# About Braille

Braille is the system of reading and writing used by people who are blind. Readers use their fingertips to feel raised dots that represent the letters of the alphabet, numbers, and punctuation marks.

### The Braille Alphabet and Braille Cells

The braille alphabet is made up of cells. Each cell has six dots, numbered 1-6, in two vertical rows. For each letter, some dots are raised and some are not; the raised dots determine the letter. The six dots can be arranged to form 64 different combinations.

### Types of Braille

Braille used for reading and writing is called Literary Braille. There is a different braille code used for mathematics, called Nemeth braille, and another braille code for musical notation. Each language has its own braille code to account for its unique characters. For example: Ñ in Spanish, Ü in German, and Ç in French.

### Contracted and Uncontracted Braille

Some people learn Grade 1, or uncontracted braille when learning to read. This is a direct, letter-by-letter translation. However, most braille is Grade 2, or contracted braille. This means it is not a straight letter-by-letter translation, but uses 180 contractions, which are shorter forms of common words and word parts.

### Braille Matters

Is braille still necessary with audiobooks and technology like computer screen readers? Of course! There is no substitute for the ability to read, whether using print or braille. Braille literacy is a critical component for success in education and the workforce. Imagine trying to do your schoolwork or perform your job without being able to read or write. Braille is essential for learning grammar, spelling, and punctuation, and only a small percentage of all books published are available in audio. Just think how many times a day you read or write something without even realizing it!

### History of Braille

Read ***A Picture Book of Louis Braille****,* by David A. Adler*.*
Braille was developed by Louis Braille in 1821, when he was a teenaged student at the National Institute of the Blind in Paris, France. Before braille,

there were various systems of raised letters, but they were based on symbols for the eyes. Braille was developed for reading each letter with one fingertip.

The official braille code, *English Braille, American Edition* was first published in 1932. The current braille code used in America is called Unified English Braille (UEB). It was developed to make braille more consistent across English-speaking countries, and it incorporated various symbols used in literary, math, science, and computer fields. For example, braille was developed long before email, so the @ symbol used in email addresses had to be uniformly incorporated.

**Reading and Writing Braille**

Students may learn braille from a Teacher of the Visually Impaired (TVI) who works in conjunction with a regular classroom teacher. Some students attend a special school for blind students, like the Kentucky School for the Blind, in Louisville.

Braille is read by moving one or more fingers along each line. Most readers use both hands—using the index finger of one hand to read a line, while the other hand marks the place of the next line.

Braille books are embossed onto special heavy-duty paper. They can be very large—the average book has 3 volumes, but very long books can consist of 10-20 thick volumes! Some children's books are available in print/braille format so both a sighted and blind reader can read together.

Braille can be embossed by hand using a slate and stylus. The user must use a sharp stylus to poke a dot onto the back side of the heavy-duty braille paper. In other words, you have to work backwards using a backwards braille alphabet.

The Perkins brailler was invented in 1951 and is the most widely used braille writer. It is similar to a typewriter, except it "types" braille cells. Instead of striking 1 key for each letter, the user must strike the keys that correspond to the necessary braille cells. For example, to type the letter L, press keys 1, 2, and 3 at the same time to emboss cells 1, 2, and 3.

Technology now allows braille translation software to convert a computer text document into braille file (.brf). The computer can be hooked to a

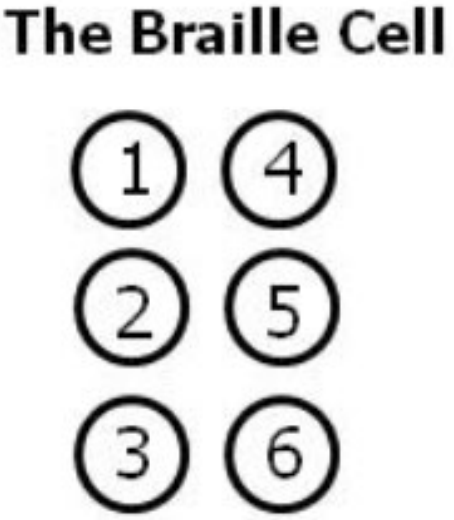
braille embosser instead of a printer to create tactile braille. Or, instead of embossing a physical braille copy, a person could read electronically using a refreshable braille display. This is a device that is attached to a computer and used with, or instead of, a regular keyboard. Small metal pins represent braille letters and words one line at a time.

Many people who are blind use a braille notetaker. This is a small combination computer and refreshable braille device that is commonly worn or carried like a shoulder bag. It allows the user to read, write, and save electronic braille wherever they are without having to deal with large, bulky braille books.

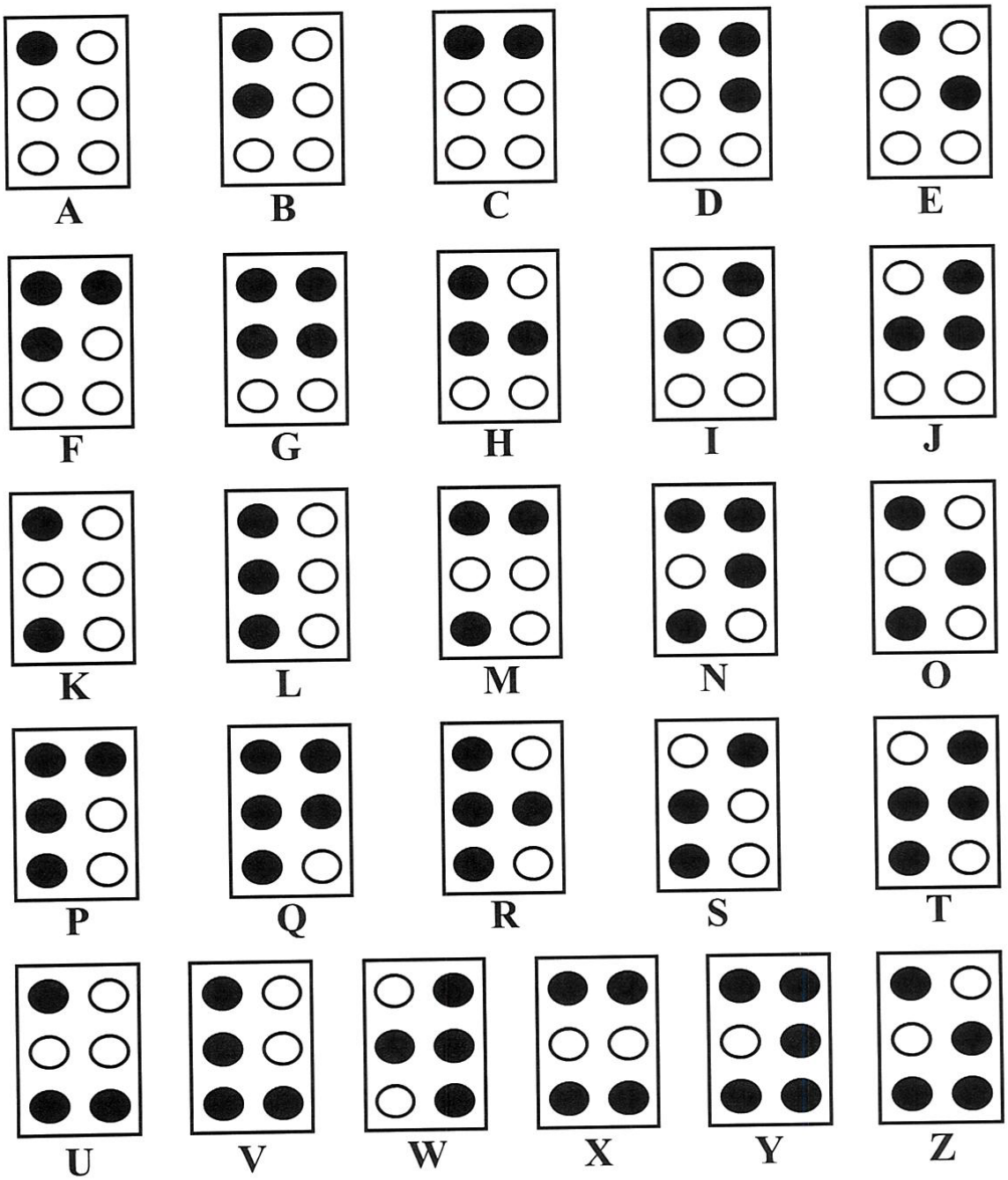
All of these adaptive devices, except the slate and stylus, are very expensive.

# What is a Braille Cell?

Braille symbols are formed within units of space known as braille cells. A full braille cell consists of six raised dots arranged in two parallel rows each having three dots. The dot positions are identified by numbers from one through six. Sixty-four combinations are possible using one or more of these six dots. A single cell can be used to represent an alphabet letter, number, punctuation mark, or even a whole word.

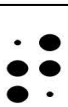
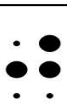
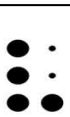
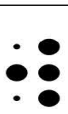


# Braille Letters




www.TeachersPrintables.net

## Simulated Braille Alphabet List

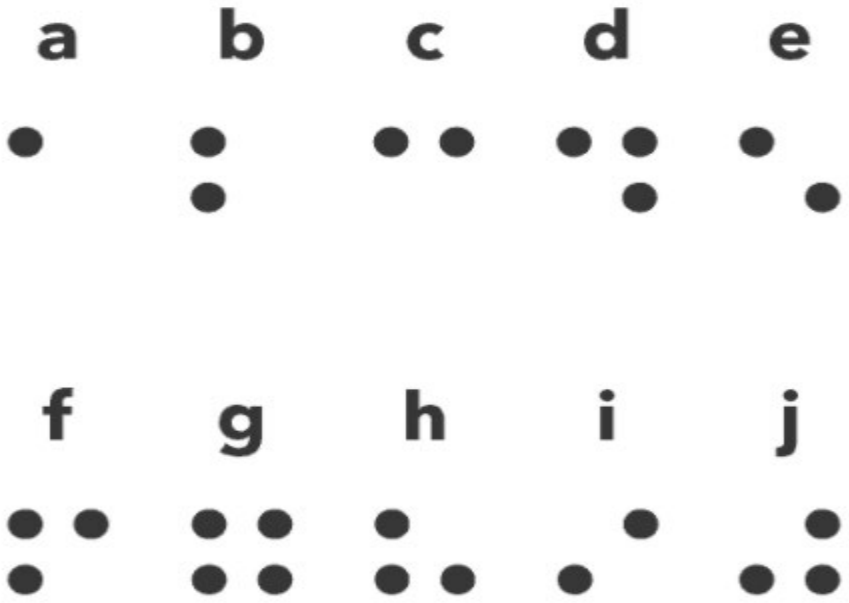
| | | | |
|---|---|---|---|
| A | | N | |
| B | | M | |
| C | | O | |
| D | | P | |
| E | | Q | |
| F | | R | |
| G | | S | |
| H | | T |  |
| I | | U | |
| J |  | V |  |
| K | | W |  |
| L | | X | |
| | | | |

| | | | |
|---|---|---|---|
| Y | | | |
| Z | | | |

# Braille Alphabet Explained

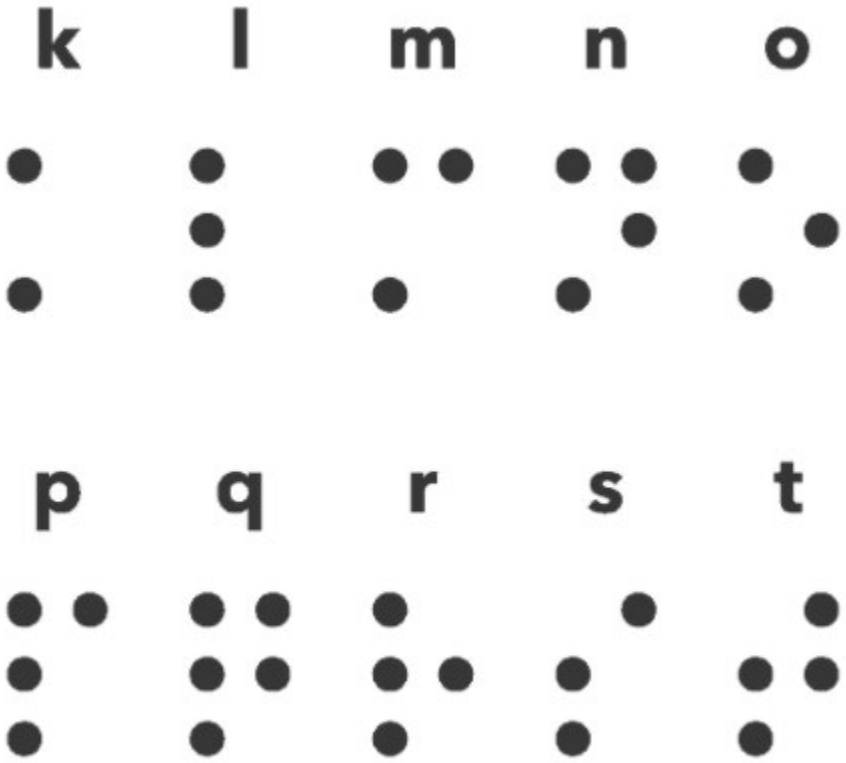
## Braille letters A – J

The braille alphabet uses a pattern throughout the alphabet. The easiest letter to learn is “a” which is dot 1. Next, the letter “b” is dot 1 and dot 2, and “c” is dot 1 and dot 4. To make it simpler, we’ve included the dot configurations in the image and table below.



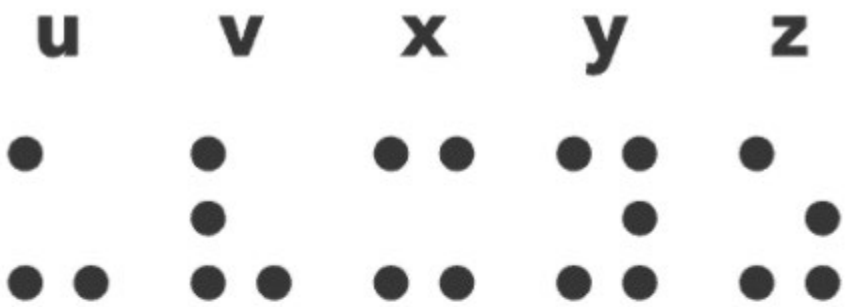
## Braille letters K – T

The second set of letters follow the pattern of adding a dot 3 to each character in the first set of braille letters.



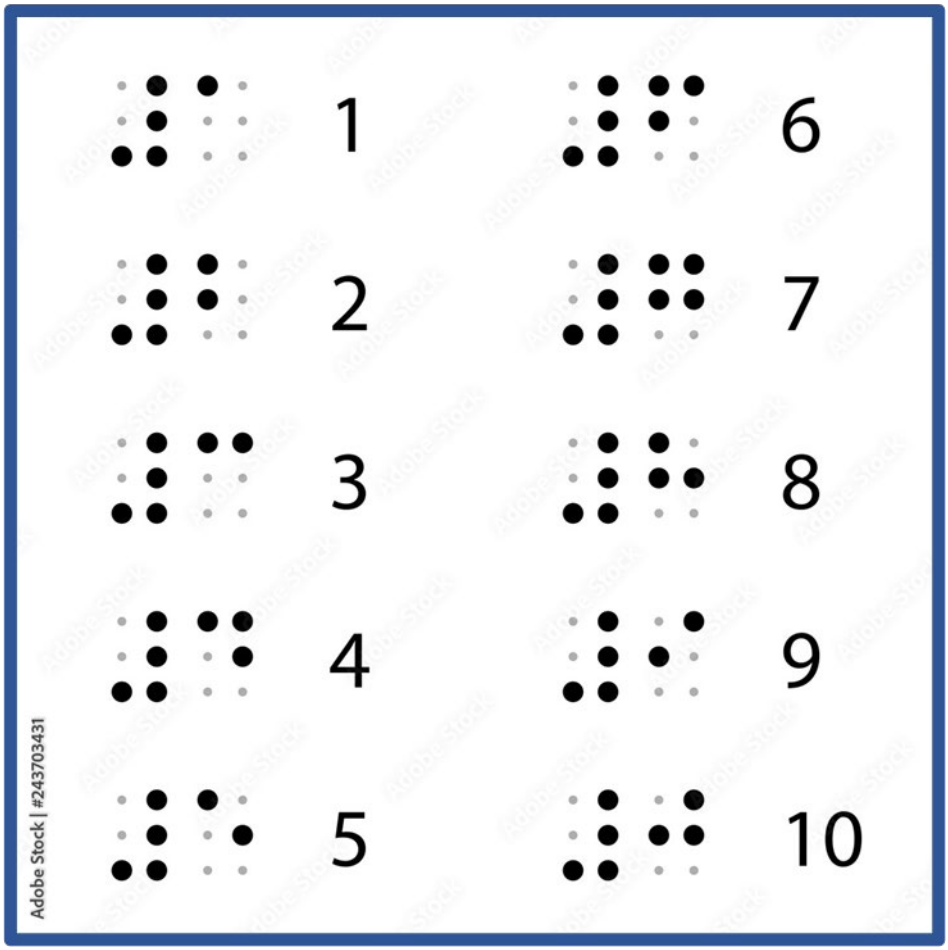
## Braille letters U – Z

The last set of letters continues the pattern by adding a dot 6 to the second set of letters. However, there is one exception that interrupts the pattern here. At the time Louis Braille invented the first version of the braille alphabet, the French language did not use the letter “w” so it is skipped. The braille letter “w” is instead created by dots 2, 4, 5, 6.



# Braille Numbers

- Braille numbers 1-10 are the same as letters A-J, except they have the number sign before them.
- The number sign is dots 3,4,5,and 6.



# Types of Braille

- Braille used for reading and writing is called Literary Braille.
- There is a different braille code used for mathematics called Nemeth Braille and another braille code used for musical notation.
- Each language has its own braille code to account for its unique letters. Some examples are Ñ in Spanish, Ü in German, and Ç in French.
- The current braille code used in America is called Unified English Braille (UEB). It incorporates symbols used in literary, math, science, and computer fields, like the @ used in email addresses.

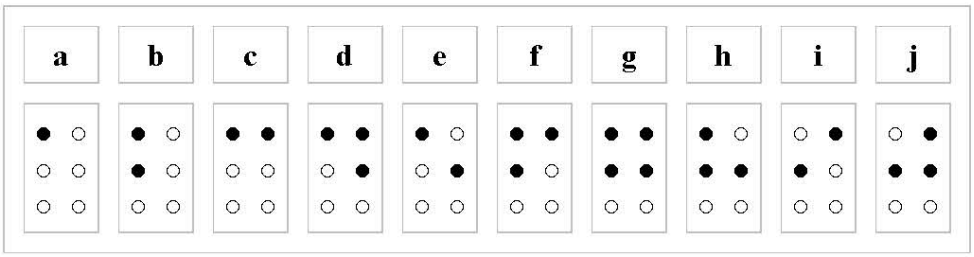
# The Literary Braille Alphabet

The braille cell, an arrangement of six dots, is the basic unit for reading and writing braille. Sixty-three different patterns are possible from these six dots. For purposes of identification and description, these dots are numbered downward 1-2-3 on the left and 4-5-6 on the right:

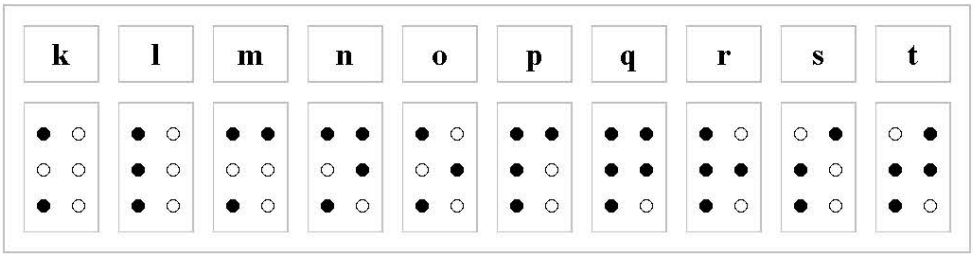
1 ● ● 4
2 ● ● 5
3 ● ● 6

(Note: As shown here, the "●" symbol represents a raised braille dot in the six-dot configuration. The "○" symbol represents a position in the cell where no braille dot occurs.)

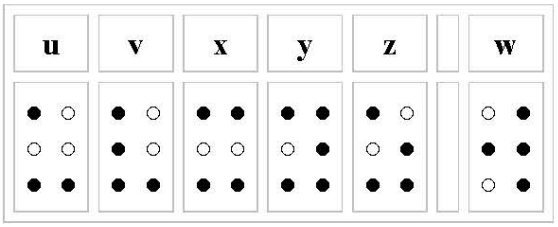
The first ten letters of the alphabet (a–j) use only the dots in the upper two rows of the cell.




The next ten letters of the alphabet (k–t) are formed by adding dot 3 to each of the first ten letters.



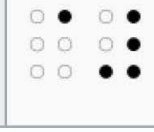
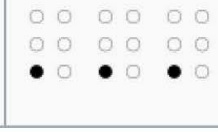

The remaining letters, except for w, are formed by adding dots 3 and 6 to each of the first five letters.




The letter "w" is an exception because the French alphabet did not contain a "w" when the code was created; the symbol for "w" was added later.

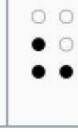
# Table of Nemeth braille codes

## General signs

| Symbol | * | , | ... |
|---|---|---|---|
| Braille |  | |  |

[4]

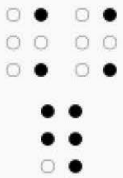
## Number signs

| Symbol | Number prefix | Decimal point | Thousands separator | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Braille | | | | | | | | | | | |  | |

[3]

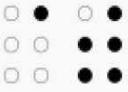
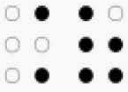
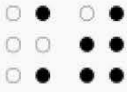
## Operators

| Symbol | + | - | × | · | ÷ | . (decimal) | √ | i√ (radical index) |
|---|---|---|---|---|---|---|---|---|
| Braille | | | | | | | | |

| Symbol | inner √ (1st) | inner √ (2nd) | end 1st √ | end 2nd √ | long division | / | ! |
|---|---|---|---|---|---|---|---|
| Braille | | | |  | | | |

[4]

## Parentheses and brackets

| Symbol | ( | ) | [ | ] | { | } |
|---|---|---|---|---|---|---|
| Braille | | | |  |  |  |

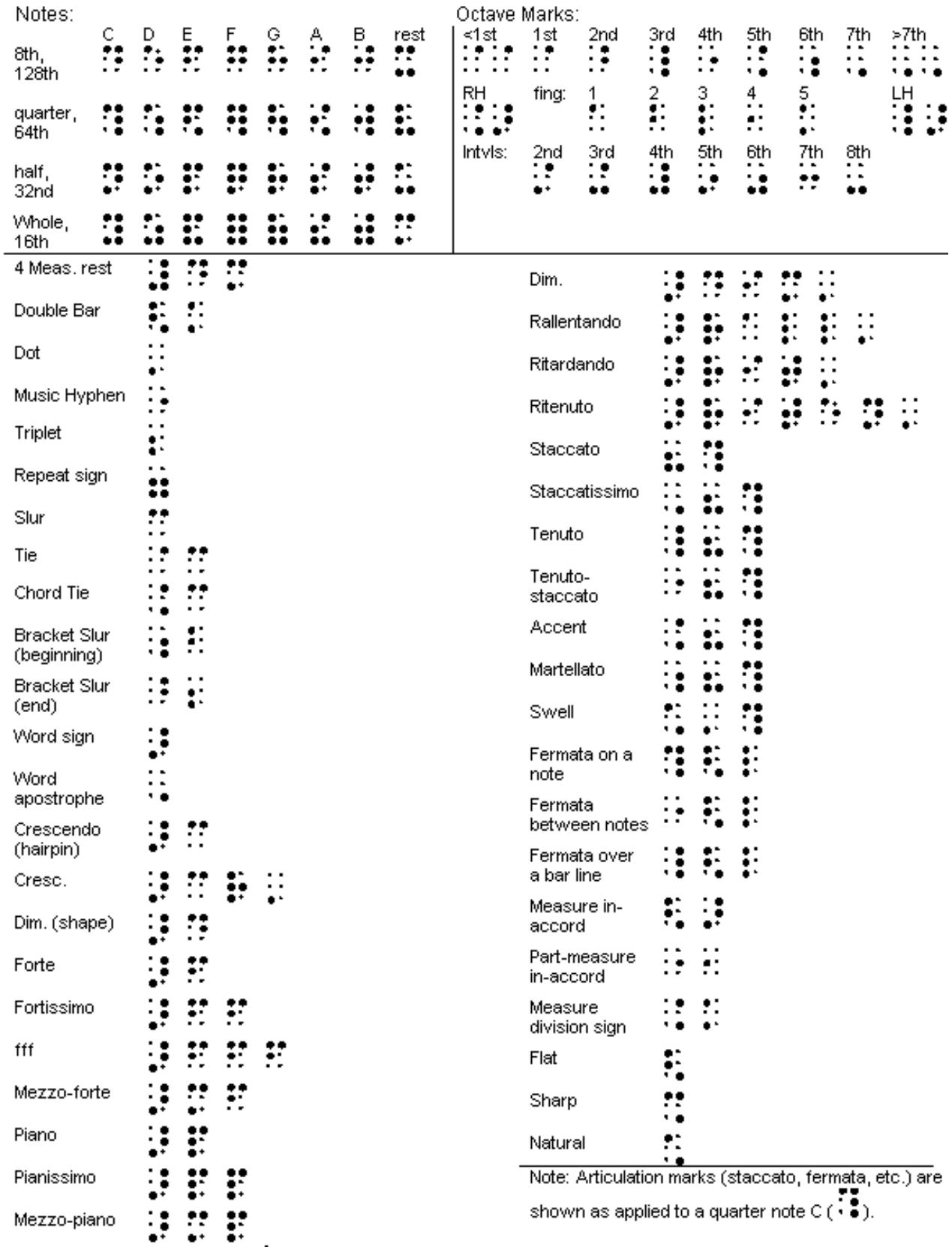
[4]

## Fractions

| Symbol | simple | | | complex | | | hypercomplex | | | fraction in mixed number | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | open | line | close | open | line | close | open | line | close | open | line | close |
| Braille | | | | | | | | | | | | |

[4]

## Braille Music Notation




Note: Articulation marks (staccato, fermata, etc.) are shown as applied to a quarter note C ( ).

# Unified English Braille Chart

Aroga Technologies

## ALPHABET AND NUMBERS

1 2 3 4 5 6 7 8 9 0
a b c d e f g h i j
k l m n o p q r s t
u v x y z w

## INDICATORS

Numeric

**Capital**

letter
word
passage
capital terminator

**Grade 1**

symbol
word
passage
Grade 1 terminator

**Typeform**

italic symbol
italic word
italic passage
italic terminator

bold symbol
bold word
bold passage
bold terminator

underline symbol
underline word
underline passage
underline terminator

script symbol
script word
script passage
script terminator

## PUNCTUATION

comma ,
period .
apostrophe '
colon :
dash -
long dash —
exclamation mark !
hyphen -
question mark ?
semicolon ;
ellipsis …
forward slash /
backward slash \
opening outer quotation mark "
closing outer quotation mark "
opening inner quotation mark '
closing inner quotation mark '

## GROUPING PUNCTUATION

opening round parenthesis (
closing round parenthesis )
opening square bracket [
closing square bracket ]
opening curly bracket {
closing curly bracket }
opening angle bracket <
closing angle bracket >

## SIGNS OF OPERATION AND COMPARISON

plus +
minus -
multiplication x
multiplication dot ·
division ÷
greater than >
less than <
equals =

## CURRENCY AND MEASUREMENT

cent ¢
dollar $
euro €
British Pound £
feet '
inches "

## SPECIAL SYMBOLS

percent %
degree °
angle ∠
hashtag #
ampersand &
copyright ©
trademark ™
superscript indicator
subscript indicator
bullet •
@ sign @
asterisk *
dot locator for mention

## ALPHABETIC WORDSIGNS

b but
c can
d do
e every
f from
g go
h have
j just
k knowledge
l like
m more
n not
p people
q quite
r rather
s so
t that
u us
v very
w will
x it
y you
z as

## STRONG CONTRACTIONS (Part and Whole Word)

and
for
of
the
with

## STRONG WORDSIGNS

child
shall
this
which
out
still

## STRONG GROUPSIGNS

ch
sh
th
wh
ou
st
gh
ed
er
ow
ar
ing

## LOWER GROUPSIGNS

ea
bb
cc
ff
gg

be
con
dis
en
in

## LOWER WORDSIGNS

be
enough
were
his
in
was

## INITIAL-LETTER CONTRACTIONS

day
ever
father
here
know
lord
mother
name
one
part
question
right
some
time
under
work
young

there
character
through
where
ought
upon
word
these
those
whose

cannot
had
many
spirit
world
their

## FINAL-LETTER GROUPSIGNS

ound
ance
sion
less
ount

ence
ong
ful
tion
ness
ment
ity

## SHORTFORM WORDS

| | | | |
|---|---|---|---|
| ab | about | herf | herself |
| abv | above | hm | him |
| ac | according | hmf | himself |
| acr | across | imm | immediate |
| af | after | xs | its |
| afn | afternoon | xf | itself |
| afw | afterward | lr | letter |
| ag | again | ll | little |
| agst | against | mch | much |
| alm | almost | mst | must |
| alr | already | myf | myself |
| al | also | nec | necessary |
| alth | although | nei | neither |
| alt | altogether | onef | oneself |
| alw | always | ourvs | ourselves |
| bec | because | pd | paid |
| bef | before | percv | perceive |
| beh | behind | percvg | perceiving |
| bel | below | perh | perhaps |
| ben | beneath | qk | quick |
| bes | beside | rcv | receive |
| bet | between | rcvg | receiving |
| bey | beyond | rjc | rejoice |
| bl | blind | rjcg | rejoicing |
| brl | braille | sd | said |
| chn | children | shd | should |
| concv | conceive | sch | such |
| concvg | conceiving | themvs | themselves |
| cd | could | thyf | thyself |
| dcv | deceive | td | today |
| dcvg | deceiving | tgr | together |
| dcl | declare | tm | tomorrow |
| dclg | declaring | tn | tonight |
| ei | either | wd | would |
| fst | first | yr | your |
| fr | friend | yrf | yourself |
| gd | good | yrvs | yourselves |
| grt | great | | |

## Retired Contractions (not used in UEB)

| | | | | | |
|---|---|---|---|---|---|
| ble | | ation | | ally | |
| dd | | com | | to | |
| into | | by | | ok | oclock |

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## Contracted and Uncontracted Braille

- Braille takes up a lot more space than print.
- Braille that is a letter-by-letter translation is called uncontracted braille, or Grade 1 braille.
- Most braille is contracted braille, or Grade 2 braille. It uses 180 contractions, or shortcuts, for the most common words and word parts.
- Examples of contractions:
    - As is shortened to z
    - Blind is shortened to bl
    - Could is shortened to cd
    - Together is shortened to tgr
    - Yourself is shortened to yrf

# UEB Braille Chart from Duxbury Systems

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
|---|---|---|---|---|---|---|---|---|---|
| a | b | c | d | e | f | g | h | i | j |
| | | | | | | | | | |
| k | l | m | n | o | p | q | r | s | t |
| | | | | | | | | | |
| u | v | x | y | z | | w | | | |
| | | | | | | | | | |

## A

| | |
|---|---|
| about | ab |
| above | abv |
| according | ac |
| across | acr |
| after | af |
| afternoon | afn |
| afterward | afw |
| again | ag |
| against | ag |
| almost | alm |
| already | alr |
| also | al |
| although | al |
| altogether | alt |
| always | alw |
| ⌂ance | e |
| and | |
| ar | |
| as | z |

## B

| | |
|---|---|
| ⌂bb⌂ | |
| be *or* be⌂ | |
| because | c |
| before | f |
| behind | h |
| below | l |
| beneath | n |
| beside | s |
| between | t |
| beyond | y |
| blind | bl |
| braille | brl |
| but | b |

### Composition Signs

| | |
|---|---|
| capital letter | ⌂⌂ |
| capital word | ⌂⌂ |
| capital pass. | ⌂⌂ |
| capital, term. | ⌂⌂ |
| grade 1 symbol | ⌂⌂ |
| grade 1 word | ⌂⌂ |
| grade 1 pass. | ⌂⌂ |
| grade 1, term. | ⌂⌂ |
| italic symbol | ⌂⌂ |
| italics word | ⌂⌂ |
| italic passage | ⌂⌂ |
| italic, term. | ⌂⌂ |

## C

| | |
|---|---|
| can | c |
| cannot | c |
| ⌂cc⌂ | |
| ch | |
| character | |
| child | |
| children | n |
| con⌂ | |
| conceive | cv |
| conceiving | cvg |
| could | cd |

## D

| | |
|---|---|
| day | d |
| deceive | dcv |
| deceiving | dcvg |
| declare | dcl |
| declaring | dclg |
| dis⌂ | |
| do | d |

## E

| | |
|---|---|
| ⌂ea⌂ | |
| ed | |
| either | ei |
| en | |
| ⌂ence | e |
| enough | |
| er | |
| ever | e |
| every | e |

## F

| | |
|---|---|
| father | f |
| ⌂ff⌂ | |
| first | f |
| for | |
| friend | fr |
| from | f |
| ⌂ful | l |

## G

| | |
|---|---|
| ⌂gg⌂ | |
| gh | |
| go | g |
| good | gd |
| great | grt |

## H

| | |
|---|---|
| had | h |
| have | h |
| here | h |
| herself | hf |
| him | hm |
| himself | hmf |
| his | |

## I

| | |
|---|---|
| immediate | imm |
| in | |
| ing | |
| it | x |
| its | xs |
| itself | xf |
| ⌂ity | y |

## J

| | |
|---|---|
| just | j |

## K

| | |
|---|---|
| know | k |
| knowledge | k |

## L

| | |
|---|---|
| ⌂less | s |
| letter | lr |
| like | l |
| little | ll |
| lord | l |

## M

| | |
|---|---|
| many | m |
| ⌂ment | t |
| more | m |
| mother | m |
| much | m |
| must | m |
| myself | myf |

## N

| | |
|---|---|
| name | n |
| necessary | nec |
| neither | nei |
| ⌂ness | s |
| not | n |

## O

| | |
|---|---|
| of | |
| one | o |
| oneself | of |
| ⌂ong | g |
| ou | |
| ought | |
| ⌂ound | d |
| ⌂ount | t |
| ourselves | rvs |
| out | |
| ow | |

## P

| | |
|---|---|
| paid | pd |
| part | p |
| people | p |
| perceive | pcv |
| perceiving | pcvg |
| perhaps | ph |

## Q

| | |
|---|---|
| question | q |
| quick | qk |
| quite | q |

## R

| | |
|---|---|
| rather | r |
| receive | rcv |
| receiving | rcvg |
| rejoice | rjc |
| rejoicing | rjcg |
| right | r |

## S

| | |
|---|---|
| said | sd |
| sh | |
| shall | |
| should | d |
| ⌂sion | n |
| so | s |
| some | s |
| spirit | s |
| st | |
| still | |
| such | s |

## T

| | |
|---|---|
| th | |
| that | t |
| the | |
| their | |
| themselves | mvs |
| there | |
| these | |
| this | |
| those | |
| through | |
| thyself | yf |
| time | t |
| ⌂tion | n |
| today | td |
| together | tgr |
| tomorrow | tm |
| tonight | tn |

## U

| | |
|---|---|
| under | u |
| upon | u |
| us | u |

## V

| | |
|---|---|
| very | v |

## W

| | |
|---|---|
| was | |
| were | |
| wh | |
| where | |
| which | |
| whose | |
| will | w |
| with | |
| word | w |
| work | w |
| world | w |
| would | wd |

## Y

| | |
|---|---|
| you | y |
| young | y |
| your | yr |
| yourself | yrf |
| yourselves | yrvs |

### Punctuation Signs

| | |
|---|---|
| apostrophe | |
| asterisk | |
| brackets [ ] | ⌂⌂ |
| British pound | |
| colon | ⌂⌂ |
| comma | ⌂⌂ |
| dash | |
| decimal point | ⌂⌂ |
| dollar | |
| ellipsis | |
| exclamation | ⌂⌂ |
| euro | |
| hyphen | |
| number sign | ⌂⌂ |
| parenthesis | ⌂⌂ |
| period | ⌂⌂ |
| question mark | ⌂⌂ |
| quote, double | ⌂⌂ |
| quote, single | ⌂⌂ |
| semicolon | ⌂⌂ |
| slash mark | |
| yen | |

Underlined word does not touch other letters.

⌂ letter or letters

⌂⌂ word or words.

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Chart Title: 2008 UEB

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# Contracted and Uncontracted Braille

**Compare the following passage in large print, contracted braille (Grade 2), and uncontracted braille (Grade 1).**

Once upon a time there was a gentleman, who after his beloved first wife died, married a widow with two daughters. When his new wife and stepdaughters arrived at his home and met his only daughter, they hated her at once, for they were vain and jealous creatures.

The new stepmother sent the poor girl to live in the kitchen and thrust upon her all the lowly tasks in the house—cleaning, doing laundry, weeding the gardens, cooking, and sewing. Indeed, the young girl became a servant, running from morning till night, until she fell into an exhausted heap upon the kitchen hearth at the end of the day.

“Look,” said one stepsister, peering into the kitchen one morning and finding the girl still asleep in the ashes. “What a smutty, cinder-covered mess!”

“Let’s call her Cinderella,” suggested the other.

# Examples of Braille Used in Public Places

As you visit different places, you will see environmental braille. Public buildings have specific signs that include braille.

## ATM Machine

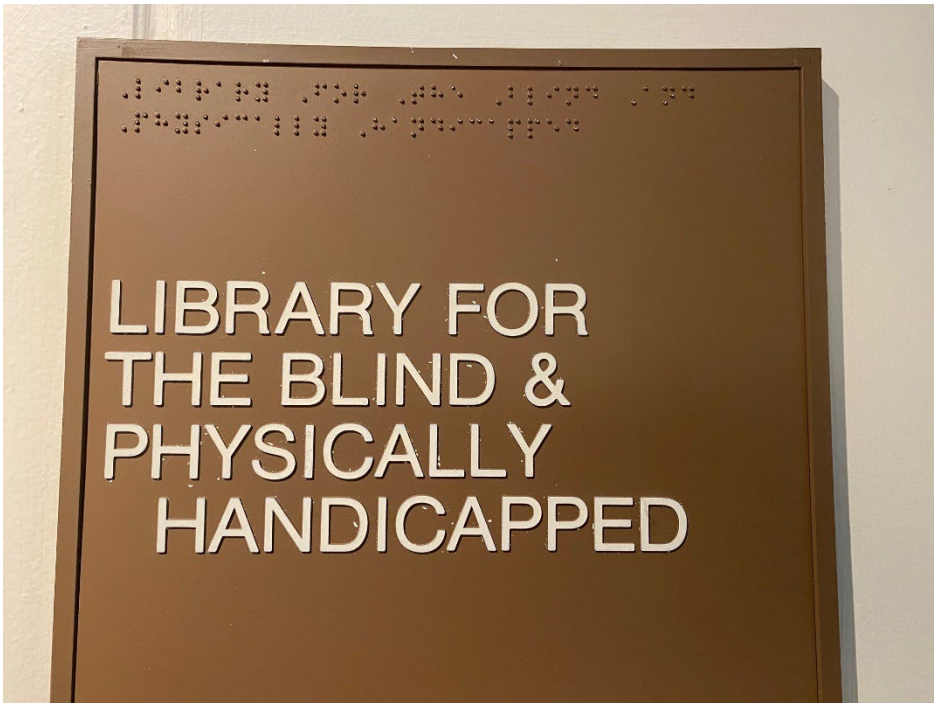
Receipt Printer
Card
Card
MEMBER FDIC
ree Access Code
1 QZ
2 ABC
3 DEF
Enter
4 GHI
5 JKL
6 MNO
Clear
7 PRS
8 TUV
9 WXY
Cancel
0
Insert Headphones to use Speech Mode
Audio Jack
Cash Dispense

**Doctor's Office**

**Exit Sign**

## Elevator

## Library



# Examples of Braille Used at Home

CVS Health
NDC 69842-811-62
Tablets
Naproxen Sodium
TABLETS, 220 mg
Pain reliever/
Fever reducer
(NSAID)
STRENGTH TO LAST 12 HOURS
24 TABLETS
DO NOT USE IF PRINTED FOIL UNDER CAP IS BROKEN OR MISSING
SEE CARTON FOR FULL INFORMATION

This item is intended for sale at
CVS pharmacy
Store # 6940
2000 HARRODSBURG
If found at other outlets call 866-439-8724
GARNIER
FRUCTIS
TRIPLE NUTRITION
NOURISHING CONDITIONER
Glycerin
+ Avocado, Olive, Almond oils
Cruelty Free
DRY TO VERY DRY HAIR
12.5 FL OZ (370ml)
DRY TO VERY DRY
System for 3X moistu
VEGAN FORMUL
PARABEN FRE
Glycerin
+ 3 Oils : Avocado, Olive & Almond
FORTIFYING SHAMPOO
TRIPLE NUTRITION
ACTIVE FRUIT PROTEIN™
WITH
FRUCTIS

## Oven

Bake Broil Clean Warm On
Start Time
Cook Time
Temp
Timer
10:42
Start?
Delay
Door Locked
Controls Locked
START
CANCEL
OFF
TEMP/HOUR
BAKE
BROIL
WARM
COOK TIME
START TIME
ACCUBAKE

# Learning Braille

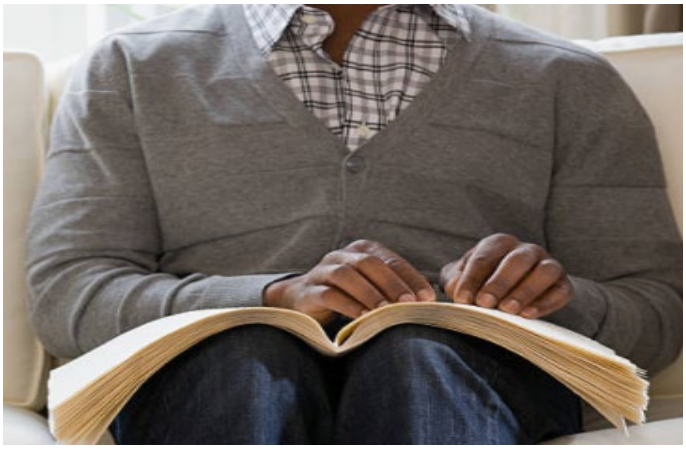
When children learn braille, they need to learn many of the same things that other students do when they learn to read—for example, how to pronounce the individual letters and how to sound out words or decode them from their context in a reading passage. However, there are additional skills to be learned, including the ability to feel the dots distinctly, to move steadily and evenly along a line of braille, and so forth. Just as beginning print readers often confuse similar letters such as “b” and “d,” braille readers may also make such errors, but the letters they reverse will be different (such as “e” and “i”). Braille readers also have more symbols to learn, and they may not encounter all the braille contractions and symbols until they are reading at a third-grade level.

Some teachers will start teaching students uncontracted braille for the first few years and then gradually introduce contractions to them in early elementary school. This method allows the student to build a solid foundation in decoding and spelling before learning contractions. This disadvantage is there is a limited amount of uncontracted braille material available. Beginning braille readers need to work consistently with a teacher of students with visual impairments as well as their classroom teacher to become a fluent reader.

## People Reading Braille

Most Braille readers read with both hands. One hand generally keeps the place on the page to find the following line easier, but some read fluently with two hands at the same time.

People can read braille anywhere, just like sighted people.



## The History of Braille

**Read A Picture Book of Louis Braille or Six Dots.**

The system of embossed writing invented by Louis Braille in 1821 gradually came to be accepted throughout the world as the fundamental form of written communication for blind individuals.

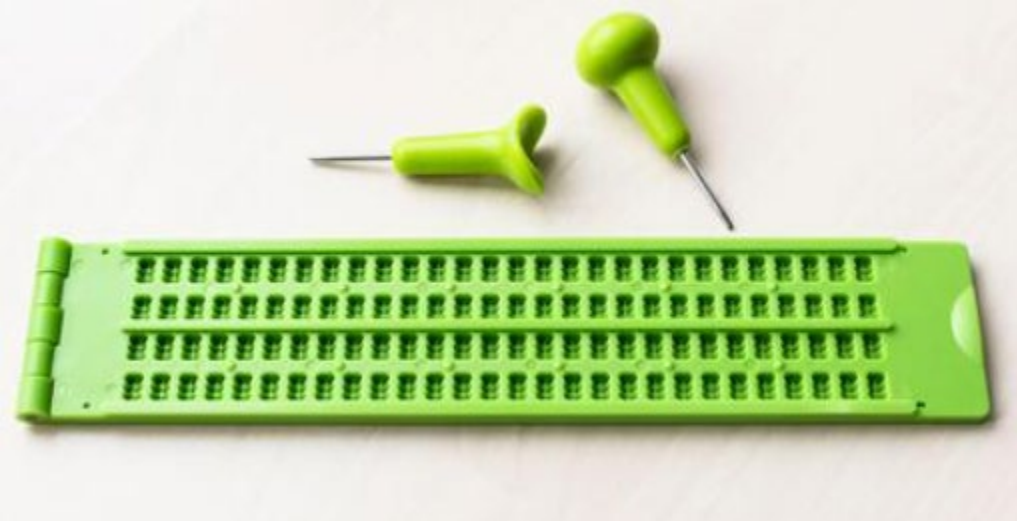
Various methods—many of them raised versions of print letters—had been attempted over the years to enable blind people to read. The braille system has succeeded because it is based on a rational sequence of signs devised for the fingertips, rather than imitating signs devised for the eyes. In addition, braille can be written by blind people and used for any notation that follows an accepted sequence, such as numerals, musical notes, or chemical tables.

Braille has undergone many modifications, particularly the addition of contractions representing groups of letters or whole words that appear frequently in a language. The use of contractions permits faster reading and helps reduce the size of braille books, making them less cumbersome. Several groups have been established over the past century to modify and standardize the braille code. The major goal is to develop easily understood contractions without making the code too complex.

The official braille code, *English Braille, American Edition*, was first published in 1932 by what is now the Braille Authority of North America (BANA). This organization represents many agencies and consumer groups and has been responsible for updating and interpreting the basic literary braille code and the specialized codes for music, mathematics, computer braille, and other uses in the United States and Canada. Other countries have similar authorities.

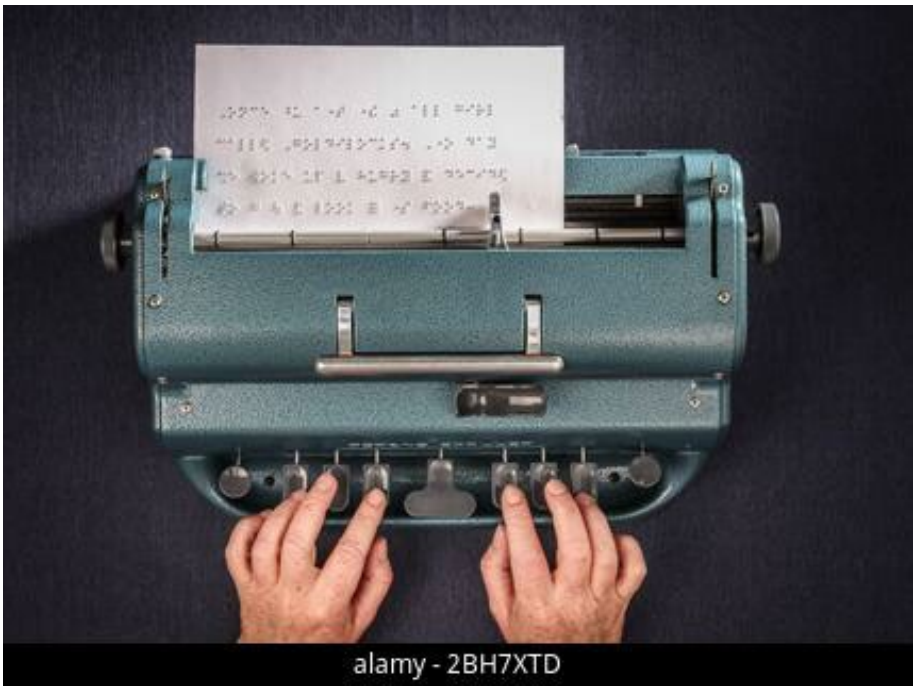
# Writing Braille

Braille can be written, or embossed, by hand using a slate and stylus.  The sharp stylus pokes a dot onto the back of the paper. This means you must use a backwards braille alphabet so the words appear correctly on the front of the paper.



# Typing Braille

The Perkins Brailler is a typewriter that types braille. You must hit all the keys needed to make a braille letter at once, like playing a chord on the piano.  For example, to type the letter G you must press keys 1,2, 4, and 5 (the G chord) at the same time.



# Braille and Computers

Technology allows braille translation software to convert computer text into a braille file (brf). A braille embosser is like a printer that "prints" embossed braille. A refreshable braille display has small metal pins that represent braille one line at a time.

# Portable Devices

Many people use a braille notetaker.  This is a small, portable refreshable braille device that can also perform many of the same functions of a computer.  It allows users to read, write, and save electronic braille wherever they are.