The happy BURP

PIZZA

SMALL PIZZA
LARGE PIZZA
MILKSHAKE
AREPA
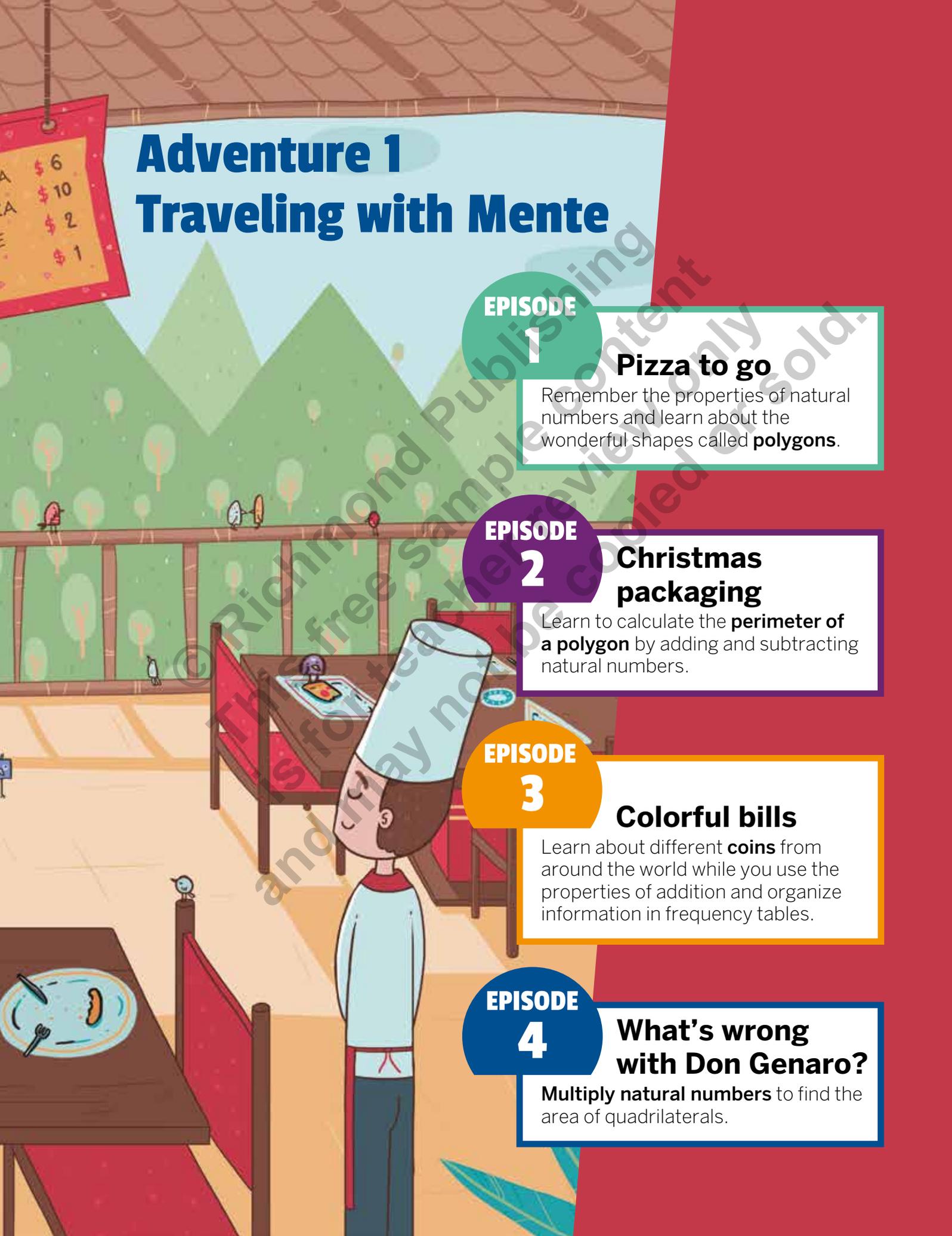
Adventure 1
Traveling with Mente

EPISODE 1

Pizza to go

Remember the properties of natural numbers and learn about the wonderful shapes called **polygons**.

EPISODE 2

Christmas packaging

Learn to calculate the **perimeter of a polygon** by adding and subtracting natural numbers.

EPISODE 3

Colorful bills

Learn about different **coins** from around the world while you use the properties of addition and organize information in frequency tables.

EPISODE 4

What's wrong with Don Genaro?

Multiply natural numbers to find the area of quadrilaterals.

GET READY

Before you start your adventure...

Use your knowledge on this adventure. Find the definitions of some **useful words** along the way.

>>ACTIVATE your superpowers

Useful words

- [ ] **Nutritional table**
- [ ] **Calories**
- [ ] **Sodium**
- [ ] **Floor tiles**
- [ ] **Export**
- [ ] **Income**
- [ ] **Expenses**
- [ ] **Profits**

Superpowers from previous grades

Superpower: Adding and subtracting numbers

To add or subtract numbers, we write its digits in columns, based on their place values and calculate from right to left, grouping or ungrouping if necessary.

$$
\begin{array}{r}
5\ 7\ 4\ 1 \\
+\quad 8\ 2\ 9 \\
\hline
6\ 5\ 7\ 0
\end{array}
$$

Superpower: Multiplying

Multiplying two numbers means repeatedly adding one of the factors as many times as the other factor indicates. Review the **multiplication tables** to activate this superpower.

$3 \times 5 = 15$

$2 \times 5 = 10$

$1 \times 5 = 5$

$0 \times 5 = 0$

Superpower: Identifying perimeters and areas

The perimeter is the length of the outline of a shape. The area is the quantity of space enclosed by a flat figure.

Perimeter

Area

Superpower: Using frequency tables

A frequency table lets you organize data from surveys or statistical studies. This superpower lets you analyze the data found in each episode.

Free practice	Students
Taekwondo	12
Dance	8
Music	15

Guadalupe is going on a fantastic trip with her dad and her cousin Mente. Join them on this first adventure and help them beat this challenge.

CHALLENGE

Puzzle 1

The objects in the picture are easy to find. What shape are they?

Puzzle 2

Do you know what the objects in the picture are? Look carefully at them and you might find some clues.

Puzzle 3

Do you see the silver coin that has a regular polygon shape?
If each side of the polygon is 1 cm, what is its perimeter?

Puzzle 4

Mente made fourteen groups like the one you see in the picture. Can you approximate how many coins he used?

Pizza to go

Mente teaches his cousin some interesting facts to make the time pass quickly while they wait for the pizza.

> I want two and a half slices of pizza to go!

> Are you crazy? You can order 1 or 2 slices, but not a half slice.

WHEN YOU ORDER PIZZA TO GO, YOU CAN ORDER 5, 8, 32, OR 15 569 SLICES.

>>History and uses of natural numbers

Set of natural numbers

The set of **natural numbers** has been used for millennia by many civilizations to count, sort, or code.
Its notation is: $\mathbb{N} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11,...\}$

GET SUPERPOWERS

SUPERPOWER 1

Mente and Guadalupe remember that they can use $<$, $>$, and $=$ signs to order the natural numbers and find out who has more slices of pizza.

We say	We write	Note
75 "is greater than" 19	$75 > 19$	This also means that $19 < 75$.
0 "is less than" 5	$0 < 5$	This also means that $5 > 0$.
3 "is equal to" 3	$3 = 3$	All numbers are equal to themselves.

SUPERPOWER 2

Mente wants to have a milkshake with his pizza. He chooses the one with the least sugar. He can compare the two milkshakes by looking at their **nutritional tables**.

When we compare the amount of sugar in each milkshake by putting the amounts on a number line, we can see that 96 is found on the left of 102, meaning that 96 is less than 102.

Delicious Milkshake	
Calories	66 kcal
Sodium	12 mg
Carbohydrates	12 g
Sugars	96 g

Tasty Milkshake	
Calories	67 kcal
Sodium	10 mg
Carbohydrates	10 g
Sugars	102 g

Milkshakes are sweet drinks we only have on special occasions because they have lots of fat and sugar.

Yes! That's why I chose the *Delicious* Milkshake, because it has less sugar.

SUPERPOWER 3

Thanks to the place value and the decomposition of natural numbers, you can compare and order them.

H	T	O
1	5	0

H	T	O
1	0	5

$$1 = 1$$
$$5 > 0$$
$$150 > 105$$
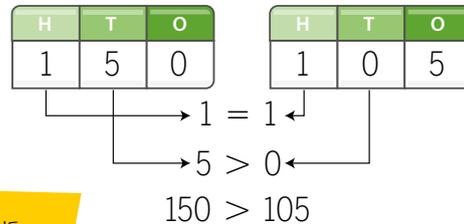
IN A PLACE VALUE CHART YOU COMPARE THE DIGITS ONE BY ONE, FROM LEFT TO RIGHT, LOOKING FOR A DIFFERENCE.

Order of natural numbers

Given two natural numbers, a and b, they can only meet one of the three conditions of the **natural number order relationship**.

1. $a < b$: "a is less than b."

2. $a > b$: "a is greater than b."

3. $a = b$: "a is equal to b."

1. Look at these numbers. Circle all that belong to the set of natural numbers.

2. Look carefully at this situation, then answer the questions.

I want a milkshake that is more than 12 ounces but not more than 20 ounces.

a. How can you order the cups to help people easily choose the size of their drink? Explain your answer.

_____

_____

_____

_____

b. Which cup should Mente choose? Explain your answer.

_____

_____

_____

_____

c. Compare your answers with two classmates'. Did they get the same answer?

_____

_____

3. Work with a classmate and look at the nutritional tables for three bags of potato chips. Do each comparison using the method shown. Then, complete the problems.

a. Using a place value chart.

Salty Chips	
Calories	150 kcal
Fat	90 mg
Sodium	120 g
Sugars	1 g

Crunchy Chips	
Calories	105 kcal
Fat	110 mg
Sodium	110 g
Sugars	1 g

Wavy Chips	
Calories	250 kcal
Fat	105 mg
Sodium	80 g
Sugars	5 g

Product with the least sodium: _____

b. Using the number line.

Product with the least sugar: _____

c. You choose the method.

Product with the least fat: _____

d. Which of the bags of chips has the most calories? _____

e. We know that the calorie amounts of the first two bags of chips have the same digits (0, 1 and 5). So, is it true that 150 > 105?

My milkshake! Oh no... Look at the **floor tiles**...

When she gets her milkshake, Guadalupe has a little accident...

- How many different shapes are in these floor tiles?

- Do you know the names of the shapes?

I have an idea! Let's design our own floor tiles!

Use your ruler and a blank sheet of paper to draw shapes with straight sides. Bear in mind the following rules.

A. They are closed shapes.

B. Each segment intersects exactly two other segments.

C. The segments only intersect at the endpoints.

- Draw a shape using segments where (B) is true and (C) is not true.

- Draw a shape using segments where (C) is true but (B) is not true.

- Draw a shape using segments where both (A) and (B) are not true.

SUPERPOWER 4

Guadalupe draws a floor tile and follows Mente's three rules. It is a closed shape; every side intersects only two other sides; and the sides only intersect at their endpoints.

My shape is an octagon because it has eight sides.
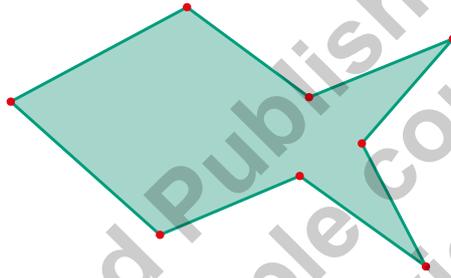
Polygons

A **polygon** is a flat, closed shape made from line segments. Each segment intersects exactly two other segments, and the segments only intersect at their endpoints.

>>Learn about polygons

Mente also draws polygons using line segments while following the three basic rules.
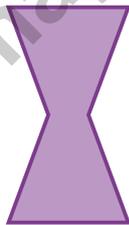
Hourglass
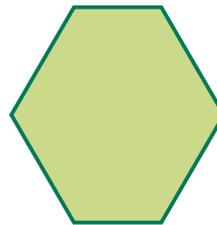
Lamp
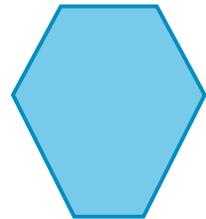
Gemstone
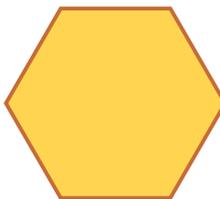
Honeycomb

Arrow

SUPERPOWER 5

Like most things, polygons can be classified. They can be classified as **concave polygons** or **convex polygons**.

Concave	Convex
Hourglass Arrow	Honeycomb Gemstone Lamp
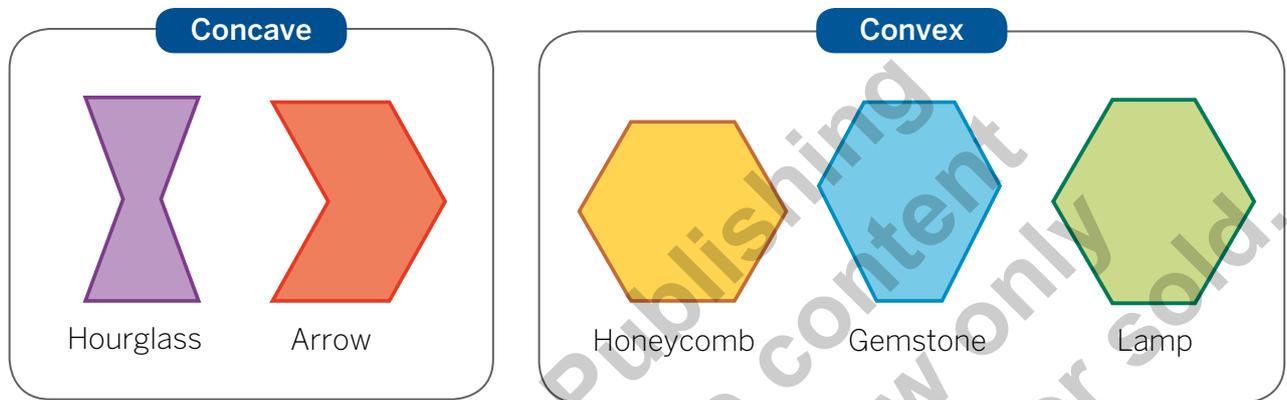
- Look at the classification above. Can you describe the characteristics of concave and convex polygons? Talk to a classmate and write down your answer.

_____

_____

Concave and convex polygons

- A **concave polygon** has at least one interior angle that measures more than 180°.
- In a **convex polygon** all interior angles are less than 180°.

>>Concave and convex polygons

SUPERPOWER 6

One of the polygons Mente drew is very interesting. The honeycomb is the only shape where all the sides have the same length and all angles are equal in measure.

120°
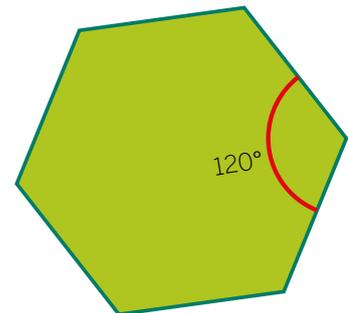
Regular polygons

Polygons that have all equal sides, and all interior angles with the same measurement, are called **regular polygons**.

4. Is it possible to draw a polygon with fewer than three sides?
Use graphs to explain your answer.

5. Use your ruler to draw creative polygons in your notebook.
You can name them using the number of sides.

Triangle: 3 sides	Quadrilateral: 4 sides	Pentagon: 5 sides
Hexagon: 6 sides	Heptagon: 7 sides	Octagon: 8 sides

6. Look carefully at these polygons. Match them with the correct label
(Concave or Convex).

Concave

Convex
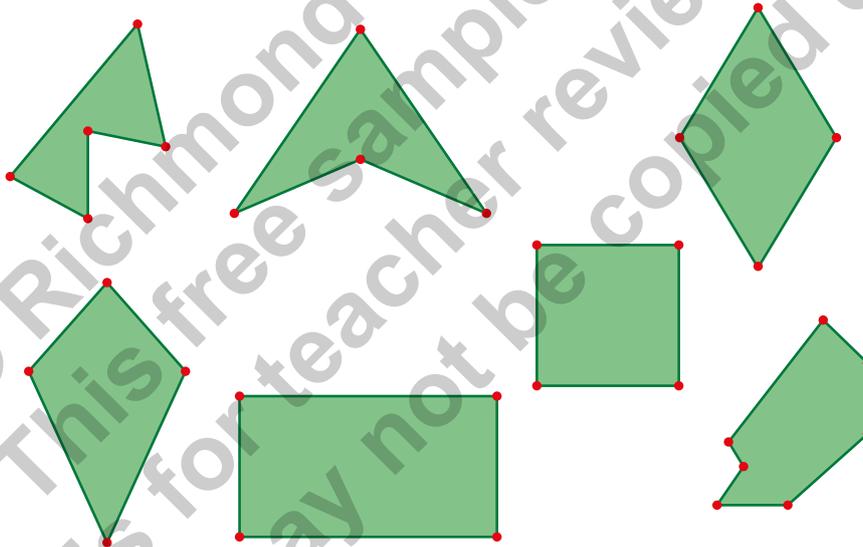
7. Look online to find the interior
angle measurements of regular
polygons with 3, 4, 5, and 6 sides.
Use your ruler and protractor to
draw an example of one of them.
Describe what you did.

8. How many sides do you think the regular polygon should have to be identical
to a circle? Discuss your answer with your classmates.