# Adventure 1
# The Kingdom of Big Numbers

On behalf of the magical world of math, I welcome you.

Fito, did you notice that in this Kingdom there are things that cost a lot?

## EPISODE 1

### A path of big numbers

Learn about **big numbers** and about **geometric shapes**.

## EPISODE 2

### Big jumps!

Discover how to **compare big numbers** and continue numerical sequences to get closer to beating the challenge.

## EPISODE 3

### The domino effect

Use mental **arithmetic strategies** to add and subtract. These operations will help you to beat the challenge of this adventure.

## Before you start your adventure…

Use your learning superpowers in your backpack, and in this adventure look for the meaning of some **useful words**.

>>**ACTIVATE your superpowers**

# Superpowers from previous grades

## Superpower: Representation

The number 4678 can be represented in several ways:

### With specific materials



Cubes    Flats    Rods

Units

### In a place value chart

| Th | H | T | O |
|----|---|---|---|
| 4  | 6 | 7 | 8 |

### With symbols and letters

In broken down form, expanded notation, or by decomposing:

$$4678 =$$

$$4000 + 600 + 70 + 8$$

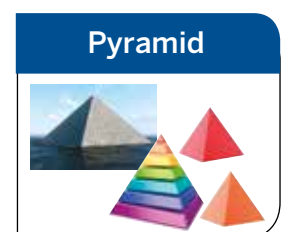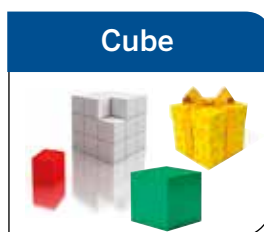In words: Four thousand six hundred and seventy-eight.

## Superpower: Using geometric figures with real objects

Geometric figures have several uses in everyday life. Look at some examples.

| Cube | Prism | Cone |
|------|-------|------|
|  |  |  |

| Cylinder | Sphere | Pyramid |
|----------|--------|---------|
|  |  |  |

### Useful words

- ☐ Consumption
- ☐ Discount
- ☐ Income
- ☐ Coin
- ☐ Offer
- ☐ Price
- ☐ Budget
- ☐ Reduction
- ☐ Value

In their first adventure, Zoe and Fito have to reach a castle in the Kingdom of Big Numbers and open the chest that they will find inside. Can you help them to solve the puzzles written on this wall?

## Puzzle 1

The code that opens the padlock on the chest has six digits. Three of them are 2, 3, and 7. You'll find out the rest in another episode and, in another, Zoe and Fito will know what to do with them.

Don't be too eager! You might lose the missing numbers in an alligator's jaws.

## Puzzle 2

When they get to the castle, Zoe and Fito will discover two gold chests. But they can only take coins from the one that contains coins that, when rounded up to the nearest hundred thousand, make 400 000.
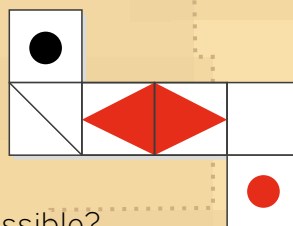What kind of coins will the siblings take?

## Puzzle 3

What is this?

The brave siblings can keep the treasure here. How can this be possible? What will the treasure be?

## A path of big numbers

In this episode, Zoe and Fito start looking for the exit from *El Librotante*.

MISTER + TELLS THE SIBLINGS THAT THE SOLUTION TO THIS ADVENTURE'S CHALLENGE IS ON A PAPYRUS THAT'S IN A CASTLE. HE SAYS THEY NEED TO BUY A MAP OF THE KINGDOM OF BIG NUMBERS. THEY START BY CHECKING THEIR BUDGET.

| Store | Price (OP) | Shipping cost (OP) | Service evaluation |
|-------|-----------|-------------------|-------------------|
| Titan | 17 190 | 7600 | ★ ★ ★ ★ ★ |
| Mimas | 18 990 | 0 | ★ ★ ☆ ☆ ☆ |
| Febe | 19 900 | 4500 | ★ ★ ★ ☆ ☆ |
| Jano | 17 990 | 2800 | ★ ★ ★ ☆ ☆ |

The Kingdom's official currency is the "opet," which is shortened to: **OP**.

Zoe, we should decide where to buy the map of the Kingdom of Big Numbers.

Yes, Fito. Let's read the information in the chart. That way, we'll make the best decision.

- Which store do you think Fito and Zoe should buy the map from? Why? Share your answers with your classmates.

If you have nine OP 10 000 bills and you add one more of the same denomination, you will have OP 100 000. The number 100 000 has six digits.

Because you solved the map problem, from now on I will give you the superpower of recognizing six-digit numbers. Pay attention!
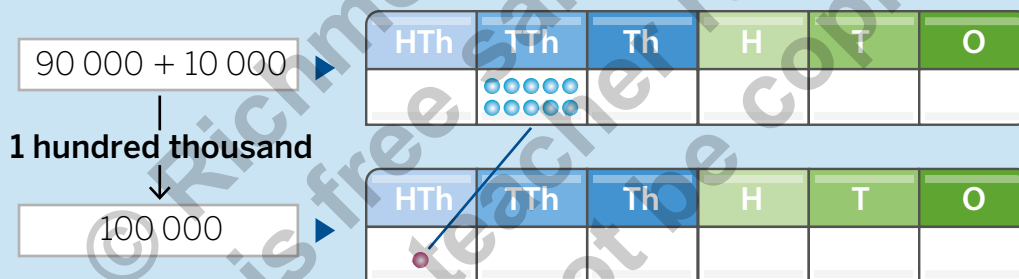
90 000 opets + 10 000 opets

## Numbers up to six digits

If, in a **place value chart**, you add 1 ten of thousands to 9 tens of thousands, you get 10 tens of thousands, which equals **one hundred thousand**:

90 000 + 10 000 ▸

| HTh | TTh | Th | H | T | O |
|-----|-----|-----|-----|-----|-----|
| | ⊙⊙⊙⊙⊙ ⊙⊙⊙⊙⊙ | | | | |

**1 hundred thousand**

100 000 ▸

| HTh | TTh | Th | H | T | O |
|-----|-----|-----|-----|-----|-----|
| ● | | | | | |

In the chart, you can see that **six-digit numbers** are composed of ones (O), tens (T), hundreds (H), thousands (Th), tens of thousands (TTh), and hundreds of thousands (HTh).

You can decompose 6-digit numbers by adding up the **place value of their digits**, for example:

489 405 = 400 000 + 80 000 + 9000 + 400 + 5 ↦ Expanded notation

**You can read them** by separating them into classes, like this:

| HTh | TTh | Th | H | T | O |
|-----|-----|-----|-----|-----|-----|
| 4 | 8 | 9 | 4 | 0 | 5 |

First, you read the thousands class: four hundred and eighty-nine thousand.

Then, you read the rest: four hundred and five.

## SUPERPOWER 1

To follow the path to the Kingdom of Big Numbers, Zoe and Fito buy two pairs of magic boots. They will get a **discount** if they write and read their **price**; a number is composed of 7 hundreds of thousands, 5 tens of thousands, 4 thousands, 6 hundreds, and 2 ones.

Zoe creates a place value chart and Fito writes the digits of the number in it.

| HTh | TTh | Th | H | T | O |
|-----|-----|-----|-----|-----|-----|
| 7 | 5 | 4 | 6 | 0 | 2 |

First, they read the thousands class: **seven hundred and fifty-four thousand.**

Then, they read the rest: **six hundred and two.**
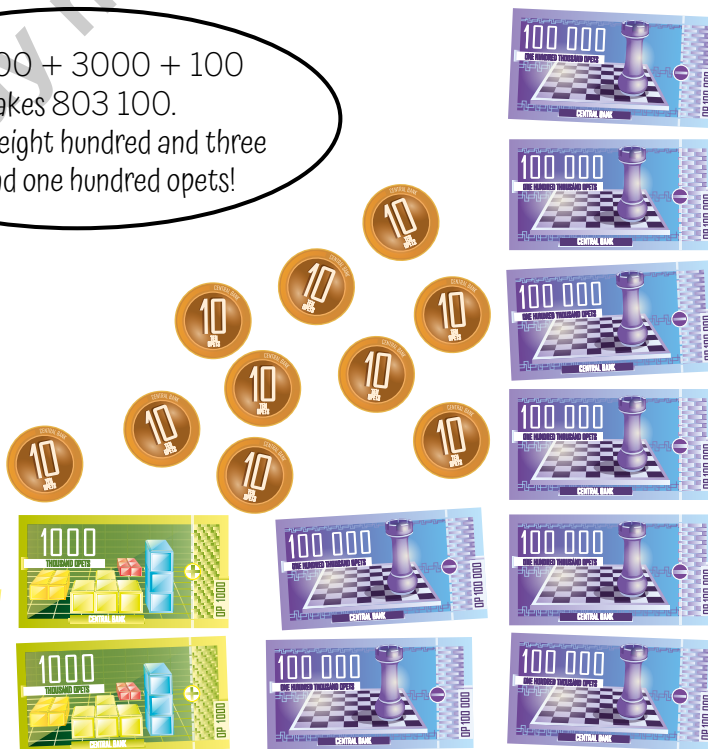
The price of the magic boots is OP 754 602.

## SUPERPOWER 2

"Tell me, Zoe," says Mister +, "How many opets are there if you add 8 bills of OP 100 000 plus 3 bills of OP 1000, plus 10 OP 10 **coins**?"

To give her answer, Zoe does the following mental arithmetic.

800 000 + 3000 + 100 makes 803 100.
There are eight hundred and three thousand one hundred opets!

**1.** Zoe looks at the **prices** of some of the items that are on **offer** and that might be useful for her on the journey to the castle.

> The price of the hat is one hundred and twenty-nine thousand five hundred opets.

OP 101 200

OP 547 800

OP 289 000

OP 129 050

**a.** Is Zoe's reading of the price correct? Compare your answer with your classmates' answers and write a conclusion.
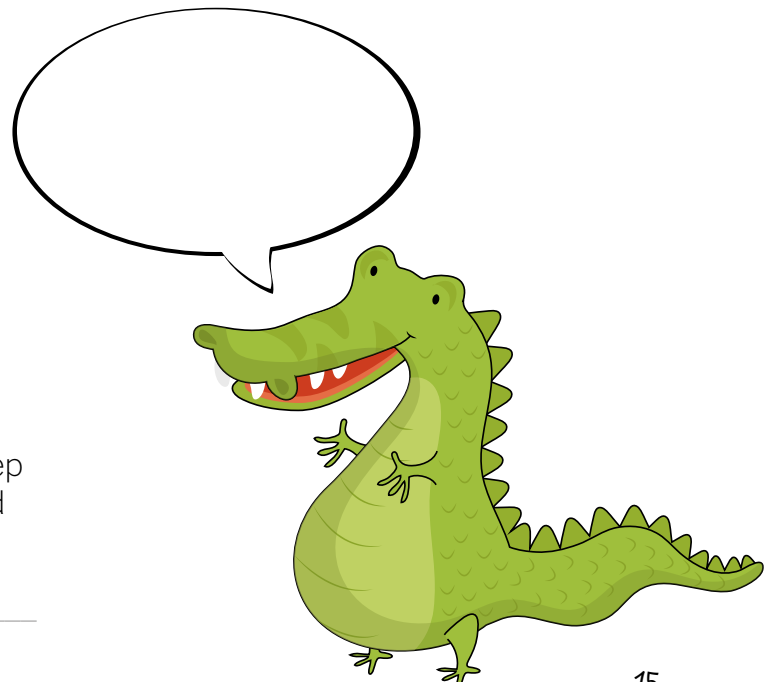
_____

**b.** Write out the prices of the items in words.
- Binoculars: _____
- Sunglasses: _____
- Water canteen: _____

**2.** Mentally calculate how much money you get by adding two OP 100 000 bills, seven OP 10 000 bills, eight OP 1000 bills, ten OP 10 coins, six OP 5 coins, and nine OP 1 coins. Write the total above the alligator's jaws.

If you did that correctly, you have just found the three digits that complete the code that opens the chest. Write the six digits that make up the number here. Keep paying attention, because soon you'll find out what you have to do with them.

_____

NOW, TO FOLLOW THE PATH TO THE EXIT FROM EL LIBROTANTE AND CONTINUE ON YOUR JOURNEY, YOU NEED TO LEARN EVEN BIGGER NUMBERS!

"If you have nine OP 100 000 bills and you add one more of the same denomination, you get a million opets. A million is written as a one followed by six zeros: 1 000 000."

## Seven-digit numbers

Seven-digit numbers can be represented in a **place value chart**, by adding 1 hundred of thousands to 9 hundreds of thousands. In this way you get 10 hundreds of thousands or **one million**.

900 000 + 100 000 ▶

| M | HTh | TTh | Th | H | T | O |
|---|-----|-----|----|----|----|----|
|   | ooooo |   |   |   |   |   |

**10 hundreds of thousands make a million**
↓

1 000 000 ▶

| M | HTh | TTh | Th | H | T | O |
|---|-----|-----|----|----|----|----|
| o |   |   |   |   |   |   |

## GET SUPERPOWERS

### ✦ SUPERPOWER 3
Mister + shows Zoe and Fito how to break down and read the number 5 378 351:

5 378 351 = 5 000 000 + 300 000 + 70 000 + 8000 + 300 + 50 + 1

"You read it by separating it into three classes, like this: five million / three hundred and seventy-eight thousand / three hundred and fifty-one."

### ✦ SUPERPOWER 4
Fito looks at the map of the Kingdom of Big Numbers. He breaks down the length of each river shown and writes the following:

1 284 000 m

1 248 000 m

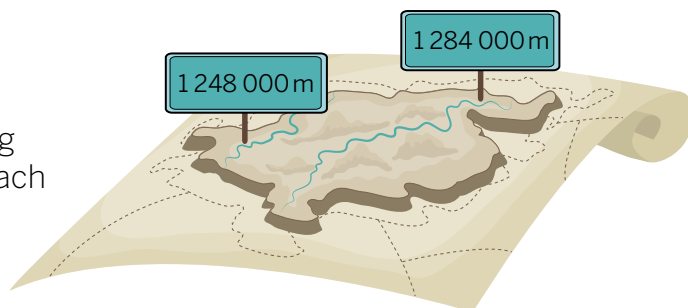**1 284 000** breaks down into:

1 000 000 + 200 000 + 80 000 + 4000

It reads: one million two hundred and eighty-four thousand.

He breaks down **1 248 000** as:

1 000 000 + 200 000 + 40 000 + 8000

It reads: one million two hundred and forty-eight thousand.

## SUPERPOWER 5

"Zoe, look at the amount shown on the sign on the right. Read the number written there," says Mister +.

Zoe goes to the board and creates a place value chart to do it:

**THE KINGDOM OF BIG NUMBERS**
**LAST YEAR WE INVESTED**
**7 279 568 OPETS**
**IN THE PROTECTION OF OUR FOREST**

| M | HTh | TTh | Th | H | T | O |
|---|-----|-----|-----|---|---|---|
| 7 | 2 | 7 | 9 | 5 | 6 | 8 |

| Seven million | two hundred and seventy-nine thousand | five hundred and sixty-eight |
|---|---|---|

## USE YOUR SUPERPOWERS

**3.** Circle the gnome that is thinking about the number eight million two hundred and three thousand one hundred.

823 100

82 310

8 203 100

**4.** With the information provided, complete the diagram and the conclusion below.

9 000 000 + 1 000 000

| TM | M | HTh | TTh | Th | H | T | O |
|----|---|-----|-----|-----|---|---|---|
|    | ⦾⦾⦾⦾⦾ ⦾⦾⦾⦾⦾ |     |     |     |   |   |   |

↓

10 000 000

| TM | M | HTh | TTh | Th | H | T | O |
|----|---|-----|-----|-----|---|---|---|
| ⦾  |   |     |     |     |   |   |   |

1 ten of millions = _____ million = _____

**5.** Last year, in the Kingdom of Big Numbers, they recycled thirty three million eight hundred and thirteen thousand pieces of plastic packaging. Write this number out in full and broken down.

GREAT, GUYS! THANKS TO YOUR NEW SUPERPOWERS, YOU HAVE MADE PROGRESS. YOU ARE JUST 978 000 METERS FROM THE CASTLE. TO CONTINUE ON YOUR WAY, YOU SHOULD ROUND THIS NUMBER TO THE NEAREST TEN THOUSAND.

Rounding? What's that, Zoe?

## Rounding

**Rounding** is a useful process to approximate a number to a specific place value.
To round off, follow these three rules:

- Highlight the digit in the place value that you want to round to.
- Increase it by 1 if the next digit is 5 or more than 5. Fill in the positions to the right with zeros.
- Leave it the same if the next digit is less than 5. Fill in the positions to the right with zeros.

## GET SUPERPOWERS

>>Rounding numbers

978 000 m

### SUPERPOWER 6

To round 978 000 m to the nearest ten thousand, highlight the digit that matches that position: 9**7**8 000.

Because the digit to the right of the tens of thousands position is 8 (which is more than 5), then you increase the highlighted digit by 1 and you fill in the positions to the right with zeros. Therefore, 978 000 rounds to 980 000.

You can see on the number line that 978 000 falls between 970 000 and 980 000, but it is closer to the bigger number.

Fito and his sister are about 980 000 m from the castle.

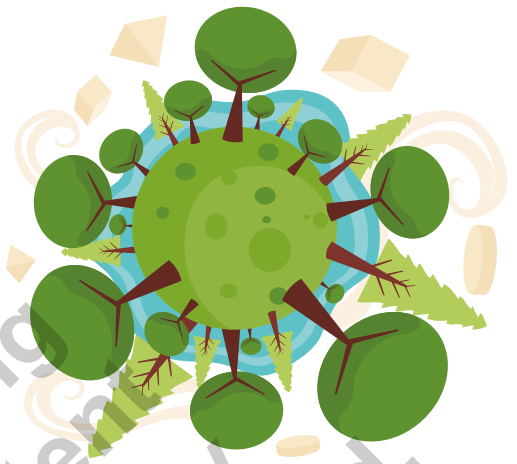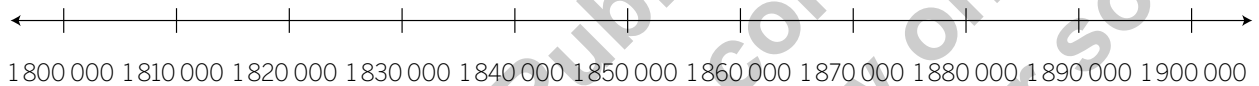| 970 000 | 972 000 | 974 000 | 976 000 | 978 000 | 980 000 |

## SUPERPOWER 7

There are 1 850 000 trees in the Kingdom's forests. To round this number to the nearest hundred thousand, Mister + highlights the digit in that position 1 **8**50 000. Because the digit in the next position is 5, the 8 increases by 1 and he fills the rest of the positions on the right with zeros. In this way, he rounds 1 850 000 to 1 900 000.

He concludes that, because 1 850 000 is in the middle between 1 800 000 and 1 900 000, it approximates to 1 900 000.

1 800 000  1 810 000  1 820 000  1 830 000  1 840 000  1 850 000  1 860 000  1 870 000  1 880 000  1 890 000  1 900 000

## SUPERPOWER 8

Fito rounds the number of inhabitants in the Kingdom to the nearest hundred thousand, like this:

First, he highlights the digit in the hundreds of thousands place: 25 **8**76 406. Because the digit to the right of the highlighted number is 7 (which is more than 5), he adds 1 to 8 and fills in the positions to the right with zeros. In this way, 25 876 406 rounded to the nearest hundred thousand is 25 900 000.

The population of the Kingdom is approximately 25 900 000 people.

**WELCOME**
**TO THE KINGDOM OF BIG NUMBERS**
**POPULATION:**
**25 876 406 INHABITANTS**

## SUPERPOWER 9

The Kingdom of Big Numbers sold a lot of recycled materials last year.

The **income** was OP 123 740 000.

To round this **value** to the nearest ten million, Zoe highlights the digit in this position: 1**2**3 740 000. She notices that the next digit is 3, so she keeps the digit 2 and fills in the positions to the right with zeros, like this: 120 000 000.

Zoe worked out that the income the Kingdom received from selling recycled material was approximately OP 120 000 000. She reads the amount: one hundred and twenty million opets.

**6.** Many people incorrectly think that if the **price** of an item ends in one or several nines, or in nines and zeros, it means there is a **discount** or **reduction**. If you want to avoid this impression, you should round it.

Write the rounded price of each chest to the nearest ten thousand.

29 999 opets

19 999 opets

28 900 opets

**7.** Rounding amounts is a good way to do mental arithmetic. But the results of these calculations are approximate.

Use the rounded prices of the chests from the previous activity to calculate the total amount you would have to pay for them.

**8.** Work with a classmate and look at the information in the picture on the right. One of you should round the number of visitors to the nearest thousand. The other one should round the number to the nearest hundred thousand.

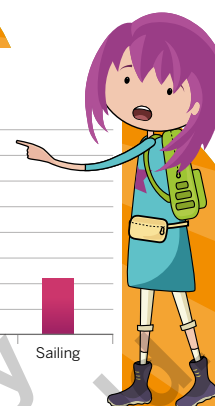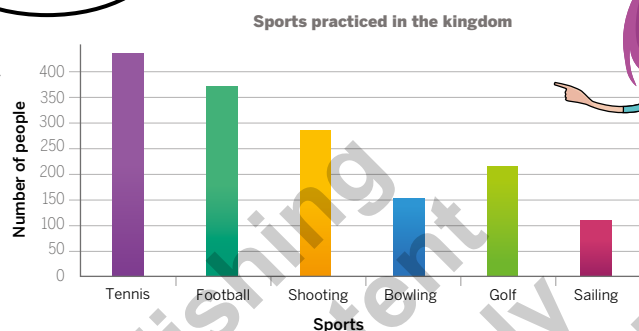**a.** Which of the two roundings is closest to the real information? Explain.

**b.** If the number of visitors increases every year by approximately one million, can you say that in 2013, about 7 000 000 people visited the zoo?

**Zoo**

**THE KINGDOM OF BIG NUMBERS**

12 265 746 VISITORS IN 2018

**What's this, Zoe?**

**Sports practiced in the kingdom**



You've done a good job! Now, I will show you a powerful tool for analyzing data.

## Vertical bar chart

A **vertical bar chart** allows you to organize and represent data in a clear and ordered way. These diagrams are made up of parallel, vertical rectangles.
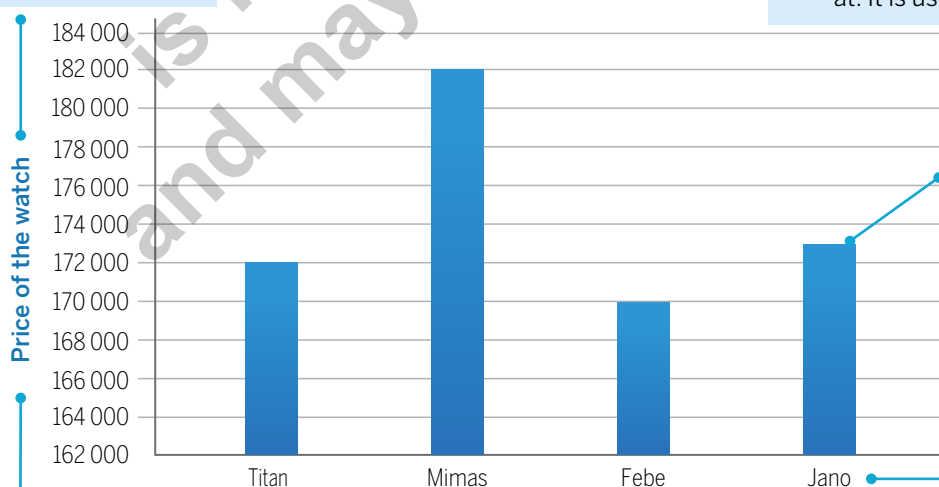
## GET SUPERPOWERS

## SUPERPOWER 10

The chart below shows the **prices** of a watch in some shops in the Kingdom.

>>Simple bar charts

We read the vertical axis from bottom to top.

The title helps us understand what information we are looking at. It is usually at the top.

**Price of the watch**

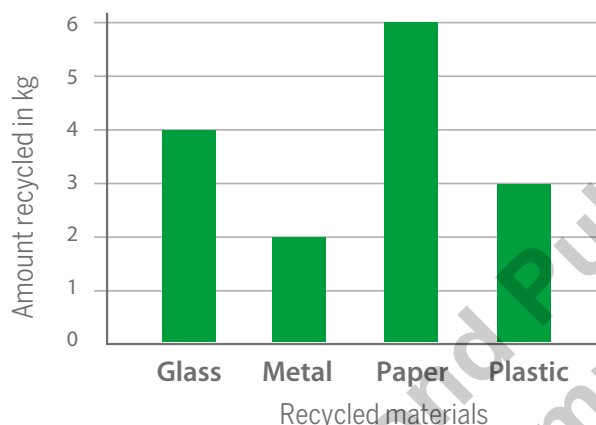The height of the bar shows us the amount.

**Price of the watch**

**Shop in the kingdom**

The labels on the axes indicate what information each bar represents.

We read the horizontal axis from left to right.

**9.** Zoe made a bar chart with information about the materials that the Montes family in the Kingdom of Big Numbers recycled in March.

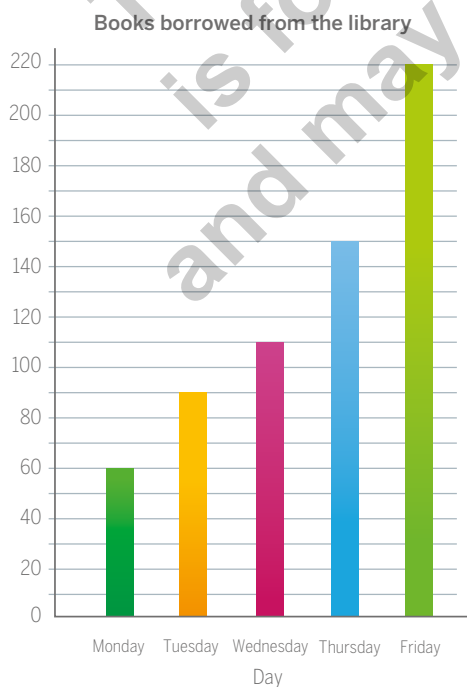Look at the chart and answer each question.



**a.** How many kilograms of material did the Montes family recycle in March?

_____

_____

_____

**b.** What kind of material did the Montes family recycle the most?

_____

_____

_____

**10.** The chart below shows the number of books borrowed from a library in the Kingdom over five days.

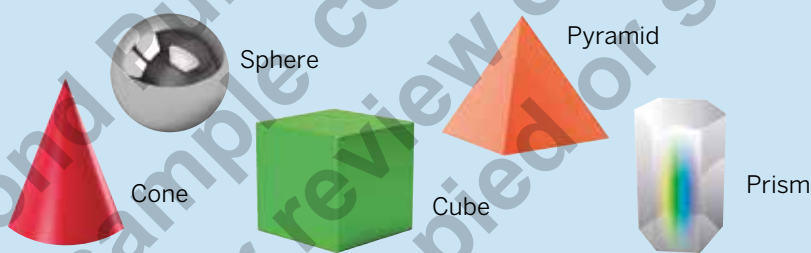Write down three questions about the information in the chart and share them with your classmates.



**a.** _____

_____

_____

**b.** _____

_____

_____

**c.** _____

_____

_____

Zoe, do you remember this packaging?

Of course. The map that Fito and I bought was in there.

Very good, Zoe. Do you also know that it's a geometric solid?

## Geometric solids

**Geometric solids** are three-dimensional figures that have length, width, and height. They can be polyhedrons or round bodies.
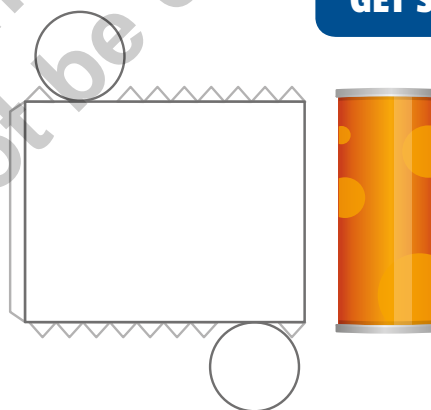
Sphere

Pyramid

Cone

Cube

Prism

## GET SUPERPOWERS

### SUPERPOWER 11

This is a flat drawing of the cylinder that the map of the Kingdom came in.

## USE YOUR SUPERPOWERS

**11.** Enlarge the drawing of some packaging on the right. Then, build the packaging using recyclable cardboard.

- What could you keep in the packaging that you built? Explain.

_____

_____

_____

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