not be used alone when next to a punctuation sign. This is because two lower signs should not stand on their own as it is hard to distinguish them from the equivalent upper signs.

EN by itself means **enough**.

- **Examples**

Grade 2 contractions in red.

Come	in	please.			
					
I	have	got	enough	of	this
					

Group 6: Word beginnings

be	con	dis
		
Lower e	Lower i	Lower d

These signs come only at the beginning of a word, but not in the middle or at the end (where they would have another meaning, such as a double letter or a punctuation mark).

- **Examples**

Grade 2 contractions in red.

DIScomFORt	uncomFORtable	BEfriend
		

Group 7: Double letters in the middle of a word

ea	bb	cc	ff	gg
				
Lower a	Lower b	Bottom c	Lower f	Lower g

These signs are used only in the middle of a word.

- **Example**

Grade 2 contractions in red.

middle	bigger
	

Group 8: Other words

were	his	was
		
Lower g	Lower h	Lower j

5.1.11
Two-character wordsigns

These contractions consist of two braille signs: an initial sign (with dots 4, 5, or 6 or some combination of these) to indicate that this is a wordsign, plus a second sign to carry the meaning. The second sign normally is the first letter of the contraction.

- Wordsigns with dot 5 ⠈ These are common whole words, such as “day”, “ever” and “father”. There are about 20 of these.
- Wordsigns with dots 4 and 5 ⠘ There are only 4 of these.
- Wordsigns with dots 4, 5 and 6 ⠸ There are 6 of these.
- Wordsigns with dots 4 and 6 ⠨ There are 5 of these.
- Wordsigns with dots 5 and 6 ⠰ There are 7 of these.
- Wordsigns with dot 6 ⠠ There are only 2 of these.

Group 10: Wordsigns with dot 5: whole words

		⠈⠉	⠈⠙	⠈⠑	⠈⠋	⠈⠛	⠈⠓		⠈⠚
a	b	c Christ	d day	e ever	f father	g God	h here	i	j Jesus
⠈⠅	⠈⠇	⠈⠍	⠈⠝	⠈⠕	⠈⠏	⠈⠟	⠈⠗	⠈⠎	⠈⠞
k know	l lord	m mother	n name	o one	p part	q question	r right	s some	t time
⠈⠥		⠈⠺		⠈⠽					
u under	v	w work	x	y young	z				

These signs can be used as part of a word, with certain specific conditions.

- **Examples**

Grade 2 contractions in red.

You	will	make	a	nice	partner.	
⠘⠽	⠘⠺	⠘⠍⠁⠅⠑	⠘⠁	⠘⠝⠊⠉⠑	⠘⠏⠁⠗⠞⠝⠗⠲	
This	is	the	right	thing	for	you.
⠘⠹⠊⠎	⠘⠊⠎	⠘⠮	⠘⠗⠊⠛⠓⠞	⠘⠹⠊⠝⠛	⠘⠿	⠘⠽⠳

Group 11: Wordsigns with dots 4, 5: whole words

			
u	w	wh	th
upon	word	whose	those

The four signs can be written as independent words on their own.
The four signs can be used as part of a word – but only if they retain their original meaning. In the word **coupon**, the contraction UPON should not be used because the part UPON does not carry the original meaning.
So **coupon** is written in braille as cOUpon  and not as coUPON 

Group 12: Wordsigns with dots 4, 5, 6: whole words

					
c	h	m	s	THE	w
cannot	had	many	spirit	their	world

These words can be used on their own right as independent words.
They can also be used as parts of other words in any position.

- **Examples**

Grade 2 contractions in red.

I	cannot	eat	many	cakes.
				
I	am	attending	their	wedding.
				

Group 13: Wordsigns with dots 4, 6: suffixes

				
d	e	n	s	t
ound	ance	sion	less	ount

These signs all represent common suffixes. The last letter of the suffix is the letter used for the contraction (**d** is the last letter of -**ound**).
These signs may be used in the middle or the end of a word, but not at the beginning.

Group 14: Wordsigns with dots 5, 6: suffixes

			
e	g	l	n
ence	ong	ful	tion
			
s	t	y	
ness	ment	ity	

These signs also all represent common suffixes. The last letter of the suffix is the letter used for the contraction (**s** is the last letter of -**ness**).

These signs may be used in the middle or the end of a word, but not at the beginning.

- **Examples**

  Grade 2 contractions in red.

hence	government	pity
		

5.1.12 Abbreviations

Standard abbreviations

Braille can be used to write standard abbreviations and acronyms as in print. If an abbreviation is in all capitals, two capital signs  are used.

etc.	Mon. Monday	AU African Union	EU European Union
			

Braille abbreviations

Braille abbreviations are short forms of words which are represented by one or more letters from the word. Braille abbreviations can be written with and without contractions. See **Appendix 5.1** for a list.

5.2
Increasing reading and writing speed and fluency

The advanced braille stage begins when a learner is able to read simple sentences in alphabetic braille letters, braille numerals and the most important punctuation signs. As the learner progresses further, they will encounter Grade 2 braille with its many short forms: wordsigns, contractions and composition signs.

Sighted readers learn how to recognize words rather than individual letters. They learn to scan lines of text and learn how to predict which words are likely to come next. They also learn that books consist of words, sentences, paragraphs and chapters, with headings and punctuation acting as signposts to guide the reader through the text.

The same is true of braille readers. They learn to read with several fingers and with both hands. They practise the accuracy of their reading. And they learn how to navigate through books.

See **Appendix 5.1** for an observation checklist for good reading skills.

5.2.1
Reading technique

Touch lightly. It is easier to read if the fingertips are only lightly brushing the braille text, not pressing down on it. The most sensitive part of the fingertips is just below the tip, but not the fleshy part further back towards the joint. The child's hands should be curved so that the second joints of their fingers are only a little higher than the first joints. Their wrists should be just above the page.

Reading with six (or eight) fingers. Good reading technique uses six fingers (the index, middle and ring finger on each hand), or even eight fingers (with the little fingers too) rather than just one or both index fingers. Make sure the fingers are positioned correctly. The index fingers are the real reading fingers, while the other fingers help to follow the correct line. The right middle and ring finger (also the little finger too) give the reader an idea of how long the word or sentence is. The left middle and ring fingers help to quickly find the new line.

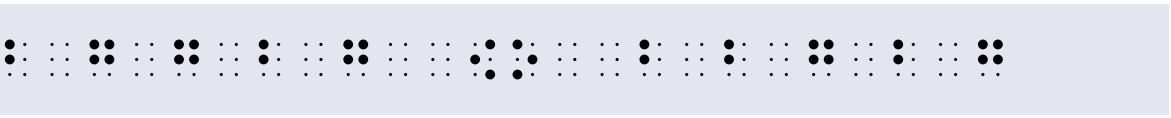
Reading using all the fingers. All the fingers are in a straight line, following the row of braille.

Reading with both hands. When a braille reader read with both hands, they scan the left side of a text with the left hand and the right side with the right hand. Learning this technique takes practice. You can teach this technique in stages.

1. The child reads across the whole line with both hands together. (This is the technique the child already uses.)
2. The child uses the left hand to read halfway across the line together with the right hand. Then they leave the left hand in the middle and continue with just the right hand to the end of the line.
3. The child separates the hands: they read the left half of the line with the left hand, then continue using the right hand to read the right side of the line. Meanwhile, the left hand searches for the next line to make a start there.

Some pupils have a strong preference for one hand, so find this technique very difficult. It is important to keep practising the technique until it becomes automatic. This can take several years. Practise turning pages: continue reading with one hand while the page is being turned.

Switching hands. To help the child get used to switching hands while reading, you can prepare worksheets with a special symbol in the middle to indicate where to switch. Here is an example:



Practise with one hand. Get the learner to practise reading with one hand. This makes it possible to two things at once, such as reading and making notes, or comparing two texts.

Strengthen the weaker hand. Most learners have a dominant hand which will read most or all of the line. To overcome this, get the weaker hand follow the other one until it starts to help with the work. Tell the learner to use the weaker hand to read at least one word at the beginning or end of the line. This is slower at first, but with practice will speed things up.

Checking the reading technique. Is the child using several fingers and both hands? Are they applying the right amount of pressure? Is the sitting posture correct?

5.2.2
Reading accurately

Accuracy is especially important for braille readers. Visual readers can go back to check something they have misread, and can look ahead to see what is coming. This is difficult or impossible for braille readers.

When a braille reader keeps reading by spelling letter by letter, try to find out why. Is it because of certain mirrored letters such as e ⠑ and i ⠊ ? Certain groups of letters, punctuation signs, or the use of the capital letter sign? The new signs and contractions introduced in Grade 2 braille?
Once you have identified the problem, give the child additional training.

Reading out loud. Get the child to read the text out loud to check on the speed and accuracy of their reading. Get the children (including blind children in the class) to read in turns, or to read together. A pupil who reads by guessing, making lots of mistakes, and who is encouraged to increase their reading pace will only make more mistakes.

Make sound recordings and play them back to the child. That will give them a better idea of their reading behaviour.

Flashcards. Use flashcards to help the child practise the contractions in Grade 2 braille.

Timing. Use a stopwatch to time the child as they read a text. This will make them aware of their reading pace. Give encouragement and a prize for a good performance – though be careful not to discourage the child for working slowly.

Predicting words. Sighted readers learn patterns in words: they learn the shape of a word rather than spelling out the individual letters. Help the braille learner do the same: blank out certain letters using all six dots ⠿ and ask if they can guess what the word is.

Uganda	lemonade	ice cream
UganXX	lemonaXX	ice crXXX
		

Working out the logic. Help the child work out what word or phrase to likely to come next in a sentence.

- "I want" is often followed by "to", "a" or "the".
- "He went" is often followed by "to".
- "The" is followed by a noun or an adjective.
- "George and" may well be followed by another name.

You can make a game out of this. Cover selected braille words with tape and ask the child to guess what they might be. Or block off the last five characters in each line of text by stretching a rubber band around the book, then asking the child to predict what words are blocked off. It is important to predict, not guess. Ask the child **why** they think those particular words will appear next.

Reading by singing. With reading by singing, the first letter is pronounced and elongated until the next letters follow. Instead of saying "s-t-r-e-a-m, stream" the child reads: "sssssttttrrrrreeeeeam". The letters are not pronounced separately but in a sequence. This lets the pupil experience the word more as a unit.

5.2.3
Increasing the reading pace

The child must be able to read accurately before you should try to increase their reading speed. Reading braille is slower than reading print – about twice as long. But if a child reads too slowly, this can affect their motivation and ability to perform in school. Reading slowly is more taxing on the memory, and slow reading does not encourage a child to read something repeatedly.

This means that once a child can read braille accurately, you will need to train them to read more quickly. Some ideas are below. Note: not all of these are suitable for all children.

Warming up. Warm up the hands and fingers before reading.

Posture. Develop a relaxed posture by doing relaxation exercises. Make sure the child does not apply too much pressure with the fingertips.

Avoiding rubbing. Avoid the fingers “rubbing” (moving up and down on a braille sign).

Read silently or out loud along with good readers.

Moving text. Have the braille text slide along underneath the fingers at a certain (high) speed.

Memory exercises. Have the learner read two texts, then discuss them both, without allowing them to return to either text.

Reading two texts at the same time. Get the child to read two texts at the same time: one with the left hand, and one with the right. For example, the left hand reads a text while the right hand reads a copy to check whether phone numbers, strange words, etc. are identical.

Learning to skim. Sighted readers speed-read by skimming text. This is possible in braille too. The reader can gather the sense of a passage by reading the first lines of short paragraphs and the first and last lines of slightly longer ones. If the paragraph is quite long, they can read a few middle lines as well.

When reading a conversation, it is possible to skip phrases like "he said," "she asked," "I explained" at the beginning or end of a line. (They are important in the middle of a paragraph, though, as otherwise the reader doesn’t know who said what.)

Developing a sight vocabulary in braille. Sighted readers learn to recognize the shape of words rather than having to read every letter. Braille readers can do the same. They can learn to recognize particular common words or letter combination. One way to practise this is to carry a set of flashcards with frequently used words or phrases on each. Starting with words with no more than four braille characters, the learner can build up to longer words and phrases until they can recognize them immediately. They can study them on the way to school, and add new ones when they have memorized the old ones.

Recognizing short words makes it easier to read longer ones. Short words are often part of longer words: “able” is also found in “table”, “unable” and “regrettable”.

Set achievable goals. Set goals for the learner to read each day. Start with a small amount, but once they have achieved this regularly, set a new, higher goal. Make sure they keep up their commitment every day. Find material that is interesting and enjoyable. It does not have to be at the learner’s intellectual level. Many adults enjoy reading children’s stories, for example. The goal is to increase reading speed, not necessarily to learn new content. Short stories from braille magazines can give the learner a sense of achievement of having read a complete story.

Make reading convenient. Allow the learner to take reading materials home, and to put reading materials in places where they like to spend time: next to a favourite chair, in the kitchen, or next to their bed. Encourage them to keep a braille calendar in their pocket or handbag, start a notebook for addresses and phone numbers, or make recipes in braille.

Get audio feedback. Get the learner to read braille at the same time as you are reading it out loud (or use a screen reader or audiobook to read out the same text). Then get the learner to read it again, this time without the audio reinforcement. Get them to record their own voice as they are reading out the text. Time the recording. Then get them to repeat it, but to try to read faster.

Try to avoid double-checking. Many braille readers develop a habit of going back over a word to double-check that they have read it correctly. Discourage this. It is often not necessary to read everything exactly (certain situations and fields, such as mathematics, are an exception). The reader's hands should be constantly moving forwards, not backwards to check a word.

5.2.4
Orientation on the page and in books

Help the child practise looking up and finding information on a page or in a book. This is a strategy that must be taught.

Finding text on a page. Teach the child to explore the layout of a page by making a zigzag movement across the page with one or both hands without reading any information.

Identifying words. Later, the child can quickly recognizing some words on the page, and then add more and more words.

Finding information. Teach the child to quickly search a page for certain information:

- "Find your name on this page."
- "Where is the word **imagine** on this page?"
- "What does the paragraph say about ___?"

Understanding the text structure. Teach the child how to recognize the book title, how to read the table of contents and chapter headings, and how to find the correct lesson or page in a book.
Reading strategies and comprehension

Focus on content. Get the child to focus on the content of the sentence or paragraph.

Following examples. Read a text out loud, sentence by sentence. Get the child to read each sentence in turn out loud, and to imitate your intonation.

Stimulate the memory. First get the child to read the title of a book or chapter. Then ask them what they already know about this story or subject.

Give the questions first. Give the child a set of questions before they read a text. Then let them read the text and answer the questions.

Multiple-choice questions. Use multiple-choice questions to test the child's reading comprehension.

Number the text lines. This makes it easier for the child to find the relevant part of the text.
Text and questions on separate pages. After the child has read the text, they can read the questions with one hand and find the answers in the text with the other.

Practise, practise, practise. Braille readers will need a lot of practice to build their vocabulary and become fluent readers. This is difficult given the often-limited amount of reading material available. Make sure the child can get as much reading as possible, and make sure that this material is interesting, entertaining and stimulating.

Ensuring understanding. Blind people may have a different, more limited understanding of certain concepts because they cannot see them. Ask questions that probe their whether they understand concepts, and explain them again if necessary.

5.2.6
Developing study skills

Just as sighted children need to learn study skills, so to do braille readers. It is necessary to teach this explicitly because they do not have visual clues and cannot see what their classmates are doing.

Independent study. Teach the child to study non-fiction texts independently and methodically.

Organizing work. Teach them how to organize their work – their desks, work surface, storage areas and workbooks – so they can find equipment and materials easily.

Note-taking. Teach note-taking during classes and while reading. Teach several writing techniques (slate and stylus, brailler, computer) to give the child flexibility.

Summarizing. Teach the child how to summarize longer texts, and how to distinguish between main and side-issues.

5.3
New reading and writing equipment

A wide range of equipment and software is available for blind and partially sighted learners. Special software makes computers and mobile phones more accessible for blind and visually impaired people. The possibilities are expanding as technology advances.

Teach the child how to use the equipment they will need for schoolwork and in later life. Which equipment to teach will depend on the circumstances and the availability of equipment in the school, which in turn depends on funding.

Ideally, the child should learn several techniques – slate-and-stylus, Perkins brailler and computer – and not just one. This will give them flexibility in their future learning and in their later life and career. Some school subjects may require the child to learn how to use a particular piece of equipment, or specialized braille notation. Mathematics, for example, may require the use of a calculator or computer, or the use of mathematical symbols in braille. Coordinate with teachers of these subjects to find out what the requirements are and how you can support each other.

5.3.1
Types of equipment and software

Computer. Students can learn how to touch type using a standard keyboard (and get audio feedback on what they have written). Software can also turn a regular keyboard into a Perkins keyboard, enlarge type for partially sighted learners, and read out text in audio form.

Many computer programs (including Windows and standard office software) have accessibility options to make it possible for blind and visually impaired users to use them. Options include magnifying the type and other elements on the screen (for partially sighted users) and audio feedback via headphones.

Refreshable braille displays. These are devices with special keys to input braille text (like the mechanical Perkins brailler), as well as a tactile display with one or more lines of retractable round-headed pins that form braille signs.
Some refreshable braille displays can display 8-dot braille as well as standard 6-dot braille.

Audio screen readers. These are computer programs that read out what is displayed on a computer screen, as well as what is entered on the keyboard. Screen readers include JAWS, Zoom Text and NVDA.

Audiobooks. Audiobooks are audio recordings of books and other materials. They come in a variety of formats, including CD-ROM, MP3 and streaming services. They can be listened to on a computer, mobile phone, MP3 player, or standalone players such as DAISY.

See **Chapter 7** for details of these and other technologies.

5.4 More information

5.4.1 General

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www.eduvip.nl/het-vernieuwde-curriculum-braille/

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Unified English braille

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Standard English braille (British braille)

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Braille Authority of the United Kingdom. Braille mathematics notation.
chezdom.net/wp-content/uploads/2008/07/bmn.pdf

Braille Authority of the United Kingdom. British Braille Science notation.
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RNIB. 2004. British braille. A restatement of Standard English Braille, compiled and authorized by the Braille Authority of the United Kingdom.
www.ukaaf.org/wp-content/uploads/2020/03/Standard-English-Braille-PDF-file.pdf
[British braille, now superseded by Unified English Braille]

5.4.4
English braille, American edition (American braille)

BANA (Braille Authority of North America). 2011. Braille formats, Principles of print-to-braille transcription.
brailleauthority.org/formats/formats2011.html
[American braille, now superseded by Unified English Braille]

Gotwals, R.R. BRL: Braille through remote learning. Session 2: Abbreviations.
www.brl.org/codes/session02/abbrev.html

5.5
Appendices

Appendix 5.1
Observation list for good braille reading skills

Source: Visio. 2021. Curriculum braille.

Use this list to check the skills of braille readers from the age of 8 or 9.

Braille readers from the age of 8 or 9
Name of student:
Date:

Before reading

The student uses a rubber pad, if necessary. (A rubber pad is required when reading a single page.)	Yes	No	
The chair has the right height (the feet need support).	Yes	No	
The table has the right height (the student's elbows should be a little higher than the top of the desk or table being used).	Yes	No	
The student warms their fingers up before beginning to read.	Yes	No	
The student orientates themself with a flat hand across the page.	Yes	No	

Sitting position while reading

The student sits straight up	Yes	No	
The book is well-positioned (body centered)	Yes	No	
The shoulders are relaxed	Yes	No	
The elbows are relaxed and positioned down to the body	Yes	No	
Both feet are next to each other	Yes	No	

Reading technique

The index fingers are parallel to each other	Yes	No	
The student uses six (or eight) fingers horizontally on one line	Yes	No	
The fingers are slightly bent	Yes	No	
The thumbs are downwards	Yes	No	
The student shows no vertically regressive hand movements	Yes	No	
The student uses very little pressure when touching the braille dots	Yes	No	
The touch is adequate: "tickle the dots". The fingertips should not be white while reading	Yes	No	
On demand, the student can read a text with only the right hand	Yes	No	
On demand, the student can read a text with only the left hand	Yes	No	
The left hand reads half of the line, the right hand takes over in a fluent movement.	Yes	No	
The student uses a two-handed reading technique in which the left hand locates the beginning of the next line, while the right hand finishes reading the previous line	Yes	No	
The student is aware of the importance of a good reading technique to improve the reading speed	Yes	No	

Put a cross in the empty cells where the answer was a "no" and formulate goals.
Discuss the goals for the coming period with the student.

Goals for the coming period

1
2
3

Amton Mbangeni
Primary school teacher, South Africa

5.6 Why braille?

I am a 54-year-old father of two girls, Ayanda (27) and Anele (20). I am married to Memory. Teaching children is my life's mission. This is not just a job to me; this is something that I need to do on a daily basis. All children are precious, but I'm particularly drawn to helping those who need it the most, and children with disabilities, especially those with visual impairment (with other disabilities) need someone who cares about them and invests in their growth and education. I don't think that most people have that capacity for patience and compassion, and I do, so I think it's my calling, a chance to do good in the world using something that I have that others don't.

I started off as a mainstream teacher in 1991. After teaching in the mainstream for 16 years I decided to train as a specialist teacher for the visually impaired. My experience in teaching in the mainstream opened my eyes for the need to specialize in teaching the visually impaired. The challenges faced by the low-vision or the visually impaired in the mainstream made me specialize in teaching the visually impaired.

When it comes to literacy they face a number of challenges such as reading and writing because of braille knowledge. There is a critical shortage of teachers who are literate in braille. I have taught the visually impaired learners since 2009 in Zimbabwe and South Africa. I have had the privilege of teaching in the mainstream, a visual impairment resource room (at a mainstream school), a school for the blind, and a special needs school (with other disabilities).

I learned braille at 40 when I started my training (with the University of Zimbabwe) to teach the visually impaired. Learning braille is one of the prerequisites to successfully complete that course. But I perfected my

braille through my engagement with my learners. I learned that different learners need different approaches in learning braille.

I learned braille for my professional growth and to empower visually impaired learners in literacy. My most important mission is to help visually impaired learners learn according to their needs and abilities. They can only do this through training by a proficient braille teacher. I thought learning braille would give me the opportunity to impact their lives meaningfully.

I began to learn braille basics while studying for the course of teaching the visually impaired. We were given exercises from the braille primer to do at our own pace. I had to perfect my braille through practice and engagement with my pupils. One of them, Ofentse Sephiri, proved to me that the blind can do mathematics at the same level as the sighted. His response and cooperation during my one-to-one teaching gave me confidence that despite being blind anything is possible as long as you are braille literate.

Braille is not only important, but it is a necessity to learn braille as a teacher for the visually impaired so that your learners will have confidence in you. Having secure braille knowledge not only allows the teachers to instruct with confidence, but it ensures that teacher is more able, and prepared, to address misconceptions that have a detrimental effect on his or understanding.

For the learner, learning braille from a young age helps with literacy. Learning braille means that blind and partially sighted people can enjoy reading for life. Braille supports the development of accessible and efficient reading and writing. It allows the learners access to the same written materials in the classroom as sighted peers. It supports instruction in correct written language usage, such as structuring sentences, punctuation, grammar and spelling.

I use braille as the medium of instruction for teaching the visually impaired. I use it in teaching my visually impaired class subjects like English and mathematics in the classroom. I use braille with my work colleagues using braille as a medium of instruction for the visually impaired. I also use braille in teaching extra lessons on mathematics and language. I use it virtually every day when I am teaching the visually impaired.

Braille teachers need to have positive attitude to learn and teach braille. Anyone can learn braille and, like anything else, the more you practise, the better you get. Braille is a practical subject: one can perfect it through practice!

Sighted people have a hard time learning to read braille with their fingers. In general, they want to read braille with their eyes. While it is not impossible to learn, it is very easy to cheat and use your eyes. Apart from putting a blindfold on, it is almost impossible not to look down and see the dots. This makes reading with the fingers very difficult and hinders the learning the process. Believe it or not, the dots can start looking like letters to sighted people. Therefore, once a sighted person learns the dot formation, reading braille becomes no different than reading a book. It's quite easy to read braille with your eyes: it is not a must to use your fingers. After all, you aren't learning a foreign language, you're learning the language you already know, just different signs for it. The hard part is learning the contracted braille. Because braille takes up so much space, there is Grade 2 braille, and also Grade 3, which is contracted even more.

At times, some of my new totally blind learners think I am blind when I am teaching them braille. I use my eyes mostly in reading braille, but there is a misconception that braille can only be read using the hands.

6. Braille: What it is and how it works

Braille is a system of writing for persons who are blind. It consists of a series of raised dots embossed on paper. Each letter or punctuation mark consists of up to six dots in a particular pattern. By running your fingertips over the dots, you can feel these patterns and read what is written.

A normal six-dot braille cell measures 6 mm by 3.6 mm, or about this size ⠿

This sign stands for the letter **b** ⠃

This sign stands for the letter **p** ⠏

This book uses braille signs printed as black ink dots. These are very useful for sighted readers, but cannot be used by blind readers, who need the dots to be raised as small bumps so they can feel them with their fingertips. To make it easy to see the different patterns, we show the raised dots as heavy dots, and the dot positions that are not raised as tiny points.

There are altogether 64 possible combinations of the six dots, including the blank cell where no dots are raised.

Another system exists known as the **8-dot braille** system, but this is beyond the scope of this book.

English braille has three levels, grades 1, 2, and 3.

- **Grade 1 braille.** Grade 1 braille, or **alphabetical braille**, is the simplest form. It consists of the letters of the alphabet a–z, the numbers, punctuation signs, and a few special signs, for example to indicate capital letters.
- **Grade 2 braille.** Uncontracted braille can take up a lot of space. Grade 2 braille, or **contracted braille**, includes various short forms represent common letter combinations and words. While it is possible to write anything without using the contractions, most books and magazines use contracted braille. Grade 2 braille is more difficult to learn than grade 1 because it uses more signs, and some signs are used to mean more than one letter or word, depending on where they appear.
- **Grade 3 braille** has more contractions (363 of them!). It is used mainly in personal correspondence.

We cover only grades 1 and 2 in this book.

6.1 Terminology in braille

6.1.1 Braille cell

This is the space occupied by the pattern of 6 dots. The full cell looks like this 

6.1.2 Braille character

A braille character is any one of the 63 combinations of dots that can occupy a braille cell.

a

6.1.3 Braille dot positions

The dots in a braille cell are numbered like this:

1 • • 4
2 • • 5
3 • • 6

Dots 1,2	Dots 2,3,4	Dots 2,3,4,5
b	s	t
		

6.1.4
Braille sign

A braille sign is any meaningful sign of whatever length in the braille system. It may consist of one or more characters which stands for a letter of the alphabet or a digit, or a set of letters, or a word on its own, or a punctuation mark, or any other sign used in the print system.

j (lowercase)	J (capital)	the
		

6.1.5
Simple sign

A simple sign is one which is made up of one braille character.

x	full stop (.)	number sign
		

6.1.6
Compound sign

This is a sign containing more than one braille character. Numbers, capitals and many letter combinations are formed by adding a special sign in front of another sign.

1	X	day
#**a**	[capital]**x**	[whole]**d**
		

6.1.7
Upper sign

An upper sign is one which contains at least dot 1 or dot 4 or both.

a	b	the	ch
			

6.1.8
Lower sign

A lower sign is one which contains neither dot 1 nor dot 4. These include many punctuation signs, which can also be used for letter combinations or whole words.

, -ea-	: con -cc-	. dis-	-gg- were
			

6.1.9
Contraction

A contraction is a meaningful sign which represents two or more letters.

for	-ound	father	question
			

6.1.10
Wordsign

A wordsign is a contraction which stands for a full word.

for	quite	with	the
			

6.1.11
Composition sign

A composition sign is one which cannot be represented with an equivalent in print.

[number]	[letter]	[capital]	[italics word]
			
6	5a	M	*moi*
			

6.2
Grade 1 braille

6.2.1
The braille alphabet

The first 10 letters of the alphabet, **a** to **j**, are formed from the top 4 dots in the 6-dot braille cell (dots 1, 2, 4 and 5).

a	b	c	d	e	f	g	h	i	j

The next 10 letters, **k** to **t**, are the same as the first 10, but have an extra dot 3.

a	b	c	d	e	f	g	h	i	j
k	l	m	n	o	p	q	r	s	t

Plus dot 3

The next 5 letters, **u** to **z** (but not including **w**), are the same as **a** to **j**, but have extra dots 3 and 6.

a	b	c	d	e
u	v	x	y	z

Plus dots 3&6

The letter **w** is the odd one out. It consists of the letter **j**, plus dot 6. This is because the original French alphabet in the nineteenth century, when Louis Braille invented this system, did not contain the letter **w**.

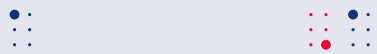
j
w

Plus dot 6

6.2.2
Capital letters

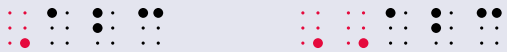
A capital letter is shown by adding the sign ⠠ in front of the letter to be capitalized.

a **A**



If you need to capitalize a whole word, use two capital signs ⠠⠠

Abc **ABC**



6.2.3
Punctuation signs

Most of the punctuation signs are the same as the letters **a** to **j**, but are lowered down one row in the 6-dot cell.

The ⠦ sign may be a question mark **?** or an opening quote mark **"**, depending on where in the word it appears.

The ⠤ sign (lowered **e**) and the ⠶ (lowered **g**) are not used as punctuation signs.

a	b	c	d	e	f	g	h	i	j
,	;	:	.		!		? or "	*	"

Lowered

An apostrophe is dot 3.

a
'

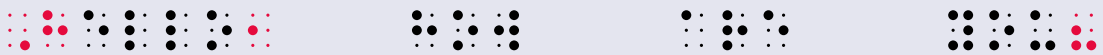
Bottom

6.2.4
Words and sentences

Words and sentences are formed in braille in the same way as in printed text: a series of signs followed by spaces or punctuation signs. The first letter in a sentence is a capital.

hello

Hello, **how** **are** **you?**



Goodbye!

6.2.5
Numbers

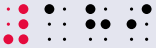
The numbers in braille are formed by adding a special sign,  before the letters **a** to **j**. This number sign tells the reader that everything until the next space (or letter sign, see below) is a number. You can think of it as a **#** sign.

a	b	c	d	e	f	g	h	i	j
									
1	2	3	4	5	6	7	8	9	0
									

1
Written as: **#a**

234
Written as: **#bcd**

189
Written as: **#ahi**



Each new number has to be preceded by the  sign.

2 men and 3 women
Written as: **#b men** and **#c women**

6.2.6
Letter sign

If you need to include a sequence of numbers and letters, you use the letter sign ⠰ to turn off the number sign.

123abc
Written as **#abc[letter]abc**

6.2.7
Italics

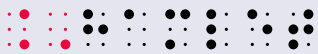
To show letters or words in italics, you need one of the signs indicating italics, plus perhaps an italics terminator.

for the following character

x
written as [italic symbol]*x*

for the following word

Hamlet
written as [italics][capital]*hamlet*



for the following passage

Things fall apart
Written as [italics passage][capital]*things fall apart*[italics terminator]

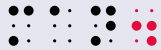
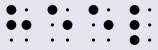
The sign ⠨ is also used as the decimal point in numbers.

5.0
Written as #**e**[decimal]**j**

1.25
Written as #**a**[decimal]**be**

6.2.8
Examples of Grade 1 braille

In the examples below, the punctuation, number and capital signs are shown in red.

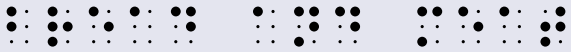
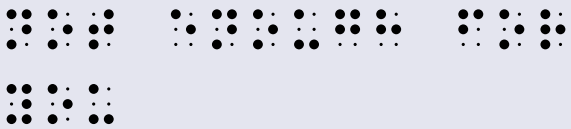
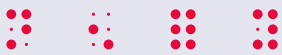
I	love	food.		
				
He	is	a	brave	man.
				
“Soot	is	dirt.”		
				
cool	wool	fool	tool	pool
				
feel	peel	heel	reel	
				
There	were	53	people.	
				

6.3
Grade 2 braille

6.3.1
Contractions

In Grade 2, or contracted braille, individual signs can stand for common letter combinations or complete words. See **Appendix 6.1** for a complete list.

Some signs stand for different letter combinations, depending on where they appear in a word.

Grade 1 braille	Grade 2 braille
I can go. 	I can go. Written as **i c g**[full stop] 
bread and meat 	bread and meat Written as **br**[ea]**d** & **m**[ea]**t** 
not enough for you 	not enough for you Written as **n** [en] [for] **y** 

6.3.2
Whole word signs

Three signs that use dots 4, 5, and 6,  and  are used to show that the following sign should be read as a whole word, not a single letter.

	Grade 1 braille	Grade 2 braille
the		
there		
these		
their		

6.3.3
Partial word signs

Three further signs that use dots 4, 5, and 6 ⠸ and ⠰ have different meanings, depending on whether they are at the start or in the middle of a word.

At the beginning of a word

⠸ indicates a letter

⠠⠸ is the capital letter sign

⠨⠸ is the italics sign.

But in the middle of a word, these signs are used to introduce common suffixes (word endings) such as **-tion** and **-ance**. The suffixes all end with the same letter that they are based on. So **-tion** and **-sion** are based on the sign for **n**, and **-ness** and **-less** are based on the sign for **s**.

The particular suffix depends on which of the partial word signs preceded the letter.

	Grade 1 braille	Grade 2 braille
p**ound**	⠏⠰⠥⠝⠙	Written as **p**[partial]**d** ⠏⠸⠙
ac**tion**	⠁⠉⠰⠞⠊⠕⠝	Written as **ac**[partial]**n** ⠁⠉⠸⠝
deci**sion**	⠙⠑⠉⠰⠎⠊⠕⠝	Written as **deci**[partial]**n** ⠙⠑⠉⠸⠎⠝

Contractions can be combined in a single word.

instruc**tion**	⠊⠝⠎⠞⠗⠥⠉⠰⠞⠊⠕⠝	Written as [in][st]**ruc**[partial]**n** ⠔⠌⠩⠗⠥⠉⠸⠝

Grade 2 braille has some complicated rules for how to use contractions. These help avoid any confusion between the signs used as individual letters or punctuation marks and as contractions.

6.4
Braille in technical fields

6.4.1
Mathematics

Mathematics uses the regular braille alphabet and number system, but with additional signs to represent mathematical operators and other symbols.

Three systems for representing mathematics in braille in English are in use: Unified English braille (which has been adopted by most English-speaking countries), British braille (still used in some countries) and Nemeth (a system developed and used in the United States).

Appendix 6.5 lists the more common mathematical symbols used in each of these systems. Mathematics frequently uses Greek letters. These are the same in all English forms of braille. See **Appendix 6.6** for a list.

The simplest arithmetic (numbers, fractions, simple equations) can be written in Grade 1 braille. More complicated mathematics uses compound signs found in Grade 2 braille.

To avoid confusion, you use the Grade 1 mode indicator ⠰ to show that the braille signs should be read as individual letters or numbers, not as contractions.

Examples of equations

a + b = 3

1 + 2 = 3

Grade 1 mode indicators

3d + e

6.4.2
Other fields

Chemistry, computing, music and other specialist fields have their own forms of braille that build on or are adapted from standard braille. All of these except music (which already has its own widely accepted standards) have been included in Unified English Braille.

6.5 More information

6.5.1 Unified English Braille

APH. UEB math tutorial.
uebmath.aphtech.org/

ICEB (International Council on English Braille). 2013. The rules of Unified English Braille.
iceb.org/Rules%20of%20Unified%20English%20Braille%202013.pdf

ICEB (International Council on English Braille). 2014. Unified English Braille. Guidelines for Technical Material.
www.iceb.org/guidelines_for_technical_material_2014.pdf

Harland, H., and C. Roberts. Unified English Braille for math for sighted learners.

Howse, J. 2019. Unified English Braille Training Manual: Introductory Mathematics. NextSense, North Rocks, NSW, Australia.

Howse, J. 2019. Unified English Braille Training Manual: Advanced Mathematics NextSense, North Rocks, NSW, Australia.

UEB Online. Accessible braille training. Cheat sheets.
uebonline.org/resources/cheat-sheets/

UEB Online. Accessible braille training. UEB mathematics resources.
uebonline.org/resources/ueb-mathematics-resources/

UEB Online. Accessible braille training. Unified English Braille Training Manual – Introductory Mathematics.
uebonline.org/wp-content/uploads/2022/01/Unified-English-Braille-Training-Manual-Introductory-Mathematics-First-Edition-Rev7.pdf

UEB Online. Accessible braille training. Unified English Braille Training Manual – Advanced Mathematics.
uebonline.org/wp-content/uploads/2021/05/Unified-English-Braille-Training-Manual-Advanced-Mathematics-First-Edition-Rev6.pdf

UEB Online. Accessible braille training. Unified English Braille Training Manual – Extension Mathematics.
uebonline.org/wp-content/uploads/2021/05/Unified-English-Braille-Extension-Maths-Training-Manual-First-Edition-Rev-4.pdf

Wikipedia.
en.wikipedia.org/wiki/English_Braille#Unified_English_Braille

6.5.2
British braille

Braille Authority of the United Kingdom. 2004. British braille: A restatement of Standard English Braille. Royal National Institute of the Blind, Peterborough, Cambridgeshire.
web.archive.org/web/20090316190551if_/http://www.bauk.org.uk/docs/bbnew.pdf

Braille Authority of the United Kingdom. 2005. Braille mathematics notation. Royal National Institute of the Blind, Peterborough, Cambridgeshire.
chezdom.net/wp-content/uploads/2008/07/bmn.pdf

6.5.3
Nemeth

APH. Nemeth tutorial.
nemeth.aphtech.org/

Pearson: Accessibility for assessments. Welcome to the Nemeth Symbol Library.
accessibility.pearson.com/resources/nemeth-curriculum/nemeth-symbol-library/index.php

Simpson, C. (ed.) 2013. The rules of Unified English Braille.
International Council on English Braille.
iceb.org/Rules%20of%20Unified%20English%20Braille%202013%20(linked).pdf

Wikipedia.
en.wikipedia.org/wiki/Nemeth_Braille

6.6
Appendices

Appendix 6.1
Grade 1 braille

Signs in the shaded cells are not used in Grade 1 braille.
The letters **a** – **j** are read as numbers if they are preceded by the number sign.

 = 1

The capital letter sign  turns the following letter into a capital.

 = A

The letter sign  turns the following sign into a letter.

 = 1a

Upper signs	a 1	b 2	c 3	d 4	e 5	f 6	g 7	h 8	i 9	j 0
+ dot 3	k	l	m	n	o	p	q	r	s	t
+ dots 3 and 6	u	v	x	y	z					
+ dot 6										w
Lower signs	,	;	:	.		!		? ”	*	”
										[space]
	number	letter	capital							

Appendix 6.2

Grade 2 Unified English Braille contractions

Here is a full list of the contractions used in Grade 2 Unified English Braille.

	 a	 b	 c	 d	 e	 f	 g	 h	 i	 j
alone	a	but	can	do	every	from	go	have	I	just
Preceded by										
					-ence		-ong			
				-ound	-ance					
			Christ	day	ever	father	God	here		Jesus
			cannot					had		

	 k	 l	 m	 n	 o	 p	 q	 r	 s	 t
alone	know-ledge	like	more	not	O	people	quite	rather	so	that
Preceded by										
		-ful		-tion					-ness	-ment
										
				-sion					-less	-ount
	know	lord	mother	name	one	part	question	right	some	time
			many						spirit	

	⠥ u	⠧ v	⠭ x	⠽ y	⠵ z	⠯ & and	⠿ for	⠷ of	⠮ the	⠾ with
alone	us	very	it	you	as					
Preceded by										
⠱				-ity						
⠸										
⠐	under			young					there	
⠨	upon								these	
⠘									their	

	⠡ ch	⠣ gh	⠩ sh	⠹ th	⠱ wh	⠫ ed	⠻ er	⠳ ou	⠪ ow	⠺ w
alone	child		shall	this	which			out		will
Preceded by										
⠐	charac-ter			through	where			ought		work
⠨				those	whose					word
⠘										world

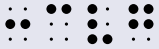
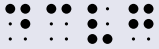
	 , -ea-	 ; -bb-	 : con -cc-	 . dis	 en	 ! -ff-	-gg-	? "	*	"
alone		be			enough	to	were	his	in	was, by

	'	-	-ing	[accent]	/ st	ar	[whole] .	[whole] ^	[whole] _	[space]
alone					still					

[number]	[partial] [letters]	[partial] [capital]	[partial]

Appendix 6.3
Grade 2 Unified English Braille abbreviations

Abbreviation	Word	Braille
A		
ab	about	
abv	above	
ac	according	
acr	across	
af	after	
afn	afternoon	
afw	afterwards	
ag	again	
alm	almost	
alr	already	
al	also	
alTH	although	
alt	altogether	
alw	always	

Abbreviation	Word	Braille
B		
BEc	because	
BEf	before	
BEh	behind	
BEl	below	
BEn	beneath	
BEs	beside	
BEt	between	
BEy	beyond	
bl	blind	
brl	braille	
C		
CHn	children	
CONcv	conceive	
CONcvg	conceiving	
cd	could	
D		
dcv	deceive	
dcvg	deceiving	
dcl	declare	
dclg	declaring	
E		
ei	either	

Abbreviation	Word	Braille
F		
fST	first	
fr	friend	
G		
gd	good	
grt	great	
H		
hERf	herself	
hm	him	
hmf	himself	
I		
imm	immediate	
L		
lr	letter	
ll	little	
M		
mCH	much	
mST	must	
myf	myself	
N		
nec	necessary	
nei	neither	

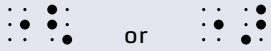
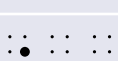
Abbreviation	Word	Braille
O		
ONEf	oneself	
OUrvs	ourselves	
P		
pd	paid	
pERcv	perceive	
pERcvg	perceiving	
pERh	perhaps	
Q		
qk	quick	
R		
rcv	receive	
rcvg	receiving	
rjc	rejoice	
rjcg	rejoicing	
S		
sd	said	
SHd	should	
sCH	such	

Abbreviation	Word	Braille
T		
THEmvs	themselves	
td	today	
tgr	together	
tm	tomorrow	
tn	tonight	
W		
wd	would	
X		
xs	its	
xf	itself	
Y		
yr	your	
yrf	yourself	
yrvs	yourselves	

Appendix 6.4
British braille

British braille is still used in some countries, and you may come across it in older learning materials. Here are the main differences with Unified English Braille. In British braille, the wordsigns for "a", "and", "for", "of", "the" and "with" may be written without spaces between them and the previous or following words. UEB requires spaces to separate these signs from the words before and after them.

The following contractions and other signs in British braille have been discontinued or changed.

British braille	Meaning	Unified English Braille
Contractions		
	ble	
	com	
	dd	
	to	
	into	
	by	
	ation	
	ally	
	o'clock	
Punctuation		
	(or) Opening and closing parentheses	
	[Opening square bracket	
	] Closing square bracket	
	ellipsis	
	Short dash	
	Long dash	

British braille	Meaning	Unified English Braille
Composition		
	Italics	
	Italics passage	
Other symbols		
	£ British pound	
	$ dollar	
	* asterisk	

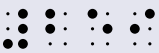
Appendix 6.5

Braille mathematics notation in Unified English Braille, British braille and Nemeth braille

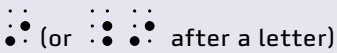
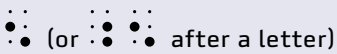
This table does not contain all the many mathematical notations used in the various forms of braille. See the *References* for a more complete list and a guide on how to use braille in maths.

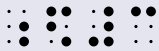
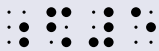
Differences with Unified English Braille (where known) are shown in red.

	Unified English Braille	British	Nemeth
Numbers			
# number prefix			
1			
2			
3			
4			
5			
6			
7			
8			
9			

		Unified English Braille	British	Nemeth
Numbers				
0				
259				
.	decimal point			
,	thousands separator			
	space			
	line continuation			
Operators				
+	plus			
−	minus			
×	multiplied by			
.	multiplication dot			
÷	divided by			
/	fraction			
:	ratio			
±	plus or minus			
Comparisons				
=	equals			
≠	not equal to			
>	greater than			
<	less than			

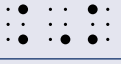
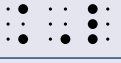
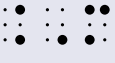
		Unified English Braille	British	Nemeth
Comparisons				
≥	greater or equal to			
≤	less or equal to			
≈	approximately equal to			
Mode indicators				
grade 1 indicator (next sign is a letter, not a number)				
whole word is grade 1				
whole passage is grade 1				
grade 1 terminator				
Measures				
¢	cent			
$	dollar			
€	euro			
£	pound			
%	percent			
°	degree			
'	foot, minute			
"	inch, second			
Brackets				
(	open brackets			
)	close brackets			
[	open square brackets			
]	close square brackets			

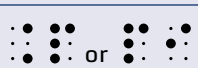
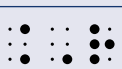
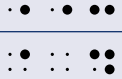
		Unified English Braille	British	Nemeth
Brackets				
{	open curly brackets			
}	close curly brackets			
Exponentials				
√	square root			
√‾	open root sign with vinculum			
∛	cube root			
|	tally			
	superscript	 (or after a letter)		
	subscript	 (or after a letter)		
!	factorial			
Calculus				
∫	integral			
dy/dx	differential			
Statistics				
x̄	x bar (mean)			
σ	Small sigma (standard deviation)			
∑	Capital sigma (sum)			
Logarithms				
log				
antilog				

		Unified English Braille	British	Nemeth
Geometry				
cos				
sin				
tan				
∥	parallel to			
⊥	perpendicular to			
∠	angle			
∟	right angle			
Shapes				
	shape indicator			
	shape termination			
□	square			
▯	rectangle			
△	triangle			
⬠	pentagon			
⬡	hexagon			
⯃	octagon			
▱	parallelogram			
○	circle			

		Unified English Braille	British	Nemeth
Sets				
∈	is an element of			
∋	contains			
⊂	subset			
⊃	superset			
∩	intersection			
∪	union			
∅	empty set			

Appendix 6.6
Greek alphabet

Lowercase			Uppercase	
alpha	α		A	
beta	β		B	
gamma	γ		Γ	
delta	δ		Δ	
epsilon	ε		E	
zeta	ζ		Z	
eta	η		H	
theta	θ		Θ	
iota	ι		I	
kappa	κ		K	
lambda	λ		Λ	
mu	μ		M	

Lowercase			Uppercase	
nu	ν		N	
xi	ξ		Ξ	
omicron	ο		O	
pi	π		Π	
rho	ρ		P	
sigma	σ		Σ	
tau	τ		T	
upsilon	υ		Y	
phi	φ		Φ	
chi	χ		X	
psi	ψ		Ψ	
omega	ω		Ω	

Appendix 6.7
ASCII and Unicode table

To type braille using Unicode in Windows, type the four-digit code in the table below, then hold down the Alt key and press X.

On a Mac, enable the Mac Unicode Hex Input, then use the input menu on the menu bar. Press and hold the Option key, type the fourdigit code in the table below, then release the Option key.

Dots	1	12	14	145	15	124	1245	125	24	245
Simbraille										
Meaning	a, 1	b, 2	c, 3	d, 4	e, 5	f, 6	g, 7	h, 8	i, 9	j, 0
Ascii (convert to Simbraille font)	a	b	c	d	e	f	g	h	i	j
Unicode (#### + Alt-X)	2801	2803	2809	2819	2811	280B	281B	2813	280A	281A

Dots	13	123	134	1345	135	1234	12345	1235	234	2345
Simbraille										
Meaning	k	l	m	n	o	p	q	r	s	t
Ascii	K	l	m	n	o	p	q	r	s	t
Unicode	2805	2807	280D	281D	2815	280F	281F	2817	280E	281E

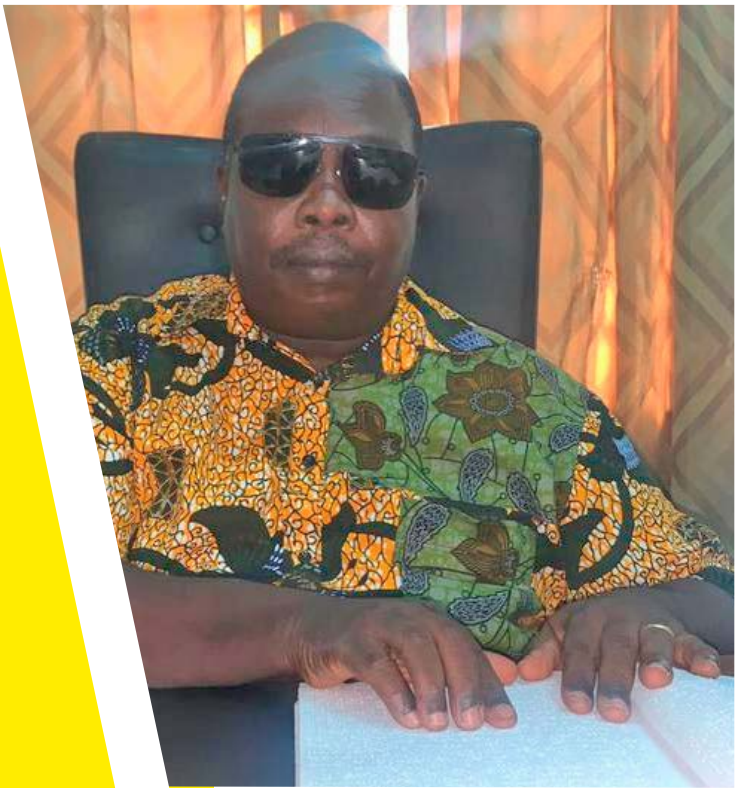
Dots	136	1236	1346	13456	1356	12346	123456	12356	2346	23456
Simbraille										
Meaning	u	v	x	y	z	&	for	of	the	with
Ascii	u	v	x	y	z	&	=	(	!	)
Unicode	2825	2827	282D	283D	2835	282F	283F	2837	282E	283E

Dots	16	126	146	11456	156	1246	12456	1256	246	2456
Simbraille	⠡	⠣	⠩	⠹	⠱	⠫	⠻	⠳	⠪	⠺
Meaning	ch	gh	sh	th	wh	ed	er	ou	ow	w
Ascii	*	<	%	?	:	$	]	\	[	w
Unicode	2821	2823	2829	2839	2831	282B	283B	2833	282A	283A

Dots	2	23	25	256	26	235	2356	236	35	356
Simbraille	⠂	⠆	⠒	⠲	⠢	⠖	⠶	⠦	⠔	⠴
Meaning	, -ea- [comma]	; -bb- [semicolon]	: con -cc- [colon]	. dis- [full stop]	en	! -ff- [exclamation mark]	-gg-	? “ [question mark, open quotes]	* [asterisk]	” [close quotes]
Ascii	1	2	3	4	5	6	7	8	9	0
Unicode	2802	2806	2812	2832	2822	2816	2836	2826	2814	2834

Dots	3	36	346	4	34	345	5	45	456	0
Simbraille	⠄	⠤	⠬	⠈	⠌	⠜	⠐	⠘	⠸	⠀
Meaning	' [apostrophe]	- [hyphen]	-ing	[accent]	st /	ar	[whole]	[whole]	[whole]	[space]
Ascii	'	-	+	@	/	>	"	^	_	[space]
Unicode	2804	2824	282C	2808	280C	281C	2810	2818	2838	2800

Dots	3456	56	6	46
Simbraille	⠼	⠰	⠠	⠨
Meaning	[number]	[partial] [letters]	[partial] [capital]	[partial] [italics]
Ascii	#	;	,	.
Unicode	283C	2830	2820	2828



Dr Peter Obeng-Asamoa
Executive Director, Ghana Blind Union

6.7 Why braille?

I work for the Ghana Blind Union, and am also a member of the National Steering Committee for the implementation of Inclusive Education, and Ghana representative for the International Council for the Education of Visually Impaired Persons. I lost my sight when I was 18.

I learned to read and write braille when I lost my sight as a teenager. My first encounter with braille was almost a religious experience. A thick braille book was put in my hands to allow me to feel the dots on the paper. At that moment I was fascinated that anyone could read what seemed like scattered dots on paper.

Braille was the only way I could continue my education at the time. Braille provided my path to education up to the university. Although now I use digital technology a lot, I still read braille during my leisure periods.

At the school that I attended in my new situation as a blind person, I received instruction from a qualified teacher of blind persons. My teacher patiently instructed me in the technique of identifying individual dots and the various patterns and arrangements of the dots. Gradually, I learned to identify letters, then words and later sentences. It would be difficult to describe the excitement and fascination that virtually engulfed me at the world of information that leaped up from the tangle of dots. Having been starved for two years without direct access to information, braille had suddenly opened and restored me to the pleasure of directly accessing information on my own. The independence to read books and access learning material, when and where I wanted, is something for which I am everlastingly grateful.

It is very important that every blind child or learner should learn to read and write braille. Braille provides an open doorway to

information, communication with other blind persons and also privacy for blind persons. There are times when I store some sensitive material in braille and I am confident that it is safe since most non-braille users cannot access the information. Even in this era of digital technology, braille has a place. With the knowledge and use of electronic braille, digital information can be access silently and without external audio interruptions. This is most useful in crowded environments.

Nowadays I use braille mainly for leisure reading. I also use it to store some sensitive and confidential information.

Braille is a very important format for all blind persons. It should form the basis for the education of blind children. After braille has been mastered children can be introduced to computer or other forms of assistive technology. Braille is not limited to paper. Due to its importance it has a place in modern technology like braille displays and other devices. It provides a great level of independence for blind users. Most importantly, blind persons are provided with a choice of format for writing and accessing their information. This should never be taken away from them.

In this era when access to information is so important, no child should be denied the opportunity to learn braille. As we are aware, braille has its place in technology. It still remains an important format of accessing information. Braille also has the advantage of providing a special level of privacy and independence for the blind user. In the developing nations of the world braille provides a security of information for blind persons in rural areas who do not have reliable electricity supply to power computers and other forms of information technology. Braille does not rely on electricity to keep it alive.

7. Equipment and software

The equipment and software for reading and writing braille ranges from simple to sophisticated. Prices vary accordingly. At the sophisticated end, the technology is changing quickly, with new devices and software becoming available at frequent intervals. Search the internet for devices and suppliers.

A range of suppliers offer equipment and teaching materials, often at subsidized prices. But they can still be expensive. Many schools have a lot of expensive equipment that gathers dust because it is underused.

It is possible to make some types of equipment, especially for younger learners or for the preparatory stage of learning braille. For example, you can make your own flashcards; you (or a carpenter) can make a braille house or nailboards (see **Chapters 3** and **4**).

Questions to ask before you invest in expensive equipment or materials (or apply for support from a donor):

- What is this item for? What problem will it help solve? Will it fulfil the purpose intended?
- What will it help the learners achieve? Will it give them skills they can use later?
- Is it for general classroom use, or for use by individual learners? Can it be shared or reused? Can it be used by sighted learners?
- Is it durable and likely to last? Can it be repaired locally?
- Does it have multiple uses? Can it be used with different ages and abilities of pupils?
- What skills are required of the teacher? Are these easy to learn?
- Is it worth the price? Is there a cheaper alternative? It is possible to make it (or an equivalent) more cheaply? How long would this take? (It may actually be cheaper to buy an item rather than making it yourself.)
- Can the supplier deliver the item to your country? How much would this cost?
- For advanced reading materials: do they use the version of braille used in your country?

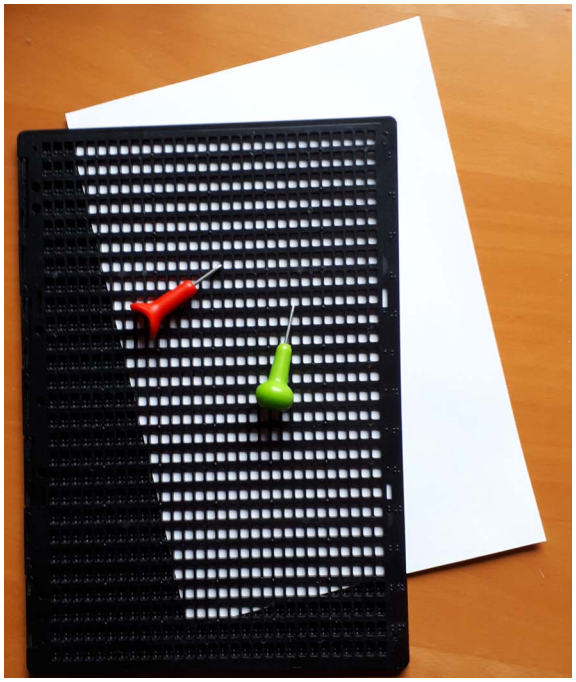
7.1 Writing devices

The commonest mechanical devices for writing braille are the Perkins brailler and the slate and stylus. These devices are rather slow to use, but they are fairly cheap compared to other technologies. More advanced technologies such as embossers and refreshable braille devices are rather more expensive.

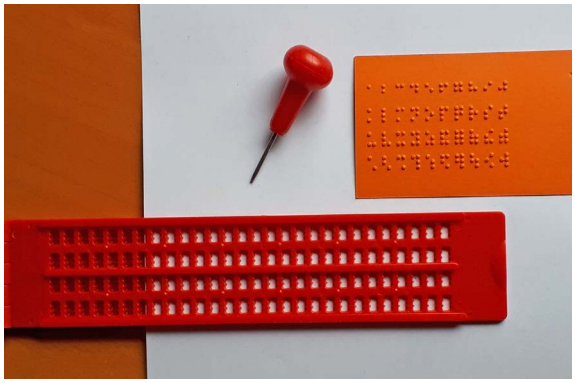
Using an Orbit notetaker (left) and Perkins brailler (right).

7.1.1
Slate and stylus

The slate and stylus were the original way of writing braille, and they are still the cheapest way to do so. A variety of makes and types are available, ranging from pocket size, to a few lines of A4 width, to a full A4 sheet.



An A4 slate and two types of stylus.



A four-line slate with a stylus and an example of the braille output.

The slate consists of two metal or plastic plates that are hinged on one side. The stylus (or "style") has a metal point, like a nail. A sheet of thick paper is fixed between the two plates of the slate. The top plate has several rows of holes, and bottom plate has small dents under the holes. By pushing the stylus through the holes in the slate, the writer produces bumps on the bottom side of the paper. This writing is done mirrored and from right to left so that afterwards, when the paper is turned over, the bumps can be read from left to right.

Slate and stylus, or brailler?

Using a slate and stylus has several disadvantages compared to a brailler:

- It is much slower since each dot must be punched out individually.
- The holes must be punched from the back of the paper, which means forming a mirror image of each character. For example, the letter **d** ⠙ is written as ⠚. Also, the text must be written from right to left, instead of left to right.
- It does not allow the writer (or teacher) to check immediately what has been written. The paper must be removed from the slate and turned over to be read. It must then be put back into the slate in the correct position before it is possible to continue writing.

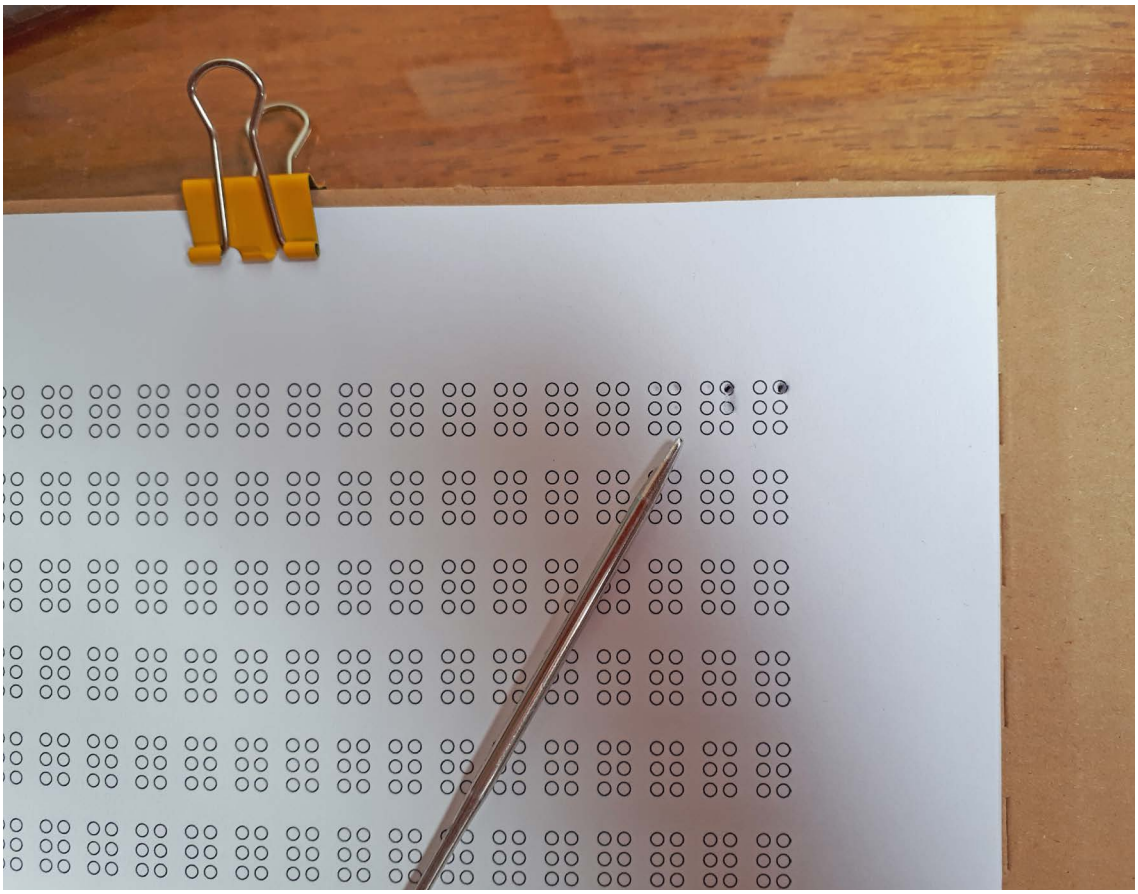
However, a slate and stylus does have advantages over a brailler.

- **Cost**. A Perkins brailler can cost several hundred dollars. A slate and stylus can cost less than $10.
- **Portability.** A full-sized slate takes an A4 piece of paper, but fits in a briefcase or backpack. A smaller slate can be popped into a pocket or handbag.
- **Noise.** It is silent. The Perkins brailler, by contrast, is fairly noisy so can be distracting for the user and other learners.
- **Breakdowns.** Braillers may break down: computers and refreshable displays may run out of power. A slate and stylus are sturdy and do not rely in electricity.
- **Speed and convenience.** It is faster to write a quick note with a slate and stylus than finding a brailler and feeding paper into it.

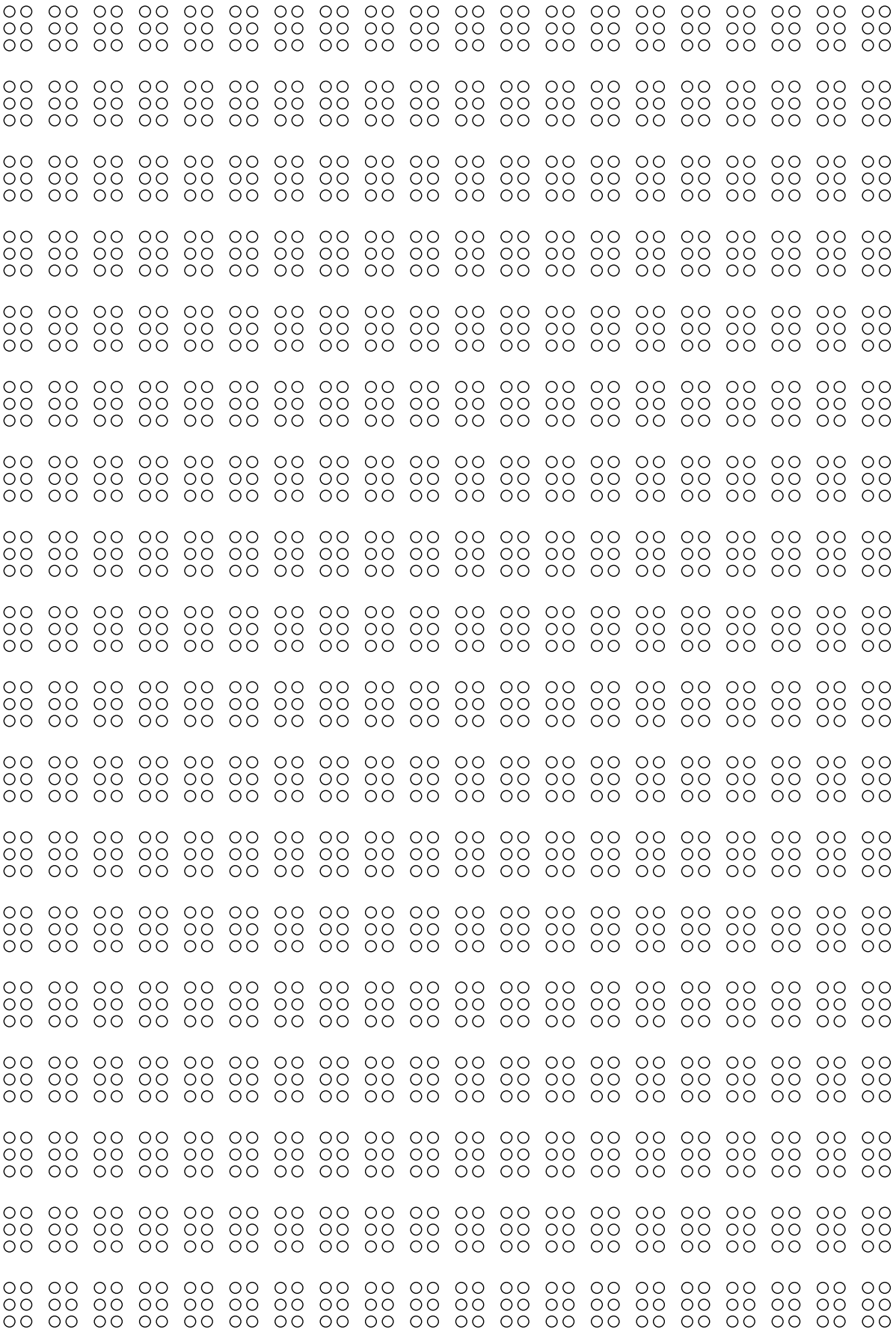
If possible, children should learn how to use a brailler before starting with a slate and stylus. They should also work mainly with a brailler rather than with the slate and stylus.

The slate and stylus are widely used in developing countries where braillers are less readily available.

No slate, no brailler?
No problem: copy the template on the next page. Clip it to a piece of cardboard and use a stylus, nail or knitting needle to punch the braille signs. Remember to start on the right side of the paper and to mirror the signs, so they can be read when the paper is turned over.



Using a template to write braille.



More information

Braille Adventures. 10 Different Types of Braille Slates.
www.youtube.com/watch?v=M6mUNyj3WRM

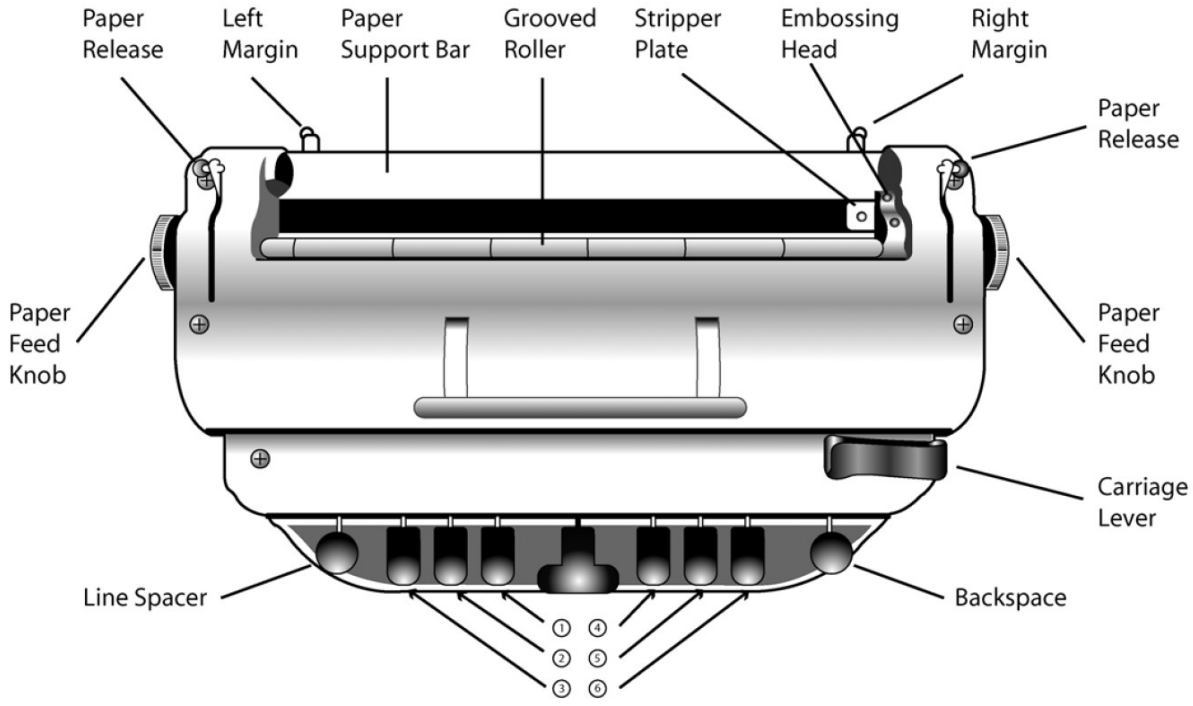
Grillot, L., and L. Weilbacher. Slate and stylus 101.
www.aph.org/access-academy-handouts/slate-and-stylus-101/

Pao Bencamino. How to use braille slate and stylus.
www.youtube.com/watch?v=A2bDR6daHW8

Wikipedia. Slate and stylus.
en.wikipedia.org/wiki/Slate_and_stylus

7.1.2
Perkins brailler

The Perkins brailler is one of the most frequently used devices for writing braille. It is a sturdy device that weighs 5–7 kg and looks like a typewriter. It has nine keys – one for each dot in the braille cell, plus a space bar in the middle, a line-spacing key and a backspacer.



A Perkins brailler: top view.

The Perkins uses special, heavy braille paper, 120, 140 or 150 gsm (grams per square metre), or 100 lb. Do not use standard photocopy paper (80 or 100 gsm) because it is too thin, and the braille dots will be squashed too easily. Copy paper may also tear or produce tiny bits of paper that clog the embossing head.

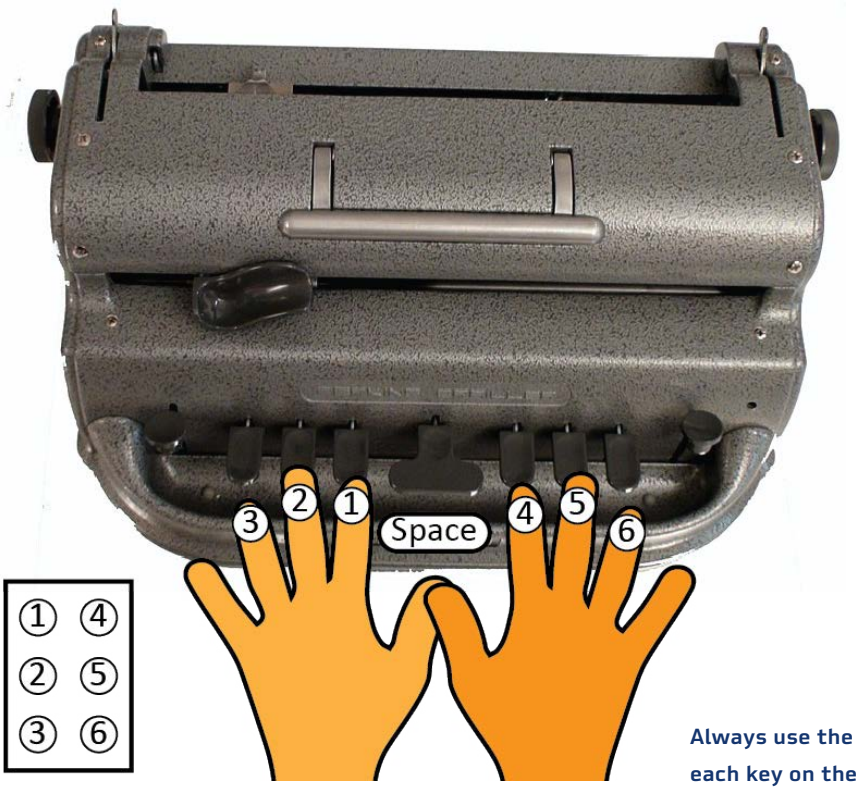
Various models of the Perkins brailler exist, including versions that are electric-powered, can be operated with one hand, and that write extra-large braille characters.
See brailler.perkins.org/pages/brailler-comparison for details.

7.1.3
How to use a Perkins brailler

Feed in the paper into the top of the brailler: turn away the feed knobs, open the levers, slide the paper all the way to the left and close the levers. Let the paper roll until it stops.

The Perkins always uses the same fingers for each key.

- Index fingers: dots 1 and 4
- Middle fingers: dots 2 and 5
- Ring fingers: dots 3 and 6
- The thumb is used to press the space bar.



Always use the same fingers for each key on the Perkins brailler.

Press the correct combination of keys for the first character.

To write an **a** ⠁ you press key 1. To write an **e** ⠑ press keys 1 and 5 at the same time. To type the sign for **for** ⠿ you must press all six keys at the same time.

After each character, the embossing head moves along one space, ready for the next character. The character can be read right away, without having to remove the paper from the brailler.

At the end of a line, press the line spacing key to feed the paper up one line, and move the embossing head over to the left side ready for the new line of text. The Perkins can produce a whole page of braille text.

In the first year, press the line spacing key twice between lines to make the text easier to read.

If a child is just starting to learn braille, make sure that they are sitting correctly and the table is the right height, The machine should not be placed too high. The child's upper arms should be in a vertical position close to the body; the lower arms should be horizontal.

Make sure also that the child uses their hands and fingers correctly. This will need continuous individual guidance. They should form each character with the fingers just above the keys before using the wrists to press the keys. Their movements should be supple and relaxed so they can work for long periods. It is possible to correct the technique until about the third year of learning. Once the child has learned the correct technique, they can focus on speed.

Cleaning and repair

Perkins braillers are sturdy but need to be oiled and cleaned periodically. See the *More information* section for sources of information on cleaning and repair. The national association for the blind in your country may be able to assist with repairs, or may know of specialists who can do so.

SMART brailler

A SMART brailler is an electronic, battery-operated brailler made by Perkins. Like a standard brailler, it can be used to emboss braille characters onto paper. It also has a display panel showing braille and standard letters, making it easier for the teacher or parent to check what the learner has written. It is possible to save text files onto a USB stick, which can then be transferred to a normal computer. That lets sighted teachers read what the learner has written on a computer screen.

A Perkins SMART brailler.

More information

American Printing House. Cool tech for reading and writing braille.
braillebug.org/braille/braille-technology/

Goertz, G., T. den Dulk and S. Goedvolk. 2011. Teaching braille. Handouts for course taught in Ghana. Visio, Netherlands.

Inbaf.ie. The Perkins Brailler operating instructions. Visual Impairment Center for Teaching and Research, School of Education, University of Birmingham.
inbaf.ie/perkins-brailler/

Perkins School for the Blind. Perkins brailler cleaning & repair videos.
brailler.perkins.org/pages/perkins-brailler-clean-repair-videos

Perkins School for the Blind. Perkins brailler repair manual
brailler.perkins.org/products/perkins-brailler-repair-manual

Perkins School for the Blind. SMART Brailler.
brailler.perkins.org/pages/smart-brailler

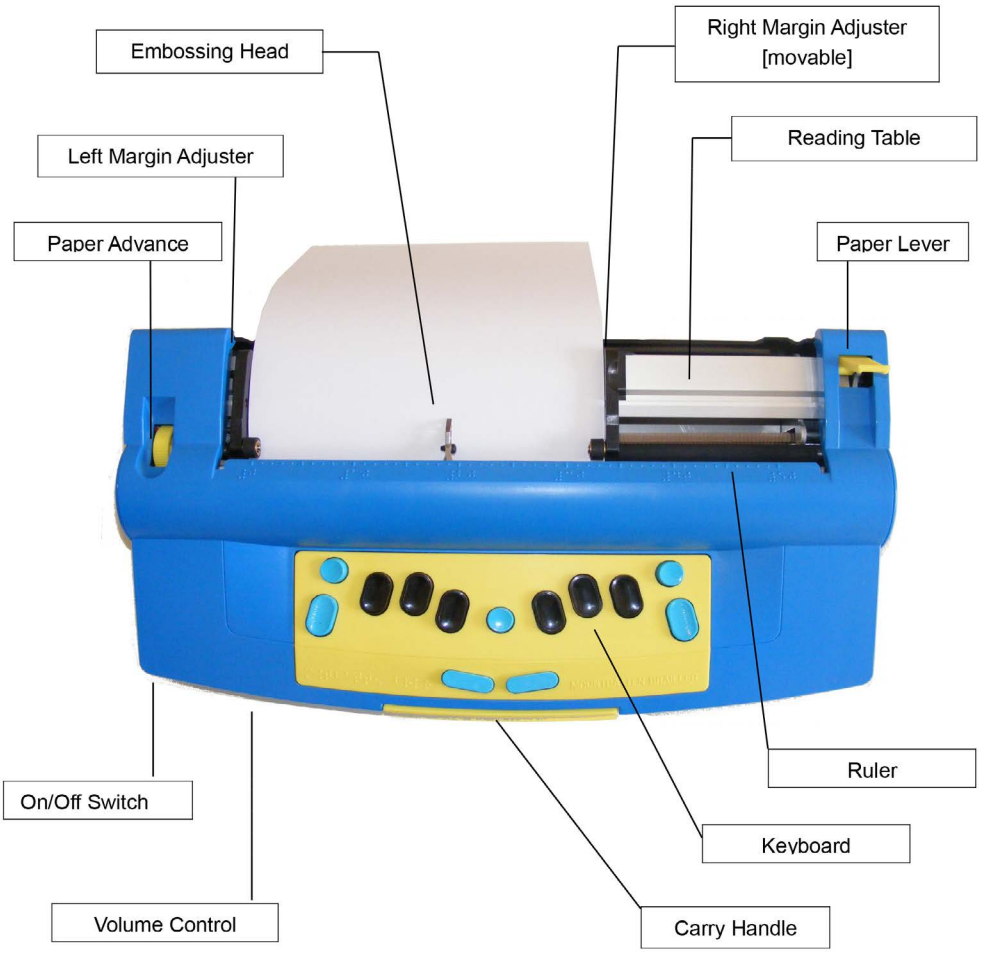
Southern, C., Clawson, J., Frey, B., Abowd, G., Romero, M. 2012. An evaluation of BrailleTouch: Mobile touchscreen text entry for the visually impaired. In: Proceedings of the 14th International Conference on Human-computer Interaction with Mobile Devices and Services (pp. 317-326). Association for Computing Machinery (ACM).
dx.doi.org/10.1145/2371574.2371623

Statewide Vision Resource Centre, Australia. 2013. Introduction to the Perkins brailler.
www.youtube.com/watch?v=kQmCUAGG-zs

7.1.4
Mountbatten brailler

The Mountbatten brailler is a battery-operated electronic machine used to type braille onto paper. It uses a similar keyboard layout to the Perkins, with six keys, one for each dot in the braille cell, plus a space key, a backspace key, and a new line key.

The Mountbatten has a memory that can store text files like a word processor and speech feedback to tell the user what they have just typed. It can be connected to a regular computer keyboard or a smartphone or tablet. Various versions of the Mountbatten are available with additional features. Some are much quieter than other braillers.



Mountbatten braillers.

More information
Mountbatten brailler.
mountbattenbrailler.com/mountbatten/

Harpo Sp. 2010. Mountbatten easy guide. A professional development program for the Mountbatten brailler. Workshop one.
mountbattenbrailler.com/downloads/training/Mountbatten%20Easy%20Guide.pdf

Videos
Mountbatten Brailler: Introductory video:.
www.youtube.com/watch?v=gUhIF44h0jw

Mountbatten Braille Whisperer: Introductory video.
www.youtube.com/watch?v=X5NLT3yWpiE

Instructional videos.
mountbattenbrailler.com/support/

7.1.5
Braille notetakers

Electronic braille notetakers are portable devices that have a Perkins- or computer-style keyboard and a tactile braille display. Some have a visual display for teachers, and a voice synthesizer that reads out what is written. The more sophisticated notetakers come with software that makes them similar to a tablet computer, and can download and install apps from the Google Play Store.

Notetakers are useful for taking notes in class and can be used as braille displays that interact with a computer, smartphone or table.

A braille notetaker.

A notetaker made by Orbit Research.

More information
American Printing House. Cool tech for reading and writing braille.
braillebug.org/braille/braille-technology/

Orbit Research.
www.orbitresearch.com/

7.1.6
Embossers

An embosser is a printer that produces raised dots on the paper. The embosser is controlled by a computer or other device that tells it what to print. Some embossers can print ink on the same sheet to make the content easier to use for sighted users.

Embossers tend to be more expensive than a regular printer, costing $5,000 or more. They come with dedicated software such as fonts and a program to translate your file into correct braille. They can also convert drawings into a series of embossed dots. They can work with standalone translators such as the Duxbury Braille Translator.

Different fonts and file formats exist, so always check before (and after) printing whether the correct version is set.

A braille embosser.

More information

Library of Congress. National Library Service for the Blind and Print Disabled. Braille embossers.
www.loc.gov/nls/resources/blindness-and-vision-impairment/devices-aids/braille-embossers/

viewplus.com/

www.indexbraille.com/

www.everydaysight.com/braille-printers-embossers/

TactileView. Software to create tactile graphics.
www.tactileview.com/

7.1.7
Braille translators

Free translators
A braille translator is a software application that converts a computer file in regular text to braille (and vice versa). Some braille translators are available online for free. They can convert text you type into braille for output as an ASCII file or an image. Some can translate into different braille standards, such as Unified English Braille (grade 1 or 2), British braille, or braille codings used in other languages.

Free translators have shortcomings. For example, they may not convert punctuation or capitals, or they may produce errors in Grade 2 braille because they fail to interpret many of the rules correctly. So it is best to have a human specialist check the transcription before using it.

Commercial translators
More sophisticated braille translators cost money. Most providers offer free demonstration versions so you can try the program out before buying it.

The leading translator is produced by Duxbury Systems. This is a computer program that functions like a word processor. You can type plaintext or import a word-processing document and then have the software translate it into braille. The software also handles illustrations. It prepares a document file that can be sent to an embosser.

You can also enter braille directly via an option that converts their keyboard into a Perkins-type keyboard, where six keys act like the keys in a brailler.

More information
American Foundation for the Blind. Braille Translators.
www.afb.org/blindness-and-low-vision/using-technology/assistive-technology-products/braille-translators

Duxbury systems.
www.duxburysystems.com/

RNIB. Transcribing text to braille.
www.rnib.org.uk/braille-and-other-tactile-codes-portal-writing-and-producing-braille/transcribing-text-braille

Free online translators
www.brailletranslator.org/

wecapable.com/braille-translator/english-to-braille-converter/

www.mathsisfun.com/braille-translation.html

www.branah.com/braille-translator

7.1.8
Braille transcription and embossing services

In some countries, you do not have to worry about preparing braille or tactile materials yourself. You can email a document with text and diagrams to a specialist transcription service. This converts the document to braille (and converts the pictures to tactile form), embosses it, and ships it back to you within a couple of days.

Services exist in Europe, North America and in some countries in Africa. A partial list is below.

Egypt
Baseera Foundation. baseerafoundation.org/services/Printing_House
Kenya
Ulemavu Research Institute. ulemavuresearch.com/services.html
Parklane Africa. parklaneafrica.com/transcription-voice-over-services/
South Africa
Adventek Services. adventek.co.za/
Blind SA. blindsa.org.za/braille/
Pioneer Printers. pioneerprinters.org.za/
Uganda
IncPart Services. www.incpartservices.com/
Kyambogo University. Faculty of Special Needs and Rehabilitation.
kyu.ac.ug/faculty-of-special-needs-rehabilitation/

7.2
Typing braille on a computer

You may need to type braille on your computer in certain circumstances:

- To prepare material for an embosser. For this, use the specialist software that comes with the embosser.
- To prepare material in braille for sighted readers (like this book). You can use the instructions below.

7.2.1
Turn your computer into a brailler: NVDA

You can turn your keyboard into a brailler using software such as NVDA. This is a free screen reader program which reads out loud what is on your screen. An add-on program turns the keys **sdf** and **jkl** into the six keys on a brailler.

1. Download NVDA from www.nvaccess.org/download/
2. Install the program, then download the add-on PC Keyboard Braille Input for NVDA from addons.nvda-project.org/addons/pcKbBrl.en.html
   Launch NVDA by pressing **ctrl + alt + N**
   Launch the brailler keyboard by pressing **Insert + 0** (zero).
   You can now use the keys **sdf** and **jkl** in combination to create the braille dot patterns. The braille appears as Unicode characters in the Windows default Segoe UI Symbol font (see below). You can also convert them to another braille or Simbraille font.
   To exit the brailler emulation (and to type normal text), press **Insert + 0**
   To change the options in NVDA, press **Insert + N**
   To exit NVDA press **Insert + N** and then **X**

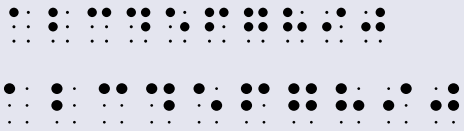
7.2.2
Braille fonts

Windows comes with a built-in Unicode font (Segoe UI Symbol) that includes braille characters. But to get the braille, you must either enter a string of Unicode characters, or use a brailler keyboard emulator such as NVDA (see above).

An alternative is to download and install a special braille font. Three types of braille fonts exist: Simbraille, Braille, and swell paper fonts. These let you type normally and then convert the text to the equivalent braille characters. So if you type **abc** and then convert to a braille font, you get the braille equivalent ⠁⠃⠉

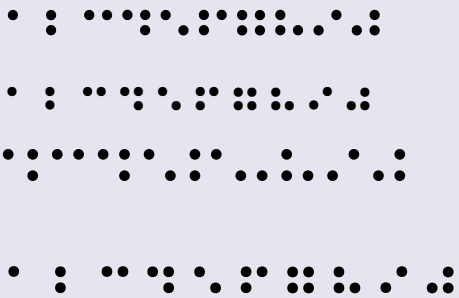
Simbraille fonts
Those that also show "shadow dots" or placeholder dots. These are useful for sighted readers who are learning braille. We have used them in this book.

- **Examples (in 20 point size)**

	SimBraille by Duxbury Systems Braille font by Mauricio Cano

Braille fonts
These have no placeholder dots.

- **Examples**

	RNIBbraille from RNIB Braille Braille Printing (note: the **g** sign in this font is incorrect!) Braille Normal

Swell paper fonts
These are used with swell paper, a special paper that forms bumps when it is printed.

7.2.3
Download visual braille fonts

- Dafont.com www.dafont.com/de/search.php?q=braille
- Fonts2u fonts2u.com/category.html?id=84
- Braille Free Font www.free-fonts.com/braille

7.2.4
Mapping of different braille fonts

Various visual braille fonts translate different characters into different braille patterns. In general, the letters **a–z** are the same in every font. But other characters (such as punctuation marks and the number sign) may be different. That means you cannot just type a sentence on your keyboard and convert the font to braille. You must instead check carefully that each braille character is correct.

Braille fonts do not translate Grade 2 braille. For that you will need a braille translator (such as that produced by Duxbury) or enter the braille codes individually.

Fonts for other languages

If you need a braille font for a language other than English, try to find one that is designed for that language.

Font sizes

To print braille the right size, make the font size around 20 points.

Some braille fonts are more compact or spaced out than others, so you may need to make the font smaller or larger than 20 points.

ASCII font mapping

The most common characters in print, including lowercase a–z, capital A–Z, the numbers and punctuation marks, are all included in a system known as ASCII.

If you type the lowercase letters **abc** in a word-processing program and convert the font to a braille font, you will always get the correct braille signs, ⠁⠃⠉

But the font does not automatically include the capital letter sign ⠠. If you type the capital letters **ABC**, you will also get ⠠⠁⠠⠃⠠⠉

In addition, the other keys on the keyboard do not necessarily correspond to the equivalent sign in braille – and this can cause problems. If you want a full stop in braille, you must type a different character from the one on your keyboard. Which character to type depends on the font you are using.

To get a full stop braille symbol ⠲ you must type a **4** on your keyboard in SimBraille or RNIBBraille, or a slash (**/**) in the Braille Printing font.

To get a comma symbol ⠂ you must type a **1** in SimBraille or RNIBBraille, and a comma (**,**) in Braille Printing.

■ **Example**

How to type a full stop and a comma in different braille font:

What you type	What you get		
To get a full stop:	Simbraille	RNIBBraille	Braille Printing
. (full stop)			
4			
/ (slash)			
To get a comma:			
, (comma)			
1			

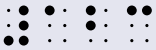
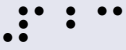
Only the braille in black is correct.

Type in **123** in SimBraille, and you get  which in Unified English Braille means ,;: [comma][semicolon][colon]. To type 123 correctly in Simbraille, you must type **#abc** 

Some fonts automatically include the number sign  in a number, and they do not map other typed characters in the same way. For example, they may not include the **#** sign, which correctly converts to  in SimBraille.

■ **Example**

How to type **123** in different braille fonts:

What you type	What you get		
	Simbraille	RNIBBraille	Braille Printing
123			
#abc			
1bc			

Only the braille in black is correct.

SimBraille and RNIBBraille use the same encoding for ASCII characters. See **Appendix 6.7** for a complete list.

Unicode
Unicode is a standard encoding system used in computing. It contains all 64 6-dot braille signs (Unicode codes U+2800 to U+283F). It also contains all the additional signs used in 8-dot braille in the range U+2840 to U+28FF).

In Microsoft Word, you can type braille by typing the code for the sign you want, then holding down the **Alt** key and pressing **X**. This gives you the braille symbol in the default font for your computer (for Windows, this is Segoe UI Symbol). If you want, you can then convert the braille text to your usual font (such as SimBraille).

See **Appendix 6.7** for a complete list of Unicode braille codes.

To get this...				
	a	for	[dot 3]	[dot 5]
Type this, then press **Alt-X**	2801	283F	2804	2810
Result (Segoe UI Symbol)	⠁	⠿	⠄	⠐
SimBraille	⠁	⠿	⠄	⠐

7.3 Making tactile drawings

Tactile drawings are drawings made of bumps on a smooth surface that can be felt with the fingertips. They may incorporate braille symbols.

7.3.1 Tips for making tactile drawings

- Make the drawing large enough to be felt easily with the fingertips.
- Keep the elements in the picture to a minimum. No unnecessary detail.
- Keep the elements separate from each other. For example, in a drawing of a face, do not let the hair overlap with the eyes.
- If you use textures, make sure they feel different from each other.
- Keep labels to a minimum.

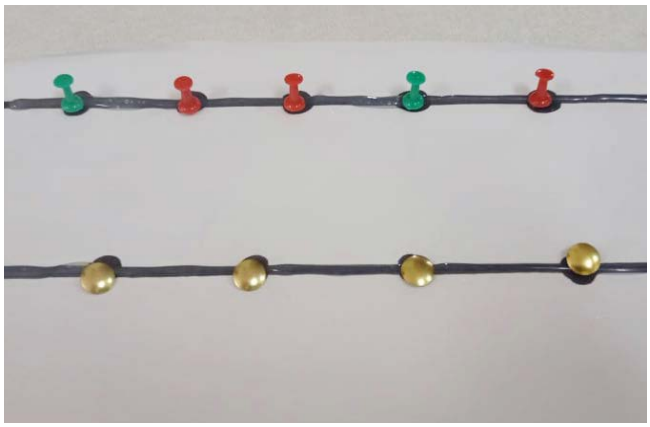
You can make tactile drawings in various ways. Below are some options, starting with the simplest.

If you are using a slate and stylus or brailler, sketch what you want to draw first with a pencil, then add the braille labels. Finally, emboss the drawing using wax dots, tracing and embossing, or one of the other methods. This avoids having the slate and stylus or brailler squash the dots in the drawing.

See Round Table on Information Access for People with Print Disabilities (2022) (under *More information*) for guidelines on how to produce accessible graphics.

7.3.2
Pushpins

Press pushpins into paper (on a cork or foam base) to form a tactile line.



Tactile lines made with pushpins.

7.3.3
Wax dots

On a piece of paper, use a pencil mark out the patterns that you want to make. For the teacher, write the name of the exercise on the paper (e.g., "Learning braille letters A–E").

Light a candle or tealight, or melt candle wax or beeswax in a small pot on the stove.
Dip a Q-tip (cotton swab) in the melted wax and use it to put wax dots or lines on a piece of paper.

Drawing made with candlewax. Make the drawing first, then dip a cotton bud (Q-tip) into the melted wax to make the bumps.

7.3.4
Tracing and embossing

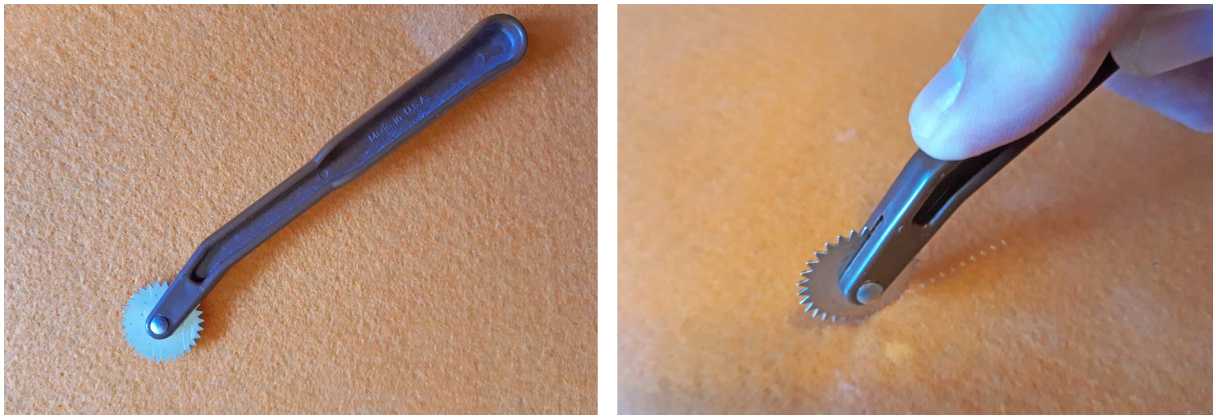
Backing sheet. You will need a backing sheet with a firm but soft surface, like a firm rubber mat. It should be slightly larger than your paper. Some possibilities:

- Rubber sheet (best if it is textured, not smooth)
- Mouse mat (try turning it over)
- Corrugated cardboard
- Several layers of tissue paper or a paper towel on a hard board

Two bulldog clips to hold the paper in place.
Stiff paper. 135 gsm or heavier (regular copy paper is 80 or 100 gsm) or plastic sheet.
Marker pen.
Thick, blunt pencil, or a ballpoint pen with large ball, or a tracing wheel (used in dressmaking).

1. Make a drawing on the paper using the marker pen, so the ink bleeds through to the other side of the paper.
2. Turn the paper over and clip it to the backing sheet with the bulldog clips.
3. Use the pencil (or ballpoint or tracing wheel) to trace the drawing on the reverse side of the paper. Press hard enough to indent the paper, but not so hard that you puncture it.

After you have produced your drawing, you can use a slate and stylus to add braille.
You may need to experiment with different backing sheets, paper thicknesses and drawing implements to find what produces the best results.

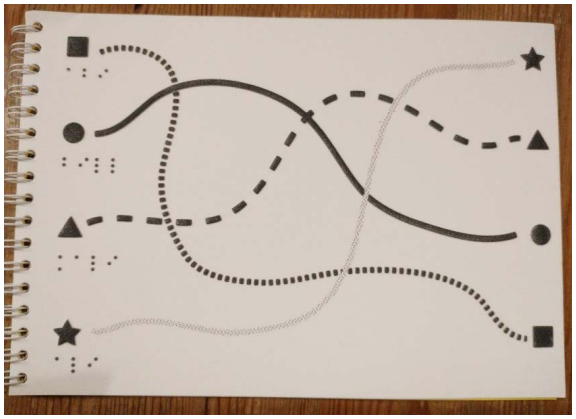


A tracing wheel.

7.3.5
Swell paper

Swell paper has a special coating on one side. You make a drawing with black ink on the paper (hand-drawing or with a computer printer). You then feed the drawing through a special heater. The heat causes the paper under the black ink to swell and make tactile bumps.

You can also use a heat lamp as a source of heat. If you do so, wear sunglasses to protect your eyes, and be careful not to cause a fire by holding the lamp too close to the paper for too long.

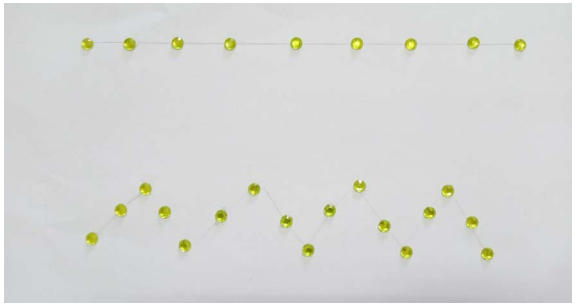


Tactile lines made with swell paper.

7.3.6
Other methods

You can also make tactile drawings in these ways:

- Roll clay or plasticine into thin sausages and stick them to stiff paper or card.
- Use commercially available sticky bumps.
- Use Wikki Stix (waxed string).
- Make your own waxed string by dipping string in a mixture of melted beeswax and mineral oil.
- Trace a drawing with glue, then sprinkle sand on it and allow it to dry before brushing off the surplus sand.
- Draw (in reverse) using a pencil on the back of some aluminium foil.
- Print out a tactile drawing on an embosser (see *Embossers* above).



Commercially available sticky bumps can be used to make drawings.

7.3.7
More information

Round Table on Information Access for People with Print Disabilities, Inc. 2022. Guidelines for producing accessible graphics.
printdisability.org/wp-content/uploads/2022/05/Guidelines-for-Producing-Accessible-Graphics-2022.docx

7.4
Making labels

You can make sticky labels using a label maker such as a Dymo, or with a slate and stylus. You need some plastic tape with peel-off backing (such as Dymo tape). Many slates come with slots designed to hold this tape.

For the Dymo labeller, you will need a special dial with the braille symbols.

7.4.1
More information

Swell paper

School Health.
www.schoolhealth.com/swell-touch-paper

Easterseals. Indata Project. Swell touch paper.
www.youtube.com/watch?v=peg7L_8PHCc

Other methods

Coloured sand and glue drawings.
makeandtakes.com/colored-sand-and-glue-drawings

Making tactile graphics with a syringe and glue.
tactileimages.org/en/blog-en/discover-a-simple-diy-technique-for-embossing-tactile-graphics-100-times-cheaper-than-other-methods/

Quick tips for creating tactile graphics by hand.
accessiblegraphics.org/formats/tactile/handmade/

Wikki Stix.
www.wikkistix.com/

Making labels

North Dakota School for the Blind. Making braille labels.
www.youtube.com/watch?v=a07UlGEojiM

RNIB. Braille labelling.
shop.rnib.org.uk/braille-and-labelling/labelling/braille-labelling

Braille Superstore. Handheld braille labeler from the Braille Superstore.
youtu.be/3X4hVk0zSgU

7.5
Braille books

Ideally, the blind child should be given the equivalent of the reading materials that are available for sighted children. That means not only textbooks and exercise materials, but also reading materials for practice and enjoyment.

You can get reading materials in four main ways; buy, borrow, order or make yourself.

7.5.1
Buy

Various publishers and specialized bookstores produce braille reading materials for learners. The following will supply books internationally.

- Braille Bookstore. www.braillebookstore.com/Braille-Bookstore
- National Braille Press. www.nbp.org/ic/nbp/
- Oakmont Visual Aids Workshop. www.teachersaidsforblindchildren.org/
- Royal National Institute of Blind People. Children's print and braille books. shop.rnib.org.uk/reading/books/children-s-print-and-braille-books

7.5.2
Borrow

Some countries have specialized libraries that lend out braille materials, often for free. Check with the national organization for blind people in your country.

7.5.3
Order

In some countries, specialized firms provide embossing services. You send them an electronic file or print version of the material you want converted to braille. The firm uses special software to translate the material to braille, then send the embossed braille back to you. Such services can handle diagrams as well as text.
Some special schools for the blind produce braille books on request for other blind learners.

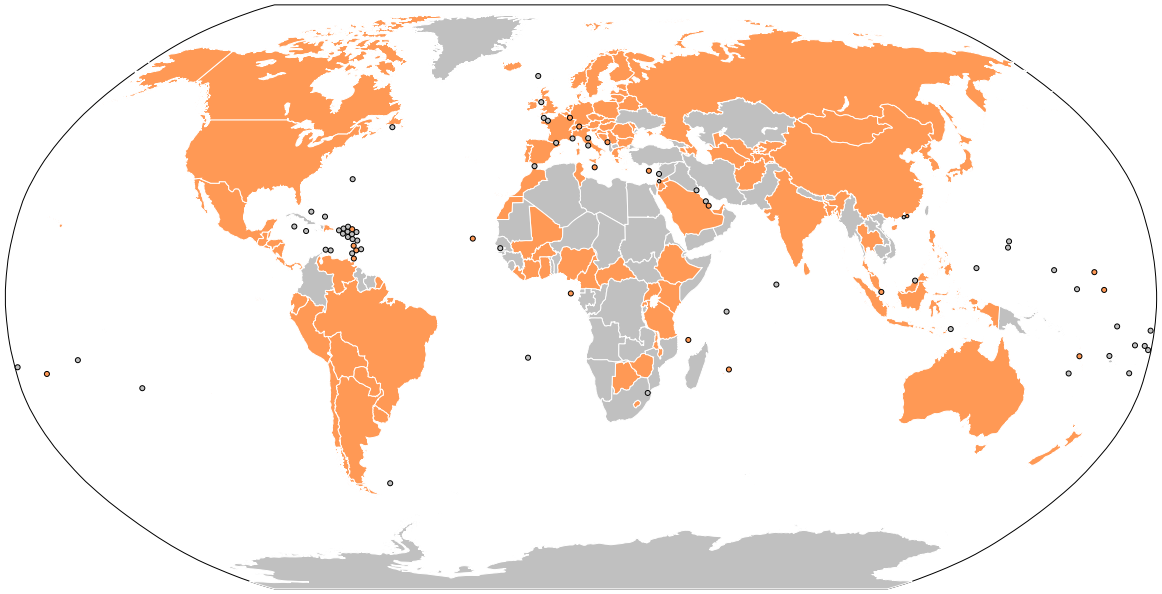
7.5.4
Make yourself

You can make your own braille materials using a computer and embosser, a Perkins brailler or slate and stylus. This is time-consuming but may be the only option available in many locations. Resource-room teachers sometimes make reading materials in braille for children in their school.

7.5.5
Treaty of Marrakesh

The "Marrakesh Treaty to Facilitate Access to Published Works for Persons who are Blind, Visually Impaired or Otherwise Print Disabled" came into force in 2016. It makes it easier to make printed materials available for the blind or visually disabled. As of 2021, it covers 109 countries, including North America, almost all of Europe, India and parts of Africa.

The treaty allows exceptions to the usual copyright laws to make it possible to create accessible versions of books and other copyrighted works for visually impaired readers. The books may be in braille, large print or audio format.



Countries where the Treaty of Marrakesh is in force, 2023.

More information
Wikipedia: Marrakesh VIP Treaty
en.wikipedia.org/wiki/Marrakesh_VIP_Treaty

WIPO. The Marrakesh Treaty.
www.wipo.int/marrakesh_treaty/en/

7.5.6
Accessible Books Consortium

The Accessible Books Consortium is a partnership between private publishers and public bodies to increase the number of books worldwide in accessible formats, such as braille, audio, e-text and large print. It operates under the Treaty of Marrakesh.

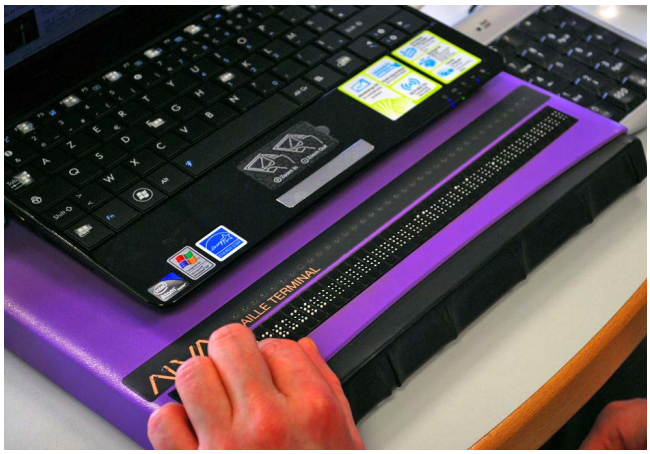
More information
Accessible Books Consortium (includes a list of websites offering accessible books).
www.accessiblebooksconsortium.org/portal/en/index.html

Wikipedia: Accessible Books Consortium.
en.wikipedia.org/wiki/Accessible_Books_Consortium

7.6
Reading devices

7.6.1
Refreshable braille displays

A refreshable braille display is an electronic device that connects to a computer, smartphone or tablet. It has one or more rows of braille cells made of round-headed plastic or metal pins. The individual pins are pushed up or down through the holes in a flat surface to create braille signs. When the reader has read a line, the display changes the configuration of the pins to display a new row of braille text.



Refreshable braille display that can display 8-dot braille.

Refreshable braille displays may have a keyboard – either a standard alphanumeric keyboard or one similar to the Perkins brailler – so the user can write as well as read text. Some displays fit beneath a laptop computer and can be used to display the contents of the screen in tactile form.

Refreshable displays can be used for reading digital newspapers and magazines as well as books and other textual material.

More information
American Foundation for the Blind. Refreshable braille displays.
www.afb.org/node/16207/refreshable-braille-displays

7.7
Screen readers

A screen reader is a software application that takes a text file (such as a word-processing document) and reads it out using a voice synthesizer. Common screen readers include Narrator (built into Windows), JAWS, NVDA, Simply Talker, Zoom Text, Windows Eyes, Narrator and TextAloud.

7.7.1
Windows Narrator

To start (and stop) Narrator, press the **Windows logo key + Ctrl + Enter** on your keyboard. Narrator will read aloud items on the screen as you point to them with the mouse or navigate to them with the keyboard.

7.7.2
JAWS

JAWS stands for Job Access With Speech. It is a screen reader available in 17 languages and with voices to support 30 languages. It can also work with screen-magnification software such as Zoom Text. Someone with low vision but who has difficulties in braille can use it. It can produce both voice output or braille display. You can use it to navigate the internet, write a document, read an email or create presentations.

More information
Freedom Scientific. JAWS.
www.freedomscientific.com/products/software/jaws/

7.7.3
NVDA

NVDA stands for NonVisual Desktop Access. It is a screen reader to allow blind or visually impaired people to access information on a computer. It converts the information on the screen information for a refreshable braille display, or reads it out using a voice synthesizer.

NVDA can also turn your computer into a brailler. See the section on *Typing sighted braille on a computer* above.

More information
NV Access.
www.nvaccess.org/download/

NVDA Community Addons. PC Keyboard Braille Input for NVDA.
addons.nvda-project.org/addons/pcKbBrl.en.html

7.7.4
Zoom Text

The ZoomText Magnifier/Reader is a magnification and reading program for low-vision users. It enlarges what is displayed on your computer screen, echoes your typing and essential program activity, and automatically reads documents, web pages, email. It works together with the JAWS screen reader, making it possible for low-vision users to listen to the audio at the same time as viewing the enlarged text.

More information
Freedom Scientific. Low vision software.
www.zoomtext.com/products/

7.7.5
Audio books

Audio books are digital audio files that can be played back on an MP3 player, smartphone or other audio device. Sighted people enjoy listening to them while they are doing something else, such as driving or cooking. They are invaluable for people with impaired vision too. A wide range of fiction and non-fiction titles is available. Some are free; most are available via subscription or can be purchased individually.

More information
Audible.com. Free listens.
www.audible.com/ep/FreeListens

Audiobooks.
Audiobooks & More. www.audiobooks.com/

MacQuarrie, A. 2014. 6 places to find free audio books for kids.
www.learningliftoff.com/free-audio-books-for-kids/

Open Culture. 1,000 Free Audio Books: Download Great Books for Free.
www.openculture.com/freeaudiobooks

Scribd. Audiobooks.
www.scribd.com/audiobooks

7.7.6
DAISY

Digital accessible information system (DAISY) is a technical standard for digital audiobooks, periodicals, and computerized text. A DAISY book can be read in various formats: using a refreshable braille display or screen-reading software, on a standalone DAISY player or computer using DAISY playback software, on a mobile phone or MP3 player. It can be printed as braille book on paper, converted to a talking book using a voice synthesizer or a human narration, or printed on paper as large print book. In addition, it can be read as large print text on computer screen.

More information
The DAISY Consortium.
daisy.org/

Wikipedia: Digital Accessible Information System.
en.wikipedia.org/wiki/Digital_Accessible_Information_System

7.8 Organizations

7.8.1 World/regional

Africa. ABC.
African Braille Centre. www.africanbraille.org/

Europe.
European Blind Union. www.euroblind.org/publications-and-resources/useful-links

North America.
BANA. Braille Authority of North America. www.brailleauthority.org/

World.
World Blind Union. worldblindunion.org/

- **Africa**
  worldblindunion.org/members-and-partners/regions-and-countries/africa/regional-members/
- **Asia**
  worldblindunion.org/members-and-partners/regions-and-countries/asia/asia-national-members/
- **Asia-Pacific**
  worldblindunion.org/members-and-partners/regions-and-countries/asia-pacific/asia-pacific-national-members/
- **Europe**
  worldblindunion.org/members-and-partners/regions-and-countries/europe/european-national-members/
- **Latin America**
  worldblindunion.org/members-and-partners/regions-and-countries/latin-america/latin-america-national-members/
- **North America and Caribbean**
  worldblindunion.org/members-and-partners/regions-and-countries/north-america/north-america-caribbean-national-members/

Pharmabraille. International Blindness Agencies Directory.
www.pharmabraille.com/support/international-blindness-agencies-directory/

7.8.2 Countries

Australia. Australian Braille Authority
brailleaustralia.org/

Canada. Braille Literacy Canada.
www.brailleliteracycanada.ca/en

Ireland. INBAF Irish National Braille and Alternative Formats Association.
inbaf.ie/

Kenya. Kenya Institute for the Blind.
keib.or.ke/

New Zealand. BANZAT. The Braille Authority of New Zealand Aotearoa Trust.
www.banzat.org.nz/

South Africa. SABA. South African Braille Authority.
sabrailleauthority.org.za/

The Netherlands (& Flanders). Braille Autoriteit.
https://braille-autoriteit.org/

Uganda. UNAB. Uganda National Association of the Blind.
unablind.org/ Organization for persons who are blind or low vision. Prints braille books for primary and secondary schools.

Enabling Services Uganda.
enablingservices.org/ A private enterprise that provides various assistive products and production of materials in braille and large print for people with visual impairments.

IncPart Services.
www.incpartservices.com/ Assistive products and services for people with visual impairments, including transcription, production of accessible educational and entertainment materials, consultancy, training, maintenance and repair.

Kyambogo University. Faculty of Special Needs and Rehabilitation.
kyu.ac.ug/faculty-of-special-needs-rehabilitation/ Educates special needs teachers and rehabilitation workers. Services include transcription, production of accessible materials, consultancy, training, maintenance and repair.

United Kingdom. UKAAF. UK Association of Accessible Formats.
www.ukaaf.org/

Royal National Institute of Blind People (RNIB)
www.rnib.org.uk/

USA. American Printing House for the Blind
www.aph.org/shop/

Worldwide Vision. Equipment for people with low vision.
www.worldwidevision.com/

Koninklijke Visio
Centre of Expertise
for partially sighted
and blind people

www.visio.org