

BRaille - 1

Read the explanation.

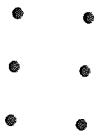
Braille is a type of code used by people who are blind or visually impaired to read and write. It uses raised dots that are felt with the fingers.


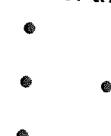
Braille was invented by a 15-year-old French boy. His name was Louis Braille. Louis was born in France in 1809. When he was three years old, he was playing in his father's shoemaking workshop and punctured his eye with a sharp tool. His eye became infected. The infection soon spread to the other eye, leaving him completely blind.

Louis went to school with sighted children where he learnt by listening to his teachers. When he was 10 years old, Louis went to the Royal Institution for Blind Youth in Paris. Here, he learnt to read by feeling raised letters on a page. The letters had been made by pressing copper wire into the paper. Although Louis was thrilled to be able to read, he felt that the method could be improved upon – it was cumbersome and provided no way for blind people to write.

In 1821, the school was visited by a French army captain. He had invented a code for soldiers to use that could be read on battlefields at night without needing light. The code used raised dots to represent sounds. Louis experimented with this and eventually came up with a simplified version of the code that represented normal spelling—the braille system.

The basis of the braille system is called a 'cell'. A cell is made up of six dots and looks like this:

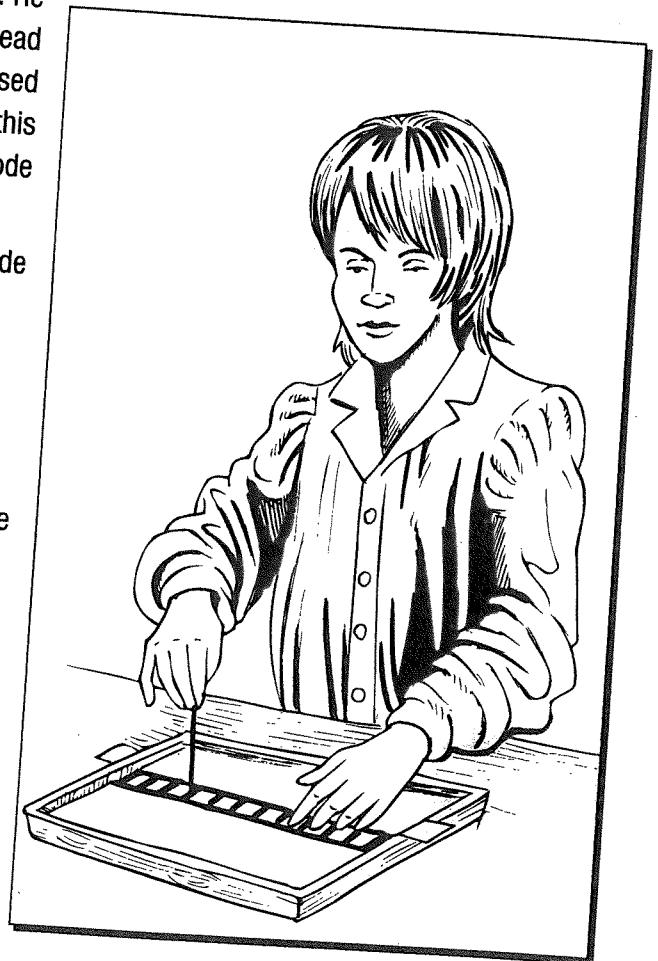


Each letter of the alphabet is made up of one or more of these dots. For example, p =  and r = 

If you were to learn braille, you would begin by learning the letters and putting them together to form words. Once you were an expert at this, you would learn a kind of braille shorthand, where dots represent words. This means that you could read more quickly and less paper would be used. You could also learn to read braille cells that represent numbers, punctuation marks and even musical notes.

The simplest way to write braille is using a slate and a stylus. A sheet of paper is placed in the slate and the stylus is used to push dots into the paper. Braille can also be written with braille writers (like typewriters) or electronic machines called 'brailleurs'. A braille writer can be plugged into a computer where the braille can be read by a voice synthesiser or printed out as normal typescript.

Today, braille has been adapted to almost every language in the world and is accepted as the standard form of reading and writing for blind or visually impaired people. There are braille books, musical scores, playing cards, watches, board games and many other materials.



Mental division strategies – rules of divisibility

Divisibility tests tell us if a number can be divided evenly by another, with no remainder.

These are handy rules to know:

- 2 A number can be divided by 2 if the ones digit is even.
- 4 A number can be divided by 4 if the last 2 digits form a number that can be divided by 4.
- 5 A number can be divided by 5 if the ones digit is 0 or 5.
- 10 A number can be divided by 10 if the number ends in a zero.
- 100 A number can be divided by 100 if the number ends in 2 zeros.
- 8 A number can be divided by 8 if the last 3 digits form a number that can be divided by 8.
- 3 A number can be divided by 3 if you add all the digits and the sum is divisible by 3.
- 9 A number can be divided by 9 if you add all the digits and the sum is divisible by 9.

1 Test these rules. Circle the numbers that match the stated rule.

a

Divisible by 2
432
235
628
900
12 562

b

Divisible by 5
350
75
5 556
34 512
17 890

c

Divisible by 4
3 432
5 208
359
6 256
32 547

d

Divisible by 10
4 560
83 210
8 436
187 490
11 609

e

Divisible by 3
36
932
3 561
22 468
13 906

f

Divisible by 100
4
570
26 730
459 800
934 600

2 Each of the numbers below has one or more missing digits. Add the digit needed to make the statements true. For some of the numbers, more than one choice of digit would work.

a 54__ is divisible by 4.

b 2__5 is divisible by 9.

c 2 35__ is divisible by 3.

d 3 4__8 is divisible by 8.

e 45 67__ is divisible by 10.

f 678 9__ is divisible by 100.

g 156 84__ is divisible by 8.

h 5 4__ is divisible by 5.

BRaille - 2

Use the text on page 23 to answer the questions.

1 Literal

(a) Write a fact for each date in Louis Braille's life.

1812 _____

1819 _____

1821 _____

1824 _____

(b) Tick true or false.

(i) Louis Braille punctured both his eyes with a sharp tool.

True **False**

(ii) You can do mathematics problems using braille.

True **False**

(iii) English is the only language that can be written in braille.

True **False**

(iv) Each letter in braille contains at least five dots.

True **False**

2 Inferential

(a) Why do you think the way Louis Braille first learnt to read is described as 'cumbersome'?

(b) List three drawbacks to writing braille with a stylus and slate.

3 Applied

(a) Write three questions you would like to ask Louis Braille about his life or his invention.

• _____

• _____

• _____

(b) Do you think the braille system should have also been named after the French army captain? Give reasons.

BRaille – 3

Use the text on page 23 to help you complete this activity.

Imagine you work for an international group that promotes the use of braille. You attend a conference about educating blind or visually impaired children. One speaker says the following:

- 1 The conference organisers ask you to respond to this speech. They want you to explain why braille should still be taught to blind or visually impaired children. Write some notes for your speech in the space below.



'Blind or visually impaired children do not need to learn braille in today's world. It is old-fashioned. Teachers should be concentrating on modern technology instead; for example, teaching the children to listen to stories on audio CDs or computers, record their own texts using a dictaphone or CD recorder and touch type on a computer keyboard. The children can then listen to the computer read their writing back to them.'

(a) Write some reasons why you think children should learn to **read** in braille.

(b) Write some reasons why you think children should learn to **write** in braille.

(c) What do you think of what the speaker said? Write what you agreed or disagreed with and say why.

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(d) Use your notes to practise your speech. When you are ready, present it to a small group.

Mental division strategies – using factors

When we are dividing by 2 digit numbers we can split the divisor into two factors. This makes the problem easier. Then we do the division in two steps:

$$\begin{array}{rcl}
 216 \div 18 & & 9 \text{ and } 2 \text{ are factors of } 18. \\
 216 \div 2 & = & 108 \quad \text{We divide } 216 \text{ by } 2. \\
 108 \div 9 & = & 12 \quad \text{We then divide } 108 \text{ by } 9. \\
 \hline
 216 \div 18 & = & 12
 \end{array}$$

4 For each problem, find a pair of factors you can work with and solve these problems:

a $564 \div 12$

\swarrow
 \searrow

\div
 \div

$\square \div \square = \square$

$\square \div \square = \square$

$= \square$

b $126 \div 14$

\swarrow
 \searrow

\div
 \div

$\square \div \square = \square$

$\square \div \square = \square$

$= \square$

c $330 \div 15$

\swarrow
 \searrow

\div
 \div

$\square \div \square = \square$

$\square \div \square = \square$

$= \square$

d $918 \div 18$

\swarrow
 \searrow

\div
 \div

$\square \div \square = \square$

$\square \div \square = \square$

$= \square$

5 These problems have been worked out already but there are 2 wrong answers. Tick the ones that have been worked out correctly. If errors have been made, circle where it all began to go wrong:

a $192 \div 12 = 16$

3 and 4 are factors of 12

$192 \div 4 = 48$

$48 \div 3 = 16$

b $288 \div 24 = 24$

2 and 6 are factors of 24

$288 \div 6 = 48$

$48 \div 2 = 24$

c $280 \div 40 = 56$

5 and 8 are factors of 40

$280 \div 8 = 35$

$280 \div 5 = 57$

d $510 \div 30 = 17$

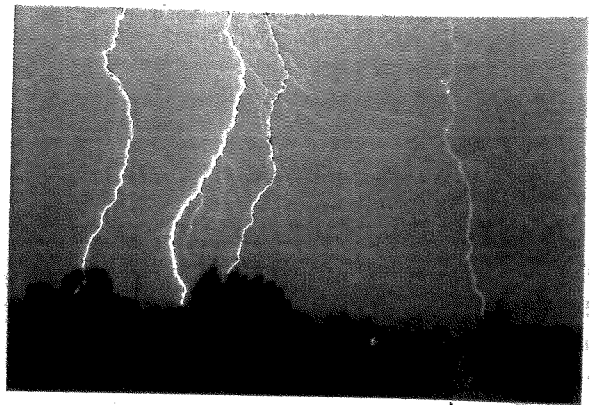
3 and 10 are factors of 30

$510 \div 10 = 51$

$51 \div 3 = 17$

Check each line carefully! It's OK to make notes as you go.





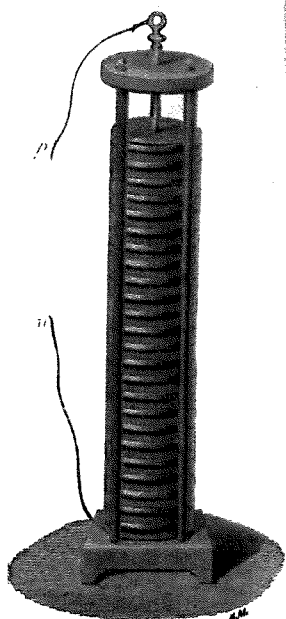
■ Lightning is caused by huge charges in the clouds

To make electricity useful, we need to make lots of it and make it move in a controlled way so it can carry its energy around to make things work.

Go further

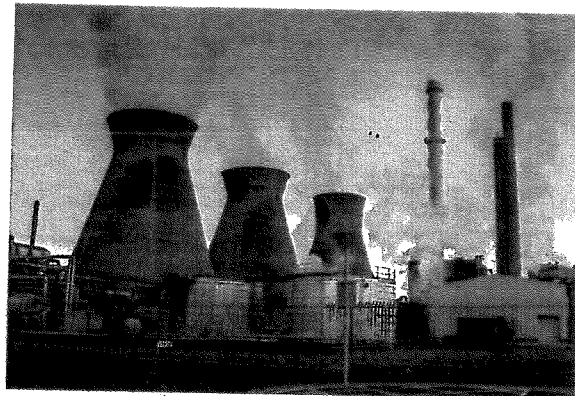
In 1792, an Italian scientist, Alessandro Volta, invented the first battery. It was a big pile of metal plates with wet sheets of card in between. He discovered that he could make the tiny charged particles from his battery flow along wires instead of making sparks.

Another important discovery was the electric light bulb. Two people, a British scientist called Joseph Swan and an American called Thomas Edison, both invented light bulbs at about the same time. No one really knows who had the idea first and the two men set up a company together to make their light bulbs. Some of these light bulbs were attached to Volta's batteries. A few years earlier another British scientist, Michael Faraday, had discovered how to make electricity using a magnet and a moving electrical conductor, which was a copper disc. The flow of electricity around a circuit made by this apparatus was quite small. However, when the copper disc was replaced by a coil of wire, bigger flows of electricity could be produced and the first useful electrical generator was made. This made it possible to make lots of electricity. Edison improved Faraday's design and, in 1882, a street in New York became the first street to be lit with electricity.



■ The first battery was a pile of metal discs with wet card between them

Electricity is now made in huge power stations, but it is still made in a similar way. In most power stations, steam is used to make the generator work. Steam is usually made by burning coal or gas. These are called fossil fuels, and they release carbon dioxide and other harmful gases into the air as they burn and are non-renewable. Carbon dioxide is a greenhouse gas and scientists believe that rising levels of this gas in the atmosphere are causing global warming (see Chapter 5). If we can reduce the amount of electricity we use we can help to reduce our contribution to global warming as well as saving money.



■ Electricity is made in power stations, usually by burning fossil fuels

Exercise 8.1a

- 1 What must happen to make electricity useful?
- 2 What was the name of the Italian scientist who made the first battery?
- 3 Describe the battery made by the scientist you have named.
- 4 Who invented the electric light bulb?
- 5 Who discovered how to make electricity using a magnet and a moving electrical conductor?
- 6 Where was the first street to be lit by electric lights?
- 7 What is the name given to the non-renewable fuels that are used in most power stations?
- 8 Why are these fuels harmful to the planet?
- 9 List three things that you have used today that need electricity to make them work.
- 10 Suggest two things you could do to reduce the amount of electricity you use.

Extra space for answers

Mental division strategies – using factors

Factors are numbers you multiply together to get to another number:

$$\text{factor} \times \text{factor} = \text{whole number}$$

Knowing the factors of numbers is helpful when solving multiplication and division problems.

1 Complete these factor activities:

- a List all the factors of the following numbers. The first one has been done for you.

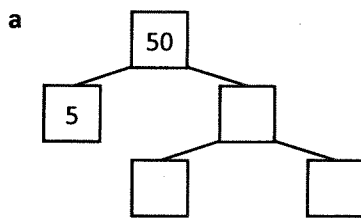
36	1, 36, 2, 18, 3, 12, 4, 9, 6
45	
72	
144	
100	
48	
64	

- b Generate 2 sets of factors for each number. The first one has been done for you.

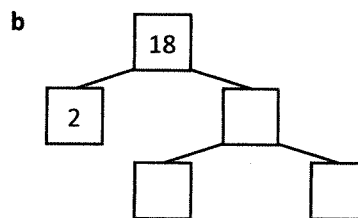
64	8×8	32×2
42		
24		
90		
120		
132		
240		

Factor trees help us work out the prime factors of numbers. Prime factors are the factors that can be divided no further, except by themselves and one.

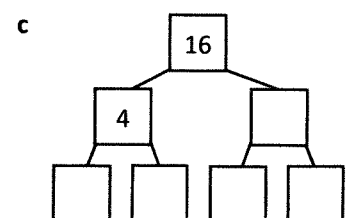
2 Practise finding factors by completing these factor trees:



$$\underline{\quad} \times \underline{\quad} \times \underline{\quad} = 50$$



$$\underline{\quad} \times \underline{\quad} \times \underline{\quad} = 18$$



$$\underline{\quad} \times \underline{\quad} \times \underline{\quad} \times \underline{\quad} = 16$$

3 Find the answer to these:

- a What are the common factors of 24 and 60?
- b What is the highest common factor of 75 and 125?
- c What is the highest common factor of 36 and 63?