Continuous Professional Development in Braille and Assistive Resources
(CPDBAR)

BAR1141
Basic Braille Literacy and Numeracy

March 2022

FOREWORD

Inclusion of learners with Special Educational Needs (SEN) is Rwanda's national commitment articulated in the National Constitution of 2003, revised in 2015 especially in its articulation of the right to education for all (Article 20) and the State's duty to establish special measures facilitating the education of persons with disabilities (article 51).

The Government of Rwanda (GoR) has ratified the Convention on the Rights of Persons with Disabilities (CRPD) of 2006; and is committed to achieving the Sustainable Development Goals (SDGs) whose fourth goal focuses on education. Rwanda through law n° 27 of 07/09/2020 published in official gazette n° 013/2020 of 07/09/2020 has ratified the Marrakesh treaty of 2013 that aims at facilitating access to published works for persons who are blind, visually impaired, or otherwise print disabled.

Rwanda has policies and plans in place to ensure access to education for all learners including those with SEN. Of these, one can mention the Education Sector Policy of 2003, the current National Strategy for Transformation (NST1 2017-2024), the Education Sector Strategic Plan (ESSP-2019/2024) stating that all in-service and pre-service teacher training programs include components of inclusive education (priorities5 & 7), the Special Needs and Inclusive Education policy and its Strategic Plan (2019-2024) and the National Policy of Persons with Disabilities (2021).

In respect of the above, Rwanda Basic Education Board (REB) in collaboration with the University of Rwanda (UR) through College of Education (CE) School of Inclusive and Special Needs Education has developed Training programmes; Continuing Professional Development Diploma in Braille and Assistive Resources (CPDDBAR) and, Continuing Professional Development Certificate in Braille and Assistive Resources (CPDCBAR) and relevant training modules to equip teachers in Rwandan schools with competences to meet the diverse learning needs of learners with SEN.

Rwanda Basic Education Board hereby introduces **'Basic Braille Literacy and Numeracy (BAR1141)** as one of the modules in the programs and urges stakeholders to support its effective delivery.

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Abbreviations and Acronyms

ADHD   Attention Deficit and Hyperactivity Disorder
CBID   Community-Based Inclusive Development
CBR   Community-based rehabilitation
CP   Cerebral Palsy
DB   Decibels
DPO   Disabled People's Organizations
EAC   East African Community
ECD   Early Childhood Development
EDPRS   Economic Development and Poverty Reduction Strategy
EFA   Education for All
EICV   Household Living Conditions Survey
ESSP   Education Sector Strategic Plan
HI   Hearing Impairment
ICF   International Classification of Functioning, Disability and Health
ICT   Information and Communication Technology
IEP   Individualized Education Plan/Program
LD   Learning Difficulties
M & O   Mobility and Orientation
MINALOC   Ministry of Local Government
MINEDUC   Ministry of Education
NCPD   National Council for People with Disabilities
NGO   Non-Government Organisation
NUDOR   National Union of Disability Organizations in Rwanda
PRSP   Poverty Reduction Strategic Plan
REB   Rwanda Basic Education Board
RNUD   Rwanda National Union of the Deaf
RSL   Rwanda Sign Language
RUB   Rwanda Union of the Blind
SDG   Sustainable Development Goals
SEN   Special Educational Needs.
SENA   Special Educational Needs Assessment
SNE   Special Needs Education
TTC   Teacher Training College
UDL   Universal Design for Learning
UN   United Nations
UNESCO   United Nations Educational, Scientific and Cultural Organization
UNICEF   United Nations Learners' Fund
UNCRPD   United Convention on the Rights of Persons with Disabilities
UPHLS   Umbrella of Organizations of Persons with Disabilities in the Fight against HIV/AIDS & for Health Promotion
UR CE   University of Rwanda - College of Education
VI   Visual Impairment (VI)
WHO   World Health Organization
WIPO   World Intellectual Property Organization
7YGP   Seven Year Government Programme
9YBE   Nine Year Basic Education
12YBE   Twelve Year Basic Education

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MODULE INTRODUCTION

This module presents the basic braille literacy and numeracy. It focuses on acquisition of basic skills in reading and writing braille to better meet the educational needs of people with visual difficulties. This is envisaged to help you master more advanced concepts related to braille in other modules that will come after this one. The system of braille in use is British English Braille with capital sign.

You will be introduced to the English braille alphabet, some short form words, abbreviations and braille numerals. Some reading exercises will be presented to you for mastery of reading skills.

You will also be introduced to some braille writing equipment and learn how to use some of these to write braille. These equipment include the braille slate and stylus, the Perkins Brailler and ICT-based devices such as Jot a Dot and embossers.

In the later part of the unit, you will learn about how to present braille in the various possible formats. This will be covered in the unit on Braille document layout.

MODULE LEARNING OUTCOMES

📖**Unit learning outcomes**

By the end of this module, you should be able to:
   i. Demonstrate knowledge and understanding of basic Braille Literacy and Numeracy, different parts of the Brailler and other braille writing equipment, and proper storage of braille equipment.
  ii. Explain the difference between braille writing and print writing
 iii. Operate common Braille equipment without difficulties
  iv. Explain the logic of braille writing
   v. Read and write basic Braille effectively
  vi. Transcribe written materials from print to basic braille and vise-versa
 vii. Search for up-to-date information related to braille and assistive resources via the Internet and libraries,
viii. Contribute to campaigns, debates and popular media related to Braille writing and assistive resources,
  ix. Advocate for proper teaching of Braille and improved educational services for people with visual difficulties and other difficulties,
   x. Participate in the ongoing quality improvement of educational services in Rwanda in which inclusion of the educationally marginalized people are part.

Indicative content
This module is comprised of the following six units namely;
   • Introduction to braille and braille equipment

- Braille alphabet and punctuation marks
- Numbers and simple mathematical operation signs in braille
- Simple word-signs
- Basic tactile drawings
- Braille layout

Unit 1: Introduction to Braille and Braille equipment

🕯 Introduction

This unit presents the development of Braille from 19th century to its current situation in Rwanda and various braille equipment. The use and maintenance of braille equipment is also discussed.

📖 Unit learning outcomes

By the end of this unit, you should be able to:
- Explain the development of Braille and its current situation in Rwanda.
- Describe various Braille equipment, their maintenance and use

Topics in this unit

Topic 1.1: Development of Braille
Topic 1.2: The use of braille in Rwanda
Topic 1.3: Braille equipment

Topic 1.1: Development of Braille

In this topic we define braille and explore its development

✍ Activity 1

Briefly discuss how people with visual difficulties read and write

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1.1.1   Defining Braille

Braille is a system of embossed dots which are formulated using combinations of six dots (REB, 2019). They are arranged in two vertical rows of three dots each. Different arrangements of the dots form the alphabet and other characters which you will learn later in this unit. They form a group of six dots numbered as follow:

The Braille Cell
1 ● ● 4
2 ● ● 5
3 ● ● 6
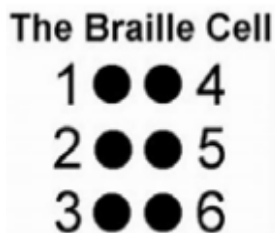
One group of the six dots as shown above is called **Braille cell.**

Persons with Visual Impairment (PVI) read these dots through touch. Those who read through touch are referred to as **touch readers**. They use their fingers to find the position and arrangement of the dots and know what is communicated. Braille writing is very different from print writing. Each letter of the alphabet and all other print characters and symbols have their Braille equivalent depending on the arrangement of the dots. This is done by using the six dots of the Braille cell. The position of the dot in a cell can make a lot of difference in meaning. For those who are not visually impaired they can read braille with their eyes. You will learn how to write the alphabet in Braille later.

1.1.2   Background of Braille

Before Braille was developed as a system of reading and writing for people who are blind, there were other efforts to enable them to read and communicate with each other or with sighted individuals. The following are persons who contributed in the development of Braille:

Valentine Haûy (1745-1822)

In 1784 Valentine Haûy founded the first school for the blind in Paris and realized that the development of some methods of reading and writing was a precondition for providing any systematic and meaningful education to persons who were blind. Haûy concentrated on using regular print in embossed form. This form of embossed print went through many modifications and therefore could not survive long. All embossed letters had for the blind one basic short-coming; it was talking to the fingers the language of the eye (REB, 2020)

Charles Barbier (1767- 1841)

Charles Barbier was an army officer in the French army and also an engineer. He needed to send messages without being discovered at night. This could only be done by touch and it is only this basis that he came up with "tangible dots". It was his idea to use embossed dots as the medium most suitable for such touch reading. His system was used by soldiers to communicate at night in the battlefield. Charles Barbier's system consisted of twelves dots, six vertical dots in two rows. The greatest disadvantage of this system was its difficulty for touch reading since the dots could not be well covered by the fingertips (REB, 2020)

Louis Braille (1809- 1852)

Louis Braille who was also French man became blind when he was young. He was acquainted with Barbier's system of dots while he was still quite young. He used it experimentally with his pupils when he became a teacher. He conceived the idea of using the upper half of the Barbier cell and designed an alphabet with the six dots cell that had two rows of three dots. The new code now called Braille was accepted in 1854 two years after Louis Braille's death. It is the Braille we use today (REB, 2020).

Braille has undergone many modifications in terms of contractions (abbreviations) representing groups of letters or whole words that appear frequently in a language (REB, 2020). The use of

contractions makes reading easier and reduces the size of braille books. This has led to modification of the braille codes to make them easily understood.

✍ **Self-assessment**

In your own words, explain what you understand by "Braille" and how it was developed.

Topic 1.2: The use of Braille in Rwanda

This topic focuses on current usage of Braille in Rwanda.

✍ **Activity 2**

Discuss in pairs the reason why the learners with visual difficulties didn't attend schools before introduction of special school in Rwanda?

Braille was introduced in Rwanda in 1978 at Home de la Vierge des Pauvre (HVP) Gatagara; an education center established for persons with disabilities. The center was established by Home de la Vierge des Pauvre (HVP), a Roman Catholic Organization for visually impaired learners in 1978 (Karangwa et al, 2013). Since then, braille continued to be used in supporting learners with visual difficulties.

Currently, there are schools established to offer education to leaners with visual difficulties. In Rwanda, such schools are categorized as either special schools or inclusive schools. Special schools include Groupe Scolaire HVP Rwamagana in Rwamagana district, Kibeho School for the blind in Nyaruguru district, and Blessing school located in Musanze district. Inclusive schools include G S Gahini and a number of other inclusive schools that are emerging. At the University of Rwanda and more specifically the college of education, and college of arts and social sciences accommodate students with visual difficulties and facilitate their learning. Use of Braille is an essential element in the support provided to students with visual difficulties.

Braille diversity

There are two types of braille used in different schools that admit learners with visual difficulties in Rwanda. Some schools use British English Braille and others use French Braille.

Efforts to harmonize the types of braille used in Rwanda are underway. In this CPD, preference is given to British English Braille as language of instruction in Rwandan schools.

Topic 1.3: Braille equipment

This topic introduces to you various Braille equipment. Braille equipment can be categorized as writing tools, reading resources and braille technological devices as further explained in this topic

✍ **Activity 3**

In pairs, discuss on the various equipment used by people with visual impairment in reading and writing

1.3.1 Categories of Braille equipment

There are different categories of Braille equipment: writing tools, mathematical tools, reading tools as explained below:

1.3.1.1 Writing tools

Braille writing tools are the tools that are used for writing Braille. The following are examples of Braille writing tools:

i. Peg board books

Pegboard books provide a way for young children who are blind or visually impaired, including those with multiple disabilities, to begin to explore books. This format uses real objects attached to pieces of pegboard. The common household materials that are selected have varied and interesting tactile properties, which encourage exploration. *In most Rwandan schools for the blind use wooden pegboards.*

These objects become the first "symbols" for the child and are an important step in developing language and literacy skills. When the child can relate an object with a specific activity or experience the object becomes a representation

Figure 1: Peg board book

for the entire memory. Object symbols become more and more abstract as the learner develops and can be paired with even more abstract representations like braille or print.
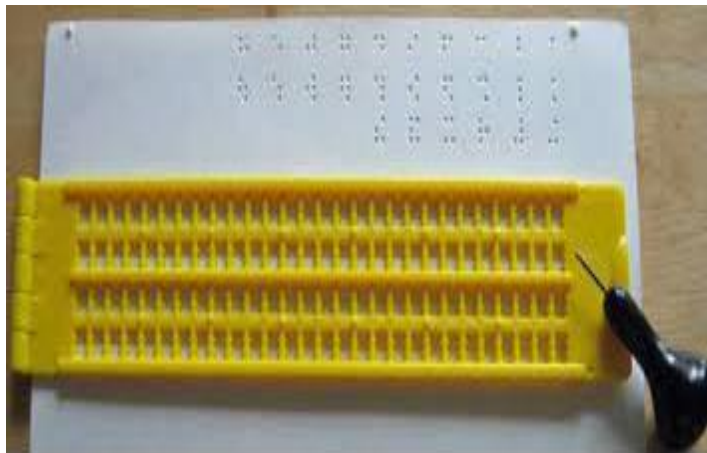
Nail pegboard   **wooden pegboard**

Figure 2: Nail pegboard and wooden pegboard

ii.   Slate and stylus

The slate is a rectangular frame that has impressions of Braille cells on it. It has a frame that is hinged on it as shown in the figure below. Braille paper is inserted and held tightly by the frame.

The stylus is used to prick dots on a special paper known as Braille paper. Writing using a stylus is done from right to left. However, reading is done after turning over the Braille paper and then we read from left to right.

Figure 3: Slate and stylus

To write Braille using the slate and Stylus, you need a lot of practice as letters must be written one way and read the other way.

How to write braille using a braille slate

Steps:

You should place the Braille slate on a stable horizontal surface such as a table or desk. Now press the end of the stylus into the braille cells across the page, from the right to the left, ensuring that the stylus depresses into the six positions of each cell onto the paper beneath the perforated plate. During the writing process, all the three middle fingers rest around the stylus stem and press it down such that dots are made through the slate cells. You should note the rule that **you write the dots on the right side while advancing to the left side**. When the braille slate is in use, it produces the sound of 'tiny pops'

When the writing is done and you want to read the braille cells, you should turn over the slate towards the left. The left forefinger should be placed on the sheet at the grip notch, and the groove plate should be removed with the right hand. In this position, you can read braille from left to right as is normal with ordinary reading.

Close back the Braille slate, making sure you do not move the paper out of its position. Continue writing onto the Braille slate as before, making sure you press into the six positions in each cell.
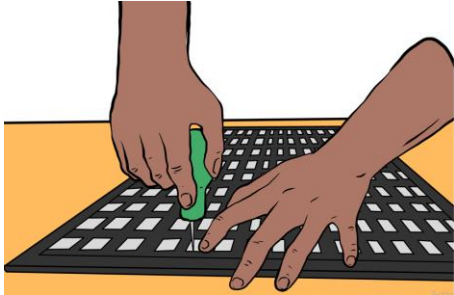
Figure 4: Use of slate and stylus

iii.   Perkins Brailler

Perkins Brailler is one of Braille writing tools (Friedman, 1963). It is the most commonly used Braille writing machine in schools in Rwanda. It is very reliable and simple to operate. The embossing head produces firm dots that are easy to read. The Braille paper is held tightly and kept in position throughout.

Figure 5: Perkins Brailler

How to write braille using a Perkins Brailler

PERKINS BRAILLER

Dot3	Dot 2	Dot 1	Spacebar	Dot 4	Dot 5	Dot 6
↑	↑	↑		↑	↑	↑
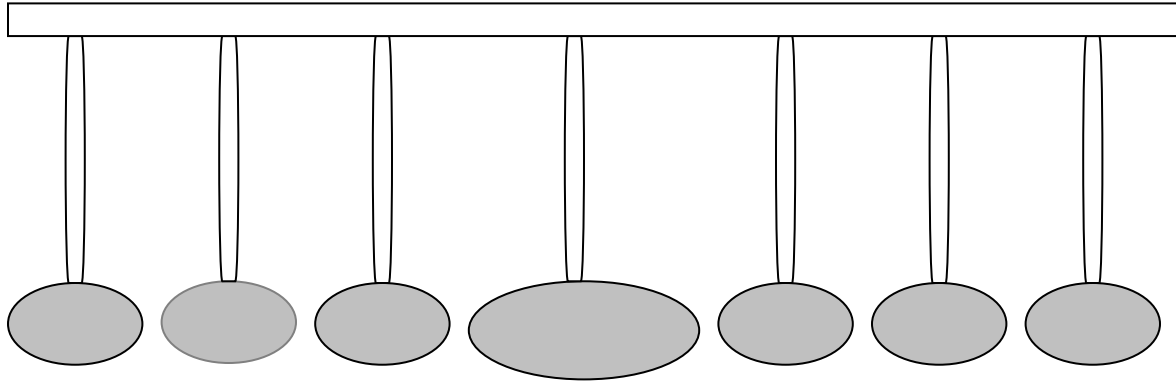
dots produced on paper

A schematic diagram of the Perkins Brailler Keyboard

Dot3	Dot 2	Dot 1	Spacebar	Dot 4	Dot 5	Dot 6
↑	↑	↑		↑	↑	↑

dots produced on paper

A schematic view of the Perkins Brailler buttons

The fingering is arranged as follows:

Dot 3 – use the ring finger of the left hand
Dot 2 – use the middle finger of the left hand

Dot 1 – use the index finger of the left hand
Dot 4 – use the index finger of the right hand
Dot 5 – use the middle finger of the right hand
Dot 6 – use the ring finger of the right hand

When using the Perkins Brailler, the six fingers should rest on, or just be above, the home keys ready to strike the relevant keys. The left or right thumb should be ready to strike the space bar as need arises. It is advisable to place the Perkins Brailler on top of its cover during use. This is meant to absorb the cluttering sound as the plastic cover absorbs some of the sound.

Parts of a Perkins Brailler:

The Perkins Brailler is made up of so many parts, but the following external parts are very important to know:

Embossing head: This is the component which moves when writing braille dots on paper.

Stripper plate: This is a platform from where the piece of Braille paper is pulled into the machine prior to brailling.

Feed roller: It is a rotating drum on which the paper winds when being fitted into the machine.

Grooved roller and Paper support: The grooved roller helps to keep the paper aligned in the machine.

Release lever: This is a lever which is depressed several times to eject the Braille paper out of the machine.

Feed knobs: These are circular knobs which are rotated anti-clockwise in the process of feeding in the Braille paper into the machine.

Embossing head lever: This is a lever which is used to shift the embossing head and shifted to any position along the strip plate.

Exploring the Perkins Brailler

Things to remember when using the Perkins Brailler
- The machine should always be covered when not under use.
- When the machine is under use, the cover should be folded and placed under the Perkins Brailler to help reduce on the noise produced.
- The embossing head should be on the extreme right position when not under use.
- When writing headings, always place the embossing head five spaces from the left margin.

The following steps as outlined by Pester, Otto and Poppe, (1995), can be followed prior to using the Perkins Brailler:

1. Place the sheet of braille paper on the paper support bar.
2. Now slide the paper between the embossing head and the stripper plate and push it towards the left until it is stopped by the edge.
3. Gently push the paper until it touches the rollers at the back
4. Hold the paper firmly in position with a finger and push the release lever back with the other hand
5. Now roll the paper feed knobs so that the paper folds around the roller until they can turn no more.
6. Slide the embossing head lever to the extreme left position.
7. Now push the line space button so that the paper is pushed out once.
8. Reach the keyboard and begin writing.

While using a Perkins Brailler, each time the paper release button is pushed, it advances the paper out by one line. There comes a time when the Paper Release button cannot move any more. This means that the paper is fully used up and has to be moved out of the Brailler by opening the clips and pulling it outwards.

Removing the paper from the Perkins Brailler

If the paper is fully used up, turn the paper feed knobs clockwise and pull the paper out. If the paper is not fully used and you want to get it out of the Brailler prematurely, press the paper release button repeatedly until it can turn no more. Now turn the paper feed knobs clockwise and pull the paper out.

Compared to other writing devices, it has a number of advantages as indicated below.

Advantages of the Perkins Brailler

- Writing is upright – the user can read braille right from the machine without moving the paper.
- Line shift is easy – this involves depressing the appropriate button and the embossing head goes to the next line
- Portable – it has a handle and can be carried about with ease
- It is a robust machine if well cared for – it is a long-lasting machine if well-protected.
- Writing and reading is possible at the same time.

Erasing is very easy – the user can make corrections on the braille text even when the paper is in the machine

1.3.1.2. Mathematical tools

Mathematical tools are Braille code for encoding mathematical and scientific notation linearly using standard six-dot Braille cells for tactile reading by the visually impaired. The code was

developed by Nemeth in 1952 and called **the Nemeth Braille Code for Mathematics** (National Braille Association, 1972)

The following are examples of Braille mathematical tools.
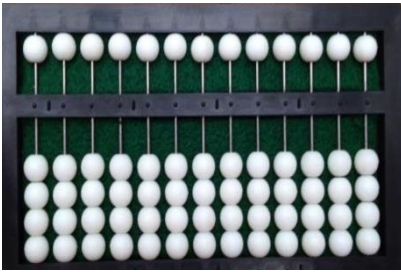
i.   Cranmer abacus

The Cranmer Abacus was designed specifically for individuals who are blind. What makes it unique is the piece of soft fabric or rubber that is placed behind the beads so that they will not inadvertently move while the person performs calculations (Amato, Hong & Rosenblum, 2013).

Figure 6: The abacus

ii.   Cuberithm Arithmetic Board

It is a Braille math teaching aid for visually impaired students with learning difficulties. It helps in the teaching of arithmetic layout and unlike paper allows easy correction. The weighted plastic cubes are embossed with braille signs. Arithmetical calculations are made by placing the cubes into the appropriate spaces on the partitioned board, with the desired braille character uppermost

1.3.1.3. Reading resources

Reading resources are materials used by people who are blind when they are reading information written in Braille. Such resources include: Braille books, Braille cards, and Braille games

i. Braille books

Braille books

iii. Braille games

1.3.1.4 Braille technological devices

Braille   Technological   devices are assistive   technologies which   allow blind or visually impaired people to do common tasks such as writing, browsing the Internet, typing in Braille and printing in text, engaging in chat, downloading files, music, using electronic mail, burning music, and reading documents

i. **Jot a dot**

Jot a dot is an electronic mini-Braille writing machine also referred to as "Pocket Brailler" developed in Australia. This is a portable brailling device and the most recent form of note taking machine for persons who are blind; it uses light paper as opposed to the other Brailler which must use heavy Braille Paper

iii. Embosser or braille printers

The embosser is the most recent development in Braille writing and mass production of Brailled materials. Special software for example the Duxbury Braille Translator (DBT) that can convert print to Braille and vice versa is installed in a computer

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✎ **Self-assessment**

List down Braille resources you consider helpful in learning for people with visual impairment. Arrange the listed resources from the one you consider most important.

📃 *Unit Summary*

This unit discussed the meaning of Braille and the different Braille equipment. The use of the various Braille equipment is also mentioned to facilitate better understanding of the purpose of the Braille equipment.

❗**Reflection question**

Describe common available equipment used by people with visual impairment to read and write

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Unit 2: Braille alphabet and punctuation marks

Introduction

To be able to use Braille, one needs to acquire relevant skills in Braille. This unit presents Braille alphabet and punctuation marks.

Unit learning outcomes

By the end of this unit, you should be able to:
- Read and write English Braille alphabet
- Write different punctuation marks in Braille

Topics in this unit:

Topic 2.1: English Braille alphabet

Topic 2.2: Punctuation marks in braille

Topic 2.1: English Braille alphabet

This topic introduces the letters of the alphabet used in English Braille writing. The first ten letters of the alphabet are formed using the top four dots (1, 2, 4, 5). Adding a dot 3 makes the next ten letters, and adding dot 6 to that makes the last six letters (except "w" because it was not used very much in the French language at the time that Louis Braille devised this system) (SANA,2002)

2.1.1 Letters from a to j

a – j

a	b	c	d	e	f	g	h	i	j

a	dot **1**	f	dots **1 2** and **4**
b	dots **1 2**	g	dots **1 2** and **4 5**
c	dots **1** and **4**	h	dots **1 2** and **5**
d	dots **1** and **4 5**	I	dots **2** and **4**
e	dots **1** and **5**	j	dots **2** and **4 5**

🖊 **Activity 4**

1. Write down any 8 letters of the alphabet in Braille

2. Write the following Braille writings in print

⠀⠀(Braille text lines)
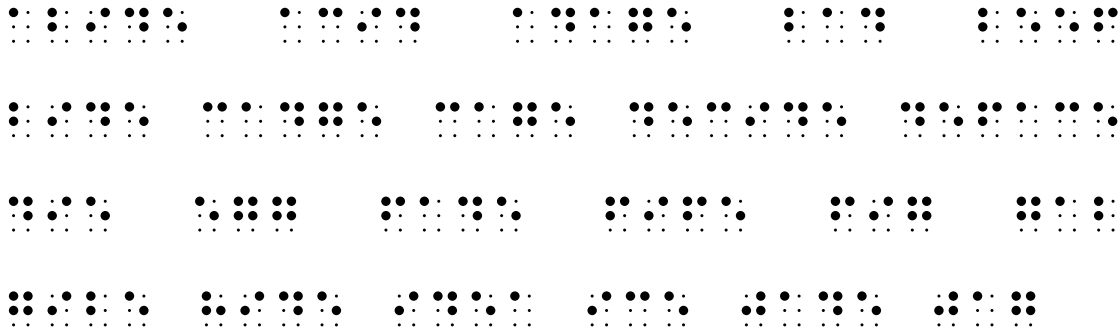
From activity 4 above you can now make more practices and write several other letters in Braille. In addition to writing in Braille, you also need to read information written in Braille.

2.1.2   Letters from k-t

Like the other letters of alphabet a-j, another group of letters that you need to be able to write and read in Braille are letters k-t (Braille, 2004)

<div align="center">

k – t

</div>

These ten letters are formed by adding dot 3 to each of the first ten letters

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

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

k	dots **1 3**		**p**	dots **1 2 3** and **4**
l	dots **1 2 3**		**q**	dots **1 2 3** and **4 5**
m	dots **1 3** and **4**		**r**	dots **1 2 3** and **5**
n	dots **1 3** and **4 5**		**s**	dots **2 3** and **4**
o	dots **1 3** and **5**		**t**	dots **2 3** and **4 5**

🖊 **Activity 5**

Write down letters k to t in Braille

2.1.3. Letters from u-z and w

u v x y z and w

u, v, x, y and z are formed by adding dot **6** to the letters k-o; thus:

k	l	m	n	o

u	v	x	y	z

w ⠺ is out of place because Braille is French origin and there is no letter w in French

u	dots 1 3 and 6		x	dots 1 3 and 4 6
v	dots 1 2 3 and 6		y	dots 1 3 and 4 5 6
w	dots 2 and 4 5 6		z	dots 1 3 and 5 6

(Howse, 2006)

✎ **Self-assessment**

1. Explain how you write letters u to z and why letter w is not included in this format.

2. Write the following braille writings in print

⠰⠩ ⠃⠗⠁⠊⠇⠇⠑ ⠞⠑⠭⠞ (decorative braille line)

Capital letter sign: The capital letter sign is represented by dot 6 written before a letter or the word. When the whole is capitalized double dot 6 is used before the word

Letter sign: The letter sign is represented by dots 5 6 written before a letter. It is commonly used in mathematics where a single letter is involved or to differentiate between a number or a letter.

Example: dot 5 6 and m: ⠰⠍

dot 5 6 and g: ⠰⠛

Topic 2.2: Punctuation marks in braille

According to Simpson(2013), ppunctuation is represented by its own unique set of dots, most often found in the lower part of the cell
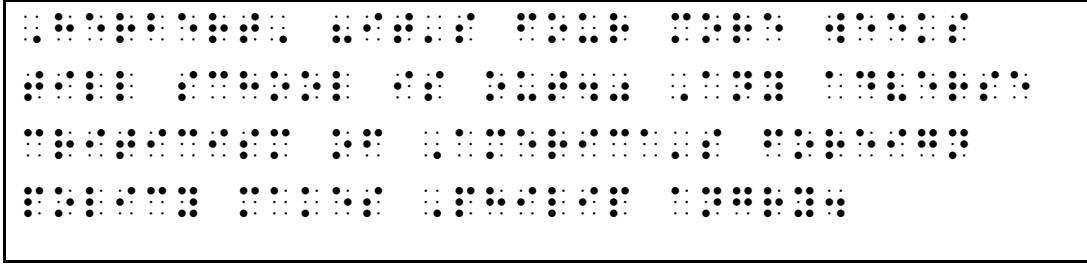

✍ **Activity 6**

Explain the use of the punctuation marks

Sign		Meaning
⠂	,	comma;non-Latin letter indicator
⠆	;	semicolon
⠒	:	colon
⠲	.	Full stop or period
⠖	!	Exclamation point

⠃ " ? opening double quatation mark; question mark

⠦ " closing quotation marks

⠄ ' apostrophe

⠤ - hyphen

✍Self-assessment

Write the following braille sentences in print

⠰⠏⠑⠕⠏⠇⠑⠰ ⠺⠊⠞⠓ ⠕⠱⠞ ⠎⠑⠑⠊ ⠰⠕⠗ ⠠⠉⠓⠕⠕⠇ ⠕⠋ ⠠⠱⠱⠹⠊ ⠇⠱⠺ ⠠⠎⠉⠓⠕⠕⠇ ⠠⠙⠑⠏⠱⠗⠞⠍⠑⠝⠞ ⠕⠋ ⠠⠇⠊⠞⠑⠗⠱⠞⠱⠗⠑ ⠠⠏⠓⠊⠇⠕⠎⠏ ⠠⠏⠑⠕⠏⠇⠑ ⠺⠊⠹⠓ ⠠⠎⠏⠑⠉⠊⠱⠇ ⠠⠝⠑⠑⠙⠎

![icon]*Unit summary*

This unit presented the Braille alphabet and different punctuation marks used while writing and reading Braille

![icon] **Reflection questions**

1. What are dots used to write in Braille the following letters:
   a. e and i
   b. d and f
   c. r and w
2. What are the dots used to write in Braille the following punctuation marks
   a. ! and ?

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Unit 3: Numbers and Basic mathematical operation signs in Braille

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Introduction

In this unit you will be introduced to writing and reading numbers in braille and basic mathematical operation signs.

Unit learning outcomes

By the end of this unit, you should be able to:
- Read and write numbers in Braille
- Use basic Braille mathematical operation signs

Topics in this unit:

Topic 3.1: Numbers in braille
Topic 3.2: Basic Braille mathematical operation signs

Topic 3.1: Numbers in Braille

This topic will introduce you to writing numbers from one (1) to nine plus zero (0) in Braille

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Activity 7

Write the letters **a** to **j** in Braille

3.1.1. Numbers in Braille

Braille is used by people with visual difficulties to read and write. It contains symbols and punctuation marks. Braille users need to have certain basic skills of using the symbols and punctuation marks of Braille (RNIB, 2005).

Literary Braille numbers are formed by placing the Braille number sign (dots 3, 4, 5, and 6) before the Braille letters "a" to "j".

This is the Braille number sign ⠼

Braille numbers from 1 to 9 plus 0

1 is a number sign plus **a**   ⠼⠁

2 is a number sign plus **b**   ⠼⠃

3 is a number sign plus **c** ⠼⠉

4 is a number sign plus **d** ⠼⠙

5 is a number sign plus **e** ⠼⠑

6 is a number sign plus **f** ⠼⠋

7 is a number sign plus **g** ⠼⠛

8 is a number sign plus **h** ⠼⠓

9 is a number sign plus **i** ⠼⠊

0 is a number sign plus **j** ⠼⠚

10 is a number sign plus **a j** ⠼⠁⠚

100 is a number sign plus **a j j** ⠼⠁⠚⠚

150 is a number sign plus **a e j** ⠼⠁⠑⠚

275 is a number sign plus **b g e** ⠼⠃⠛⠑

Examples:

⠼⠁ ⠼⠃ ⠼⠉ ⠼⠙ ⠼⠑ ⠼⠋ ⠼⠛ ⠼⠓ ⠼⠊ ⠼⠚

1   2   3   4   5   6   7   8   9   0

✒ **Self-assessment**

1. Write the following numbers in Braille 14, 58 and 237
2. Write the following numbers in print

(a)	(b)	(c)	(d)	(e)
⠼⠁	⠼⠛	⠼⠁⠃	⠼⠁⠛⠑	⠼⠁⠛⠚⠊

Topic 3.2: Basic Braille mathematical operation signs

This topic will introduce you to the writing and reading Basic Braille mathematical operation signs.

According UKAAF (2019), the Braille signs in the following table are used to represent the corresponding print signs**.**

+ Plus

- Subtraction

/ Division

X multiplication
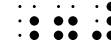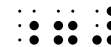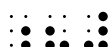
= equal sign

Math symbols

⠐⠖	⠐⠔	⠐⠦	⠐⠌	⠐⠶
+	**-**	**X**	**/**	**=**
Dot 5, 2-3-5	dot 5, 3-6	dot 5, 2-3-6	dot 5, 3-4	dot 5, 2-3-5-6

Note: The addition, subtraction, multiplication, division and equal sign are two cells each

Examples:

⠼⠃⠐⠖⠦   ⠼⠙⠐⠶⠼⠋   ⠼⠋⠐⠌⠼⠃

⠼⠃⠐⠔   ⠼⠙⠐⠌⠼⠃   ⠼⠋⠐⠴

⠼⠃⠐⠦   ⠼⠙⠐⠖   ⠼⠋⠐⠴

⠼⠃⠐⠌   ⠼⠙⠐⠖   ⠼⠋⠐⠶

⠼⠃   ⠼⠙⠐⠖   ⠼⠋⠐⠖

⠼⠋   ⠼⠙⠐⠌   ⠼⠋⠐⠌

⠼⠃⠐   ⠼⠙⠐⠌   ⠼⠋⠐⠴

⠿ ⠿ ⠿

⠿ ⠿ ⠿

⠿ ⠿ ⠿

⠿ ⠿ ⠿

Unit summary

This unit highlighted different basic skills in Braille numbers and basic mathematical operation signs. The trainees also participated in different activities offered in this unit.

Reflection Questions

1. Write the following in print

i. ⠿ ⠿ ⠿

ii ⠿ ⠿ ⠿

iii ⠿ ⠿ ⠿

2. Write the following sums in Braille
   i. 249-127=
   ii. 675+47=

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Unit 4: Simple upper word-signs and abbreviations

Introduction

This unit aims at equipping you with the knowledge of simple upper word-signs and abbreviations that are used in braille that represent whole words.

Unit learning outcomes

By the end of this unit, you should be able to:
- i. Identify simple upper word-signs
- ii. Read and write simple word-signs and abbreviations
- iii. Differentiate special common upper word-signs

Topics in this unit:

       Topic 4.1: Simple Upper word-signs
       Topic 4.2: Five special common word-signs
       Topic 4.3: Simple abbreviations

Topic 4.1: Simple Upper word-signs

This topic introduces you to the letters of the alphabet which represent whole words when they are standing alone in Braille

Activity 9

Discuss why you think it is useful to have letters representing whole words in Braille

Understanding how word-signs are formed helps in developing the ability to read and write in Braille. This topic covers simple word-signs and abbreviations. It provides practice activities that will help you to get familiar with word-signs and abbreviations. The following table shows how the letters of the alphabet are used in Braille to represent whole words when they are standing alone; usually it is the first letter that is taken (REB, 2020).

The following are letters used in Braille and the word each of them stands for:

b: but	**l:** like	**v:** very
c: can	**m:** more	**w:** will
d: do	**n:** not	**x:** it
e: every	**p:** people	**y:** you

f: from	q: quite	z: as
g: go	r: rather	
h: have	s: so	
j: just	t: that	
k: knowledge	u: us	

Letter **a, i** and **o** do not represent any word in Braille.

Single letters used in this way to represent words are called simple upper word-signs; simple because they take up one cell, upper because they have a dot in the top of the cell, and word-signs because they represent words. They may only be used as abbreviations for the word if they represent the exact word, i.e. when no other letters are added to them.

Examples

    I like   He likes

But me   No buts

You will just do that.

  So that I can go

  ✍ **Self-Assessment**

Use the simple upper word-signs you have learnt to form meaningful sentences

Topic 4.2: Five special common word-signs

In the previous topic, you learnt what is meant by upper word-signs. You also learnt about some letters which are used as simple upper word-signs. In this topic, you will learn about five commonly used Braille signs and what they stand for (REB, 2020).

✎ **Activity 10**

Write 10 words that you think occur very frequently in English. See how many of the words you write will occur among the five common words discussed in this topic

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The words 'and', 'for', 'of', 'the', and 'with' occur very frequently in English. In braille, they are represented by five special common word signs as follows:

⠿   ⠿   ⠿   ⠿   ⠿

  and   **for**   **of**   **the**   **with**

and dots 1 2 3 and 4 6
for   dots 1 2 3 and 4 5 6 (all six dots)
of   dots 123 and   5 6
the   dots 23   and 4 6
with dots 23 and 4 5 6

One unique feature about these five word-signs is that where two or more of these words occur in succession and in the same phrase, the word-signs that express them are written adjoining one another (if in the same line of Braille) as if they were one word, that is to say without any space between them, in order to save space (Park, 1998).
Example:

with the knowledge of the people and for the purpose

⠿⠮   ⠿   ⠿⠿   ⠿   ⠿⠿⠮   ⠿⠮⠿⠿⠮⠿
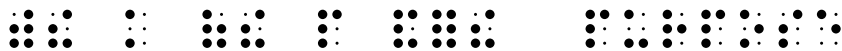
Similarly, when the article **"a"** occurs next to any of these five word-signs in the same line of Braille and in the same phrase, they are written as if they were one word without leaving any space between them.
Example:

       and a   and with a

       ⠿⠁   ⠿⠿⠁

So far, you have learnt the words represented by the letters of the alphabet and the five special common word-signs. You should always bear in mind that using these word-signs is governed by some rules which you must always follow.

✍ **Self-assessment**

1. Translate the following braille text:

    ⠰⠆   ⠰⠒   ⠒⠆   ⠒⠒   ⠒⠆

Transcribe the following from print to braille:

    I can see the man with the dog and a cat.

Topic 4.3: Simple abbreviations

This topic introduces you to some of the simple abbreviations used in braille

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✍ **Activity 11**

Make a list of 20 words that you think can be abbreviated. Why did you choose these words?

Below is a list of some abbreviations used in Braille. These are letters that are used in combination to represent whole words (Mulenga & Muzata, 2020).

al: also

bl: blind

tgr: together

abv: above

af: after

alm: almost

alr: already

✍ **Self-assessment**

Write down the words represented by the following abbreviations:

al	bl
tgr	abv
af	alm
alr	

We have now come to the end of the unit. In the next unit, we shall learn about basic tactile drawings.

▤ *Unit summary*

In this unit, you have learnt about simple upper word-signs and the words they stand for. You also learnt about the five common abbreviations. In the final part of this unit, you learnt some simple abbreviations. Remember to practice what you have learnt in order to familiarize yourself with the abbreviations.

❗ Reflective Question

Write down as many sentences as you can in braille using the abbreviations you have learnt in this unit.

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Unit 5: Basic tactile drawings

🕯️Introduction

This unit presents tactile graphics, including tactile pictures, tactile diagrams, tactile maps, tactile graphs, and images that use raised surfaces so that a person with visual difficulties can feel them. They are used to convey non-textual information such as maps, paintings, graphs and diagrams.

🖊️ Unit learning outcomes

By the end of this unit, you should be able to:

i.	Identify various equipment and materials used to make tactile drawings
ii.	Draw different tactile lines, shapes and objects
iii.	Interpret different tactile lines, shapes, and objects

Topics in this unit

Topic 5.1: Equipment and materials used to make tactile drawings
Topic 5.2: Tactile graphics

Topic 5.1: Equipment and materials used to make tactile drawings

This topic presents various tactile materials that can be appreciated using one's sense of touch, as well as some equipment and materials used to make them. Educators use tactile materials to teach people with visual difficulties. Tactile materials vary from natural to synthetic and many can be found locally.

🖊️ **Activity 12**

List down various equipment and materials used in making tactile drawings

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5.1.1 Making tactile equipment
There are various ways of making tactile displays easier to interpret (Braward and Johnson, 2016):
- Making textures, shapes, lines, and symbols or items distinctly different from one another.
- Simplify many lines or elements in an illustration. Leave out unnecessary details and lines. A tactile illustration should show only a few of an object's most important features,
- Identifying tactile details, such as the stem on an apple to distinguish it from an orange.

- **To avoid clutter** place items no closer than ¼ inch apart; lines closer than ⅛ inch apart are not felt as being separate.
- **Avoid many intersecting lines**. Lines that do meet and cross over one another should be tactually distinct from one another (e.g. dotted versus solid).
- Shapes should be at least ½ inch on a side, no smaller, if they are to be recognized.
- Fill large outlined shapes or areas with a "fill pattern" (areal pattern) or texture to help the child tell what is inside and what is outside the shape.

Furthermore, Barth (1981) explained that if a tactile illustration has many objects or elements, break it into two or more separate illustrations. For a young child, a tactile illustration should show only one to a few objects per illustration.

Equipment and materials for making tactile drawings

Equipment and materials used in making tactile drawings are different tools that are used to make tactile drawings. They are mainly categorized into two groups: those which are **natural and those which are manufactured.** Below is a list of different tools used in making tactile drawings and their importance in making tactile materials (Spence and Osterhaus, 1997).

5.1.2 Manufactured equipment and materials

1. Tactile drawing board

A tactile drawing board uses direct tactile drawing's approach to draw, and hence is generally used as geometry set too. This board uses a special plastic film sheet placed over rubber-surfaced tactile clipboard and uses a special stylus to create tactile impressions on it.

Whereas one can draw a line, a circle, and an angle individually using this board, drawing a full meaningful geometrical construction comprising of multiple lines, angles, circles, and arcs as part of it is not easy.

2. Tactile Slate and Stylus

This is a kind of slate and stylus that can be used to create raised lines for tactile graphics onto various media such as on Braille paper, and drawing film.

3. Tactile Markers

Tactile markers are designed to orient individuals who are blind or have low vision. Tactile markers are made of plastic. They are adhesive-backed clear dots which can be used to mark light switches, oven controls, house keys, alarm clocks,

telephones, tape recorders, computers keyboards, etc.
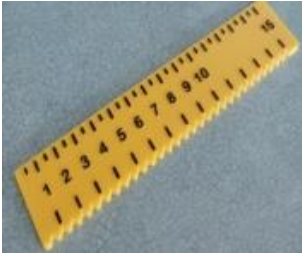
4. Tactile ruler

The tactile ruler is **a** low-cost measuring ruler for people who are blind or have low vision. It has tactile markings at the standard 0.5cm resolutions which can be touched and felt by people with visual difficulties.

Tactile Protractor

The tactile Protractor is an instrument which is used to measure and draw angles with precision. It creates a click sound at every 1° angle. It can be locked in place for quick and accurate drawing.

5.1.3 Natural equipment and materials

1. Food

Different food items are inexpensive tactile materials that can be found around the house and home. Cooked pasta in different shapes, dry beans, rice and nuts, allow young children practice their fine-motor skills and pincer grasping. Since these materials can also help in developing fine-motor skills, they are helpful for learning to draw and later write.

2. Sand

Wet and dry sand have different properties, and children can experiment with them through play. Wet sand can be mounded into shapes and moulded into containers. Sticks, rakes and other objects can be used to draw lines in wet sand, and other toys can leave imprints in it. Dry sand runs easily through a child's hands and sieves. Marks can be made in dry sand, and funnels are a way to feel the flow of this tactile material.

3. Play Dough

Play dough is a fun project to make and for children to play with. Young children can use it to make a wide range of objects or just push it through their fingers. Play dough can be made with easy homemade recipes or it can be purchased cheaply from toy stores. Like wet sand, it can be moulded and remain in specific shapes. When dry, play dough will harden and retain its shape.

4. Beads and Lacing

Plastic beads are easy to touch and hold, and teaching children to lace beads builds fine-motor skills which are useful for writing. Using fingers to pincer grasp the small beads is a popular kindergarten activity. Just like beans, beads are an exciting way to teach children. For example, lacing necklaces with beads builds concentration and patience.

5. White glue

Tracing lines and images with white glue is a fast and easy way to create a tactile image. Also, white glue is almost invisible, which is an advantage when it is important to use color.

6. Glitter glue

Glitter glue is used when one needs something with a higher contrast and a sandy texture. Glitter glue can also be shaken over white glue and let it dry.

7. Foam stickers

A fun way to display information is by using foam letters and shapes on paper. They are especially liked because they have a smooth, soft texture compared to most other available options.

 Self-assessment

1. Identify at least five tactile materials that can be easily found around your home.
2. Explain two main categories of tactile equipment and materials

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Topic 5.2: Tactile graphics

Tactile graphics are also referred to as hepatic sensory modality. It gives information and communicates visual images which accompany Braille text through touch. Thus, we are able to convey the content in maps, charts, diagrams, images and building layouts or geometric figures. Tactile graphics utilize raised lines and patterns on paper or plastic. The raised surfaces include lines, shapes, and multiple textures to communicate printed visuals, such as maps, diagrams, graphs, drawings, charts, and pictures. In the same way, individuals who are blind or visually impaired use their fingers to read by feeling Braille dots that form words (Otto & Poppe, 1994).

 Activity 13

Explain the importance of tactile graphics

5.2.1 Basic Principles for Preparing Tactile Graphics

Spence and Osterhaus (1997) highlighted seven basic principles for preparing tactile graphics:

1. Make the tactile graphic as clear as possible. Information should be presented in a clear, concise manner for the student.
2. Know the important facts to be kept in mind when creating the graphic.
3. Ensure that geometric shapes or Braille signs used illustrate the concept.
4. Omit unnecessary parts of the diagram.
5. Keep in mind the level of knowledge, skill, and age of the reader.
6. Determine if the shapes, textures and total form convey the concept.
7. Remember to keep the graphic simple; otherwise, it becomes useless.
8. While Editing or proofreading the graphic, be guided by your fingers and not by your eyes, before showing it to a student. Be careful if someone tells you that your graphic is "pretty" or "beautiful", as this may be a warning sign that your student may not be able to understand it at all.

Using a vertical approach to feel every aspect of the tactile graphic can cover more area quickly with fewer sweeps and overlapping. Horizontal or circular search patterns are other ways that a person can use to explore a tactile graphic. Whichever method a person chooses should ensure that information is not missed.

5.2.2 Importance of tactile graphics in teaching and learning

An inclusive teaching and learning environment needs the use of tactile graphics. Tactile graphics are vital for the inclusion of persons with visual difficulties in daily activities, including education, employment, travel, performance of household chores, and many other areas. Visual cues are often inaccessible to people who have visual challenges such as blindness or low vision. Hence, these people get excluded from educational, practical, cultural, and recreational activities and information. Below we will explain why it is important to use tactile graphics in teaching and learning activities (Otto and Poppe, (1994).

1. Children with visual difficulties need to get access to visual information in a format they can understand at the same time as their sighted counterparts.
2. A lot of information is given graphically to sighted children and adults. People with visual difficulties need to be able to know how to use tactile graphics in order to be able to access, understand and use the information that is visually available to other people.
3. When students are introduced to tactile graphics over time, they are able to develop skills in areas such as spatial orientation, as well as how to find and use keys, and how to systematically search the graphic for information.
4. It is important that a child with visual difficulties learn how to use tactile graphics at the same time as they are learning Braille. This is because doing so helps students with visual difficulties develop skill levels similar to their sighted peers.
5. Being able to use tactile graphics enables students with visual difficulties to read graphics that will be required for the understanding of concepts such as diagrams, graphs, and maps. Students are also able to participate in standardized testing exercises.

5.2.3 Challenges in Designing and Making Tactile Graphics

1. Sometimes tactile graphic readers and producers do not receive satisfactory instruction, experience, and materials needed to design and produce objects with high-quality standards
2. Tactile Graphics are not exact duplicate copies of the original printed images. Rather, they are representations that have been adapted for the sense of touch.
3. Tactile graphics generally become more difficult to interpret and create confusion as the image and subject matter become more complex. As a result, many printed maps, graphs, and diagrams must be reduced to their most essential information in order to be understood.
4. There are times when an image contains a lot of more information that can fit on one graphic page. In such cases, the image is simplified so as to try and keep the most important elements of the graphic. Thus, producing graphic materials for some subjects, such as scientific matter, can be more challenging (Sheppard and Aldrich, 2000).

In summary, when making a tactile graphic, always ensure that it conveys the required information in the most efficient and understandable way possible. To make the graphic more user-friendly, remove all unnecessary decorative elements and reduce the image to only relevant and meaningful information.

✍ Self-assessment

1. Identify basic principles for preparing tactile graphics
2. Discuss challenges faced by graphic readers

🗒 *Unit summary*

In this unit, you have learnt about basic tactile drawings. Specifically, you have learnt about equipment and materials used in making tactile drawings and graphics. You found out the importance of tactile drawings. You have also learnt about the principles of making tactile graphics and the challenges faced in making tactile graphics.

❓Reflective questions

1. In this unit, you have learnt about the challenges of producing tactile graphics. Can you think of any other challenges not mentioned in this unit?
2. Compare and contrast manufactured and natural materials used in making tactile graphics

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Unit 6: Braille document layout

Introduction

This unit introduces you on how to transcribe Braille to print and print to Braille. Braille transcriber should consider that document format has to be transcribed also. The principles of Braille transcription provide all possible guidelines to make suitable Braille documents to a reader.

Unit learning outcomes

By the end of this unit, you should be able to:
- Identify elements of braille format
- Explain the principles of Braille transcription
- Explain different embossing techniques

Topics for this unit:

> Topic 6.1: Elements of Braille format
> Topic 6.2: Principles of Braille transcription
> Topic 6.3: Embossing techniques

Topic 6.1: Elements of Braille format

This topic introduces you to some of the elements of Braille design

✎ Activity 14

Differentiate Braille formats from the pictures below

Unformatted braille

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Formatted Braille

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Texas School for the Blind and Visually Impaired Outreach Programs, 2011

Elements of Braille format

According to the Braille transcription principles the following are some elements of Braille design.

- ✓ **Page number**: The Braille page number mostly placed in the top right corner of each Braille page. Example: in DBT: The top right corner is the default position for the Braille page number. The print page reference is the current print page number, shown at the left end of the navigation line. Refer to 1.5 Print page turnover for information regarding the print page indicator within the text.

- ✓ **Paragraph:** A Braille paragraph is shown as a block of text, with the first line indented two cells. Blank lines must not be left between paragraphs.

  Example:

  "There," I said, pointing toward it, "doesn't that suggest something to you?"

  She made a motion with her head-half negative, half contemptuous.

  ⠐⠦⠮⠗⠑⠂⠐⠶ ⠊ ⠎⠙⠂ ⠏⠕⠔�⠤⠀ (braille)

  Title and Headings
- ✓ *Heading 1:* Heading text is preceded by a blank line and centered. Leave a minimum of 6 blank cells on each side of the heading.

  Heading 2: Heading text is preceded by a blank line and blocked in cell 5

  Heading 3: Heading text is preceded by a blank line and blocked in cell 3

  Heading 4: Heading text is preceded by a blank line and blocked in cell 1

  Note that the blank line preceding a heading is not always required, as described in 2.3.4.

- ✓ **Line spacing:** Braille is usually single-line spaced. Double-line spacing may sometimes be appropriate for new braille readers.
- ✓ **Chapters:** The first chapter of a book should start on a new braille page. Subsequent chapters should normally begin on a new braille page.
- ✓ **Centred text:** It is permissible to center text in braille where centering has been used in the print to convey a particular meaning.
- ✓ **Indented text:** Indented text is inset from the far left margin, compared with other text on the page. Indentation is often used for material from another source, such as a poem or quote within a novel.

Blocks of text indented in print should generally be indented in braille. Use increments of two braille cells, regardless of the indentation distance in the print (Australian Braille Authority, 2016).

✍ **Self-assessment**

Identify and explain the elements of Braille format.

Topic 6.2: Principles of Braille transcription

This topic introduces you the principles of Braille transcription

✍ **Activity 15**

Do you think that Braille transcription has principles? Justify your answer

6.2.1 Principles of Braille transcription

Presentation of Guidelines: Each section is complete, with few references to other sections. A hierarchy of information is used to present basic material first, followed by more detailed concepts.

Decimal Numbering: The change in numbering connects all elements of the sections and subsections.

Examples: Short examples are embedded within the guidelines and longer examples at the end of each section. This allows the reader to see how the guidelines are intended to be used and eliminates the need to hunt through full-page examples for a few lines.

Sectional Page Numbering: This new page numbering provides a way for updates to be added to Braille Formats more easily.

Appendices: There are several appendices covering blank lines, foreign language symbols, interpoint guidelines, agency decisions, and a glossary. (Braille Authority of North America, 2016)

✍ **Self-assessment**

Explain the principles of print-to-braille transcription

Topic 6.3: Embossing techniques

This topic introduces you to different techniques used in embossing

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✍ **Activity 16**

1. What do you understand by the term embossing?
2. Discuss the techniques that can be used while embossing?

6.3.1. Embossing

Embossing is the process of generating a three-dimensional image on a surface through the use of pressure, sometimes combined with heat. Debossing is the opposite process and it creates a recessed image that is sunken on the paper/card surface. Embossing is achieved through the use of two tools (usually made of brass or copper), one of which is built in the reverse of the desired design (raised) and the other one is recessed, commonly known as a male and female.

For embossing, the tools are connected to a machine that pushes them into paper using a combination of heat and extreme pressure to permanently alter it. Embossing can either be single layered or multi-layered if you want to give tiny details even more prominence for a finely sculpted end result. The great benefit of using the embossing technique is the high-quality (Downey, 2017).

Although it is a very popular technique, there are a number of factors that play a big part during the embossing process in the pursuit of great results.

1. **Die depth:** It is mainly down to the engraver's experience to determine the die depth accurately with the end result in mind. If you can show us the artwork or an image of what you are trying to achieve, we can tell you how to get there with the artwork you have.
2. **Pressure:** How intense is the impact on the weight of the stock being embossed, depending on the type of paper being used.
3. **Heat:** The ability to maintain a consistent heat level to get a great embossing result.
4. **Stock:** The paper/cardstock and thickness are paramount to how the end result will appear for embossing

The following are several different embossing techniques depending on what is used during the process and how bold or subtle the embossing needs to be (Downey, 2017).

1. **Blind embossing:** Is achieved by using the no ink during the process, so the image is raised and uses the color of the material only. The end result is extremely elegant and can be used to add a special touch to your invitations, business cards and is subtly distinctive.

2. **Combination embossing:** Is achieved when embossing techniques are combined with foil stamping ones by using a combination die.
3. **Fluted embossing:** Is achieved when the embossed image is either aligned with another embossed image or with printed graphics. Often used in conjunction with foil blocking.
4. **Pastelling embossing:** When a combination of die is used to provide a subtle antique appearance to the material being foil stamped and embossed. This works best when lighter colored stocks are used for a delicate contrasting effect.
5. **Glazing emboss:** When a finished embossed area is given a shiny or polished appearance through the combination of heat and pressure. This works best on dark colored stocks.
6. **Scorching emboss:** When instead of polishing the stock, a scorched effect is created on an embossed image by increasing the temperature of the heating plate beyond the normal range. This works best on lighter colored stocks.

✍ **Self-assessment:**

1. Explain the factors that play a big part during the embossing process in the pursuit of great results.
2. Discuss different embossing techniques depending on what's used during the process and how bold or subtle the embossing needs to be

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⊟ *Unit summary*

This unit discussed 3 topics. Topic 1 is the elements of braille format that contains page number, paragraph, title and headings, line spacing, and chapters. Topic 2 is principles of braille transcription that is composed of presentation of guidelines and decimal numbering. The last topic is embossing techniques that discussed different embossing techniques depending on what's used during the process and how bold or subtle the embossing needs to be. These techniques include blind embossing, combination embossing, fluted embossing, pastelling emboss, glazing emboss, and scorching emboss.

❔ **Reflection questions**

1. Identify and explain the elements of Braille format.
2. Explain the principles of Braille transcription.
3. Explain the factors that play a big part during the embossing process in the pursuit of great results.
4. Discuss different embossing techniques depending on what's used during the process and how bold or subtle the embossing needs to be.

References
Australian Braille Authority. (2016). Rules and guidelines for formatting braille. Retrieved on 3/11/2021 from http://brailleaustralia.org/wp-content/uploads/2016/05/ABA-guidelines-for-formatting-2016-12.pdf

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Texas School for the Blind and Visually Impaired Outreach Programs (2011) TETN #20437 Braille formats: Principles of print-to-braille transcription. Retrieved on 04/11/2021 from https://library.tsbvi.edu/assocfiles/40645286.pdf

TRAINING MONIITORING AND EVALUATION TOOL
Instructions:
The present form is completed in the course of training or at the end. It is designed to monitor, evaluate and help in improving the training. Please complete the form, and be as honest as you can

Training Location
Training site/venue: _____ District: _____ Province……………

Identities of the trainee (Please Tick (√) where appropriate

Status	Male	Female	Married	Has a disability	Minority	Other
Training background	TTC	B. Ed trainee	Not trained t	Trained on the job	Under training	Other
Trainee's placement	Primary	Secondary	Special	Inclusive	Tertiary	Other

The training Session(s)
Module (s) covered: Code …………………..Unit (s) ……….. Topics Covered: ………

Please tick (√) under the appropriate response of your choice (Excellent, Very Good, Good, or poor)

SN	Statement	Excellent	Very Good	Good	Poor
Section 1: Content					
1.1	The importance of the training in relation to my job				
1.2	The organization of the training content				
1.3	The clarity of the content learned				
1.4	The easiness of language used by the trainers				
1.5	The trainer's mastery of the content				
1.6	The amount of the content learned				
1.7	Achievement of training objectives				
1.8	Meeting of my expectations				
Section 2. Methodology for content delivery					
2.1	The methods used by trainer in delivering the content				
2.2	The language used by the trainer				
2.3	Instructions were clear and understandable				
2.4	Appropriateness of the duration of the training.				
2.5	Mastery of the content by the trainer				
2.6	Trainees' active participation in learning activities				
2.7	Usefulness of training resources used by the trainer				
2.8	Consideration of trainees with disabilities' needs				
Section 3. Online learning support					
3.1	Clarity of online instructions				
3.2	Ease in accessing and using online Learning platform				
3.3	Benefits of online learning resources				
3.4	Support by IT Technician on online learning platform				
3.5	Accommodation for people with disabilities				
Section 4. Logistics					
4.1	The appropriateness of the training venue				
4.2	Facilities at the venue (Furniture, electricity, WC, etc.)				
4.3	The network connection & accessibility				
4.4	Other logistical issues				
4.5	Accessibility and facilities for People with disabilities				

Any additional comment: ………………… ……………………………………

Thank you

Special Educational Needs identification tool[1]

The University Rwanda (UR) and all its partners uphold equal opportunities for persons with disabilities and other Special Needs in all its programs and services. All students/trainees and staff with disabilities or other challenges that impact on equal participation and performance, are encouraged to complete the present form. Personal information provided herewith shall be treated confidentially (if required), and shall be strictly used for processing and/or designing reasonable accommodation wherever possible.

Section A: Personal Information

1st Name: ....Middle & Family Name (s): ....Gender: ....Date of Birth: .... /..../...

Place of origin: Country: .... Province: ....District. .... Sector: ....Cell: ....

Identification: Passport/ ID No: .... Student's Reg. No: ....

Contact address: Personal Email: .... Tel: .... Personal physician's address (if any): ....

Section B: Academic program Details

Program of Study[2]: School:…........................... Department: ...   Current Academic Year of study:......

Section C: Special Educational Needs Details

Special Educational Needs (Difficulty that deters performance and/or access to UR CE services)	**Specify support provisions received (if any)** (Please, tick where appropriate **√)**	**Specify in details** (Types, sizes, placement, etc.) **of support provision you require in order to participate with minimum hindrances.**
Physical challenges		
Visual difficulties		
Hearing difficulties		
Speech/communication difficulties		
Chronic Illness/Allergy		
Mental health challenges		
Specify any other		

Section D:

Details of authentic evidences available (Please, tick where appropriate **√)**

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Psychologist's report [ ]   Medical practitioner's Statement [ ]   Others (specify)

Section E: Student's declaration

I do confirm that all the information declared in the present document are true and authentic, and do agree to supply any other related documentations regarding my special needs/disabilities to UR CE departments entrusted with the responsibility of accommodation and support provisions for students with special needs.

Done at: ……/………/………… **Signature of Student/trainee**_____ **Date:** ...../....../...

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[1]**N.B.:** Reasonable accommodation or support provisions shall be restricted to students who have duly completed the present form, only after the declared Special Needs (difficulties) are assessed, established, and registered by authorized UR offices.

[2] Use codes to demote the College, School, and Department