TEKSING TOWARD STAAR

MATHEMATICS ®

# GRADE 3

# Lesson Projections

# Six Weeks 1

# Lesson 1

# Place Value

Our whole number system is based on a simple pattern of tens.

Each place has ten times the value of the place to its right.

## EXAMPLE 1

A place value chart can be used to show the value of numbers.

Each place in the chart has a value of 10 times the place to its right.

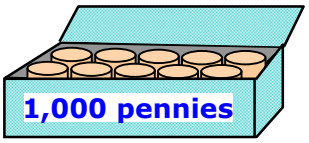
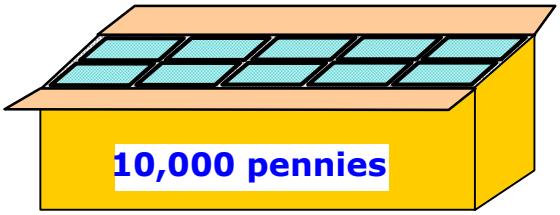
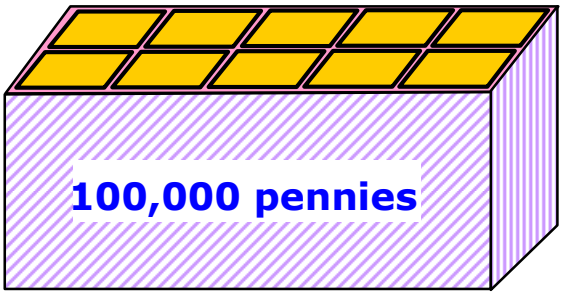
| Hundred Thousands | Ten Thousands | Thousands | Hundreds | Tens | Ones |
|---|---|---|---|---|---|
| 10<br>ten thousands | 10<br>thousands | 10<br>hundreds | 10<br>tens | 10<br>ones | |

- tens place = 10 ones
- hundreds place = 10 tens
- thousands place = 10 hundreds
- ten thousands place = 10 thousands
- hundred thousands place = 10 ten thousands

Each place has ten times the value of the place to its right.

# EXAMPLE 2

Imagine 100,000 pennies.

| | | |
|---|---|---|
| This container holds 100 pennies. | **100** |   |
| This box holds 10 containers of 100 pennies. | **1,000** |   |
| This carton holds 10 boxes of 1,000 pennies. | **10,000** |   |
| This crate holds 10 cartons of 10,000 pennies. | **100,000** |   |

Every **digit** in a number has a value.

Digits are the symbols used to represent whole numbers in **standard form**.

The digits are 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9.

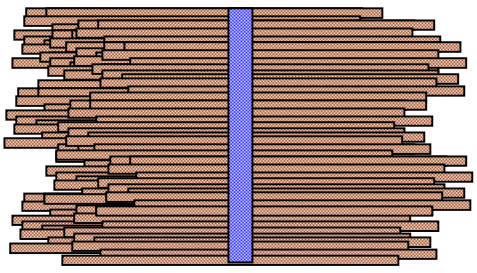
The position, or place, a digit is in tells you the value of the digit.

This value is called **place value**.

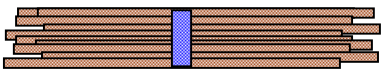
There are many different ways to look at numbers to help you understand place value.

- One way is to use objects to model place value.

Bundles of sticks can be used to model place value.



This bundle has 100 sticks and represents **1 hundred**.



This bundle has 10 sticks and represents **1 ten**.



This is 1 stick and represents **1 one**.

- **Write:** 111 **(standard form)**
- **Say:** *one hundred eleven* **(word form)**

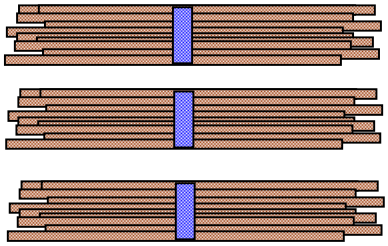
# EXAMPLE 1

In the number 32 the 3 represents 3 tens and the 2 represents 2 ones.

Represent 32 using a concrete model.

- **Think:** 3 tens + 2 ones

Use bundles of sticks to create the model.



**3 tens**

**2 ones**

- **Write:** 32
- **Say:** *thirty-two*

## NOTE

Remember to use a hyphen when you use words to write 2-digit numbers greater than 20 that have a digit other than zero in the ones place.

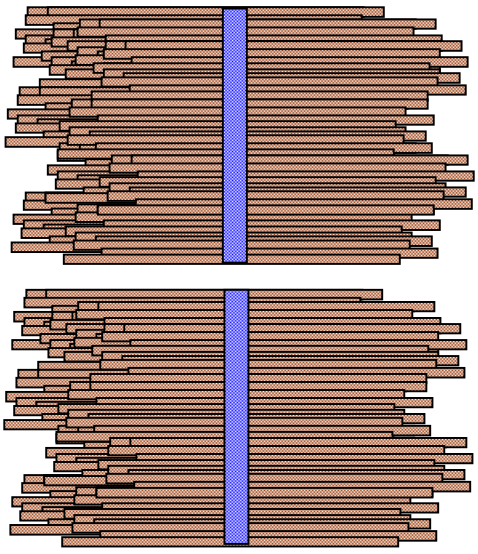
# EXAMPLE 2

In the number 247, the 2 represents 2 hundreds, the 4 represents 4 tens and the 7 represents 7 ones.

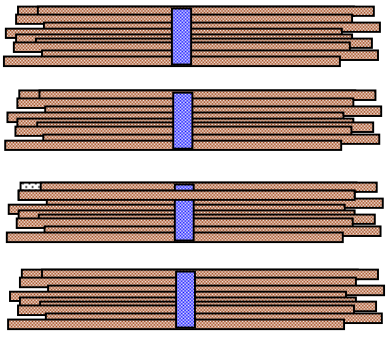
Represent 247 using a model.

- **Think:** 2 hundreds + 4 tens + 7 ones

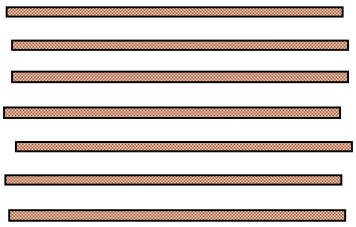
Use bundles of sticks to create the model.



**2 hundreds**



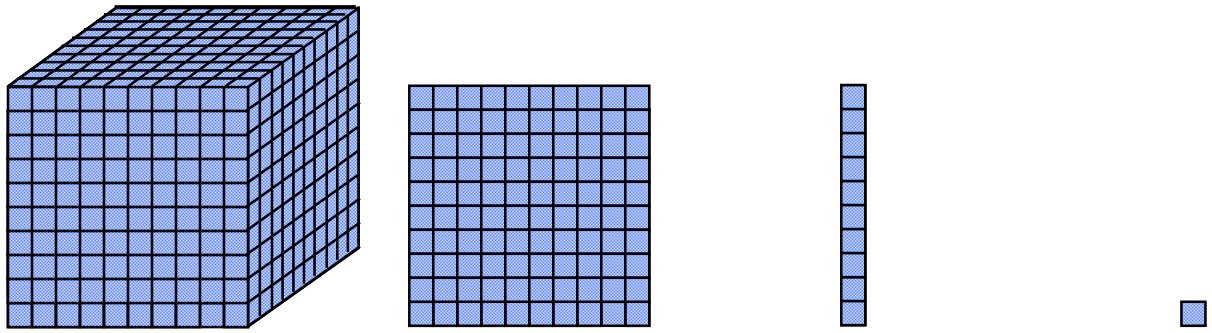
**4 tens**



**7 ones**

- **Write:** 247
- **Say:** *two hundred forty-seven*

- Another way to model place value is to use base-10 blocks.



| This base-10 cube is made of 1,000 unit cubes.<br><br>It has a value of 1,000. | This base-10 flat is made of 100 unit cubes.<br><br>It has a value of 100. | This base-10 rod is made of 10 unit cubes.<br><br>It has a value of 10. | This base-10 unit is made of 1 cube.<br><br>It has a value of 1. |
|---|---|---|---|

- **Write:** 1,111
- **Say:** *one thousand, one hundred eleven*

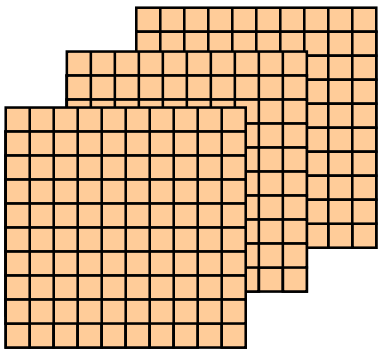
# EXAMPLE 1

In the number 358 the 3 represents 3 hundreds, the 5 represents 5 tens and the 8 represents 8 ones.

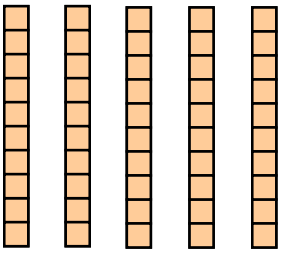
Represent 358 using a model.

- **Think:** 3 hundreds + 5 tens + 8 ones

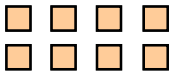
Use base-10 blocks to create the model.



**3 hundreds**



**5 tens**



**8 ones**

- **Write:** 358 **(standard form)**
- **Say:** *three hundred fifty-eight* **(word form)**

# EXAMPLE 2

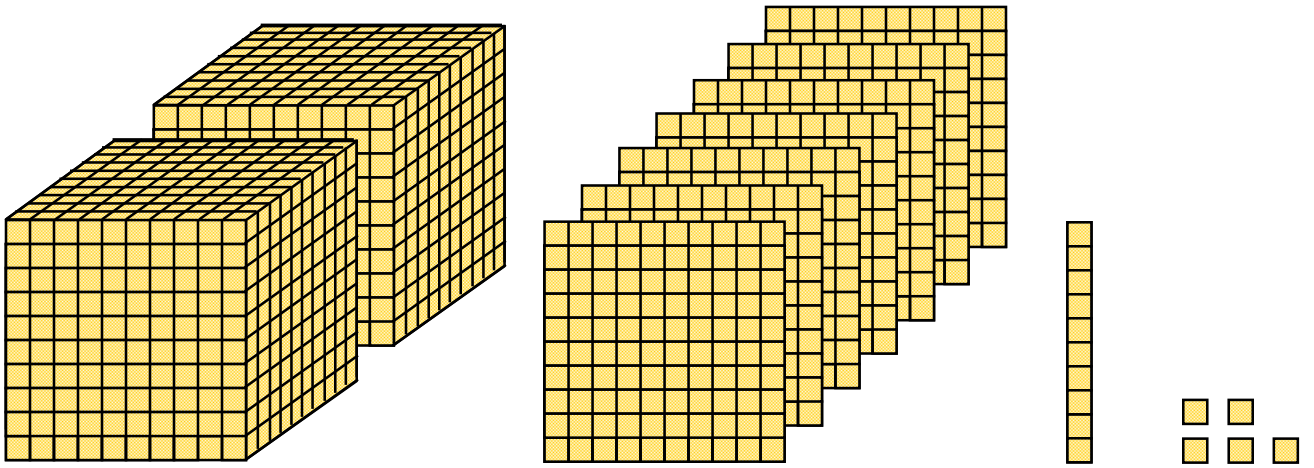
In the number 2,715 the 2 represents 2 thousands, the 7 represents 7 hundreds, the 1 represents 1 ten and the 5 represents 5 ones.

Represent 2,715 using a model.

- **Think:**

  2 thousands + 7 hundreds + 1 ten + 5 ones

Use base-10 blocks to create the model.



**2 thousands** **7 hundreds** **1 ten** **5 ones**

- **Write:** 2,715
- **Say:** *two thousand, seven hundred fifteen.*

# Problem-Solving Model

| Step | Description of Step |
|---|---|
| 1 | **Analyze the given information.**<br>•Summarize the problem in your own words.<br>•Describe the main idea of the problem.<br>•Identify information needed to solve the problem. |
| 2 | **Formulate a plan or strategy.**<br>•Draw a picture or a diagram.<br>•Find a pattern.<br>•Guess and check.<br>•Act it out.<br>•Create or use a chart or a table.<br>•Work a simpler problem.<br>•Work backwards.<br>•Make an organized list.<br>•Use logical reasoning.<br>•Brainstorm.<br>•Write a number sentence or an equation. |
| 3 | **Determine a solution.**<br>•Estimate the solution to the problem.<br>•Solve the problem. |
| 4 | **Justify the solution.**<br>•Explain why your solution solves the problem. |
| 5 | **Evaluate the process and the reasonableness of your solution.**<br>•Make sure the solution matches the problem.<br>•Solve the problem in a different way. |

# Problem-Solving Questions

**Directions:**

- **Work with a partner.**
- **Write your answers on notebook paper.**
- **Answer questions 1-3.**
- **Complete the solution to the problem.**
- **Answer questions 4-10.**

1. What is the main idea of this problem?
2. What are the supporting details in this problem?
3. What skills, concepts and understanding of math vocabulary are needed to be able to answer this problem?
4. Did this problem involve mathematics arising in everyday life, society, or the work place?
5. What is a good problem solving strategy for this problem?
6. Can you explain how you used any math tools, mental math, estimation or number sense to solve this problem?
7. Did this problem involve using multiple representations (symbols, diagrams, graphs, math language)?
8. Did you use any relationships to solve this problem?
9. How can you justify your solution to the problem?
10. How can you check for reasonableness of your solution to this problem?

# Problem-Solving 1

Your teacher will give you and a partner 1,000 stir sticks, rubber bands, and a gallon baggie.

**1.** Put a rubber band around 100 sticks to represent a value of 100. Make 9 of these.

**2.** Put a rubber band around 10 sticks to represent a value of 10. Make 9 of these.

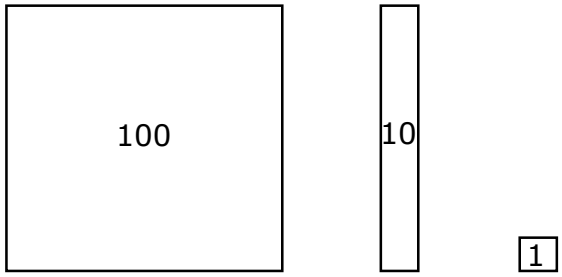
**3.** You will need single sticks to represent a value of 1. You will need 9 of these.

**Write your answers on notebook paper.**

**4.** Use the stir sticks to model 936.

Think about the meaning of each digit.

Use these symbols to represent your model.




**5.** Say the words that represent the model.

**6.** Write the words that represent the model.

**7.** Be sure to put your set of base-10 sticks into the gallon baggie. You will use them again.

# Using a Place Value Chart to Understand Numbers

A place value chart shows the value of each digit in a number.

## EXAMPLE 1

Look at 246 in the place value chart.

| Hundred Thousands | Ten Thousands | Thousands | Hundreds | Tens | Ones |
|---|---|---|---|---|---|
| | | | **2** | **4** | **6** |

200 + 40 + 6

The place value chart shows the value of each digit.

- The digit 2 is in the hundreds place so it represents 2 hundreds and has a value of 200.
- The digit 4 is in the tens place so it represents 4 tens and has a value of 40.
- The digit 6 is in the ones place so it represents 6 ones and has a value of 6.

# EXAMPLE 2

Look at 4,257 in the place value chart.

| Hundred Thousands | Ten Thousands | Thousands | Hundreds | Tens | Ones |
|---|---|---|---|---|---|
| | | **4** | **2** | **5** | **7** |

4,000 + 200 + 50 + 7

The place value-chart shows the value of each digit.

- The digit 4 is in the thousands place so it represents 4 thousands and has a value of 4,000.
- The digit 2 is in the hundreds place so it represents 2 hundreds and has a value of 200.
- The digit 5 is in the tens place so it represents 5 tens and has a value of 50.
- The digit 7 is in the ones place so it represents 7 ones and has a value of 7.

# EXAMPLE 3

Look at 34,084 in the place value chart.

| Hundred Thousands | Ten Thousands | Thousands | Hundreds | Tens | Ones |
|---|---|---|---|---|---|
| | **3** | **4** | **0** | **8** | **4** |

30,000 + 4,000 + 0 + 80 + 4

The place value chart shows the value of each digit.

- The digit 3 is in the ten thousands place so it represents 3 ten thousands and has a value of 30,000.
- The digit 4 is in the thousands place so it represents 4 thousands and has a value of 4,000.
- The digit 0 is in the hundreds place so it represents 0 hundreds and has a value of 0.
- The digit 8 is in the tens place so it represents 8 tens and has a value of 80.
- The digit 4 is in the ones place so it represents 4 ones and has a value of 4.

# EXAMPLE 4

Look at 140,386 in the place value chart.
**(NOTE:** Don't forget zeros!**)**

| Hundred Thousands | Ten Thousands | Thousands | Hundreds | Tens | Ones |
|---|---|---|---|---|---|
| **1** | **4** | **0** | **3** | **8** | **6** |

100,000 + 40,000 + 0 + 300 + 80 + 6

The chart shows the value of each digit.

- The digit 1 is in the hundred thousands place so it represents 1 hundred thousand and has a value of 100,000.
- The digit 4 is in the ten thousands place so it represents 4 ten thousands and has a value of 40,000.
- The digit 0 is in the thousands place so it represents 0 thousands and has a value of 0.
- The digit 3 is in the hundreds place so it represents 3 hundreds and has a value of 300.
- The digit 8 is in the tens place so it represents 8 tens and has a value of 80.
- The digit 6 is in the ones place so it represents 6 ones and has a value of 6.

# Problem-Solving 2

## Write your answers on notebook paper.

How can you use a place value chart like the one below to represent the value of 987,605?

| Hundred Thousands | Ten Thousands | Thousands | Hundreds | Tens | Ones |
|---|---|---|---|---|---|
| | | | | | |

_____ + _____ + _____ + _____ + _____ + _____

**1.** Make a sketch of the place value chart on your notebook paper.

**2.** Fill in your chart to represent 987,605.

**3.** Explain the value of the digit 9 in your chart.

**4.** Explain the value of the digit 8 in your chart.

**5.** Explain the value of the digit 7 in your chart.

**6.** Explain the value of the digit 6 in your chart.

**7.** Explain the value of the digit 0 in your chart.

**8.** Explain the value of the digit 5 in your chart.

# Writing Numbers in Expanded Notation

Writing numbers in **expanded form,** or **expanded notation**, is another way to help you understand place value.

## EXAMPLE 1

Write 43,809 in expanded notation.

Look at 43,809 in the place value chart.

| Ten Thousands | Thousands | Hundreds | Tens | Ones |
|---|---|---|---|---|
| **4** | **3** | **8** | **0** | **9** |

4 × 10,000 + 3 × 1,000 + 8 × 100 + 0 × 10 + 9 × 1

The chart shows the value of each digit.

- The digit 4 is in the ten thousands place so it represents 4 ten thousands and has a value of 40,000.
- The digit 3 is in the thousands place so it represents 3 thousands and has a value of 3,000.
- The digit 8 is in the hundreds place so it represents 8 hundreds and has a value of 800.

| Ten Thousands | Thousands | Hundreds | Tens | Ones |
|---|---|---|---|---|
| **4** | **3** | **8** | **0** | **9** |

4 × 10,000 + 3 × 1,000 + 8 × 100 + 0 × 10 + 9 × 1

- The digit 0 is in the tens place so it represents 0 tens and has a value of 0.
- The digit 9 is in the ones place so it represents 9 ones and has a value of 9.

The value of the number 43,809 is

40,000 + 3,000 + 800 + 0 + 9.

# EXAMPLE 2

Write 205,497 in expanded notation.

Look at 205,497 in the place value chart.

| Hundred Thousands | Ten Thousands | Thousands | Hundreds | Tens | Ones |
|---|---|---|---|---|---|
| **2** | **0** | **5** | **4** | **9** | **7** |

$2 \times 100{,}000 + 0 \times 10{,}000 + 5 \times 1{,}000 + 4 \times 400 + 9 \times 10 + 1 \times 7$

The chart shows the value of each digit.

- The digit 2 is in the hundred thousands place so it represents 2 hundred thousand and has a value of 200,000.
- The digit 0 is in the ten thousands place so it represents 0 ten thousands and has a value of 0.
- The digit 5 is in the thousands place so it represents 5 thousands and has a value of 5,000.
- The digit 4 is in the hundreds place so it represents 4 hundreds and has a value of 400.

| Hundred Thousands | Ten Thousands | Thousands | Hundreds | Tens | Ones |
|---|---|---|---|---|---|
| **2** | **0** | **5** | **4** | **9** | **7** |

$2 \times 100{,}000 + 0 \times 10{,}000 + 5 \times 1{,}000 + 4 \times 400 + 9 \times 10 + 1 \times 7$

- The digit 9 is in the tens place so it represents 9 tens and has a value of 90.
- The digit 7 is in the ones place so it represents 7 ones and has a value of 7.
- The value of the number 205,497 is

  200,000 + 0 + 5,000 + 400 + 90 + 7.

# Problem-Solving 3

**Write your answers on notebook paper.**

The table below shows the heights of three mountains in Texas.

| Mountains in Texas | |
|---|---|
| Mountain | Height |
| El Capitan | 8,085 feet |
| Bartlett Peak | 8,508 feet |
| Guadalupe Peak | 8,749 feet |

**1.** What is the expanded notation for the height of El Capitan?

**2.** What is the word form for the height of El Capitan?

**3.** What is the expanded notation for the height of Bartlett Peak?

**4.** What is the word form for the height of Bartlett Peak?

**5.** What is the expanded notation for the height of Guadalupe Peak?

**6.** What is the word form for the height of Guadalupe Peak?

| Mountains in Texas | |
|---|---|
| Mountain | Height |
| El Capitan | 8,085 feet |
| Bartlett Peak | 8,508 feet |
| Guadalupe Peak | 8,749 feet |

**7.** What is the value of the digit 8 in the height of Guadalupe Peak?

**8.** What is the value of the digit 0 in the height of El Capitan?

**9.** What is the value of the digit 5 in the height of Bartlett Peak?

**10.** What is the value of the digit 4 in the height of Guadalupe Peak?

# Using Place Value to Read Numbers to 999,999

When you read numbers, always start on the left. Numbers are read in groups of three digits called **periods**.

| Thousands Period | | | Ones Period | | |
|---|---|---|---|---|---|
| Hundred Thousands | Ten Thousands | Thousands | Hundreds | Tens | Ones |
| **4** | **6** | **9** | **4** | **6** | **0** |

## EXAMPLE

Read the number 528.

This number is a three-digit number.

Look at 528 in a place value chart.

| Ones Period | | |
|---|---|---|
| Hundreds | Tens | Ones |
| **5** | **2** | **8** |

**Write:** 528

**Read the numbers from left to right.**

**Say:** *five hundred twenty-eight*

Many numbers have more than three digits.

The digits in these numbers are arranged in groups of three called **periods**.

A comma is used to separate each **period**.

## EXAMPLE 1

Read the number 2,685.

This number is a four-digit number.

**NOTE:** A comma is used to separate periods.

Look at 2,685 in the place value chart.

| Thousands | Hundreds | Tens | Ones |
|---|---|---|---|
| **2** | **6** | **8** | **5** |

**To read this number:**

- first, say the one-digit number to the left of the comma, ***two***;
- next, say the name of the period, ***thousand***;
- then, say the three-digit number to the right of the comma, ***six hundred eighty-five***.

Read the number 2,685 as

***two thousand, six hundred eighty-five***.

# EXAMPLE 2

Read the number 45,073.

This is a five-digit number.

**NOTE:** A comma is used to separate periods.

Look at 45,073 in the place value chart.

| Ten Thousands | Thousands | Hundreds | Tens | Ones |
|---|---|---|---|---|
| **4** | **5** | **0** | **7** | **3** |

The 0 shows there are no hundreds.

## To read this number:

- first, say the two-digit number to the left of the comma, ***forty-five***;
- next, say the name of the period, ***thousand***;
- then, say the three-digit number to the right of the comma, ***seventy-three***.

Read the number 45,073 as

***forty-five thousand, seventy-three***.

# EXAMPLE 3

Read the number 342,805.

This is a six-digit number.

**NOTE:** A comma is used to separate periods.

Look at 342,805 in the place value chart.

| Hundred Thousands | Ten Thousands | Thousands | Hundreds | Tens | Ones |
|---|---|---|---|---|---|
| **3** | **4** | **2** | **8** | **0** | **5** |

The 0 shows there are no tens.

## To read this number:

- first, say the three-digit number to the left of the comma, ***three hundred forty-two***;
- next, say the name of the period, ***thousand***;
- then, say the three-digit number to the right of the comma, ***eight hundred five.***

Read the number 342,805 as

***three hundred forty-two thousand, eight hundred five***.

# Problem-Solving 4

**Write your answers on notebook paper.**

**1.** Write 374,074 in words.

**2.** What is the value of the 3 in 374,074?

**3.** Write 740,297 in words.

**4.** What is the value of the 4 in 740,297?

**5.** Write 497,407 in words.

**6.** What is the value of the 9 in 497,407?

**7.** Write 173,784 in words.

**8.** What is the value of the 3 in 173,784?

**9.** Write 734,870 in words.

**10.** What is the value of the 3 in 734,870?

**11.** Write 427,718 in words.

**12.** What is the value of the 4 in 427,718?

# Lesson 6

# Fractions

A **fraction** is a number that describes a part of a whole or a part of a group by using **equal** parts.

## Parts of a Fraction

The parts of a fraction are the **numerator** and the **denominator**.

The **denominator** is the bottom number of a fraction and tells how many **equal** parts are in the whole.

The **numerator** is the top number of a fraction and tells how many of the **equal** parts the fraction represents.

## Using Concrete Objects to Model Fractions

Concrete objects can be used to model fractions that represent part of a whole object or part of a set of objects.

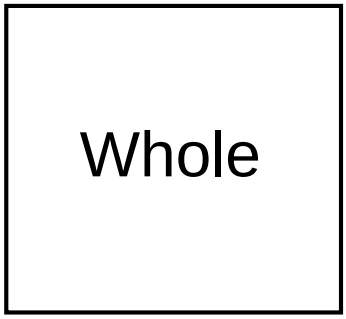
# Fractional Part of a Whole Object

Use objects to model fractions that represent part of a whole object.

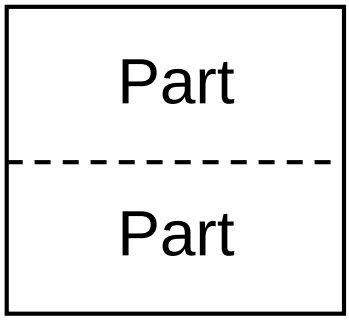
## EXAMPLE 1

Construct a concrete model to represent a fractional part of a whole object.

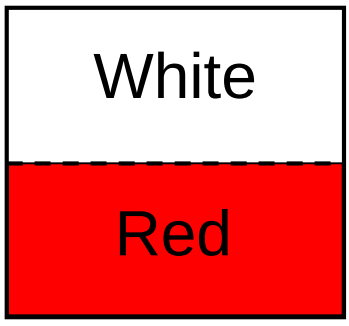
Your teacher will give you a square piece of white paper. The square represents 1 whole.

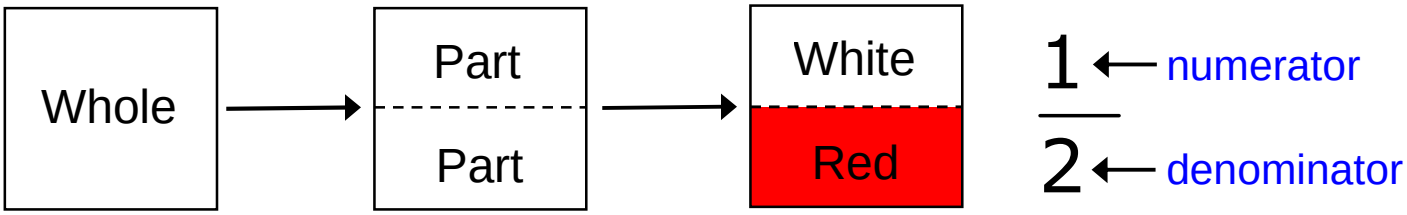



Fold the paper in half to make 2 equal parts.




Leave the top part of the square white and color the bottom part red.






The **denominator** of the fraction tells how many **equal** parts are in the whole.

$\frac{1}{2}$

The **numerator** of the fraction tells how many of the **equal** parts are colored red.

- The fraction $\frac{1}{2}$ is read as ***one half***.
- The fraction $\frac{1}{2}$ represents that 1 out of 2 equal parts of the piece of paper are colored red.
- The piece of paper shows $\frac{1}{2}$ of the paper is red.

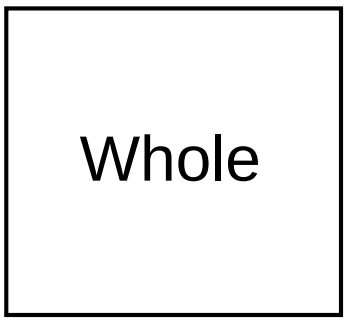
Use scissors to cut your square into **2** parts - 1 **white** part and 1 **red** part.

Place the **white** part on top of the **red** part to verify that you have 2 **equal** parts.

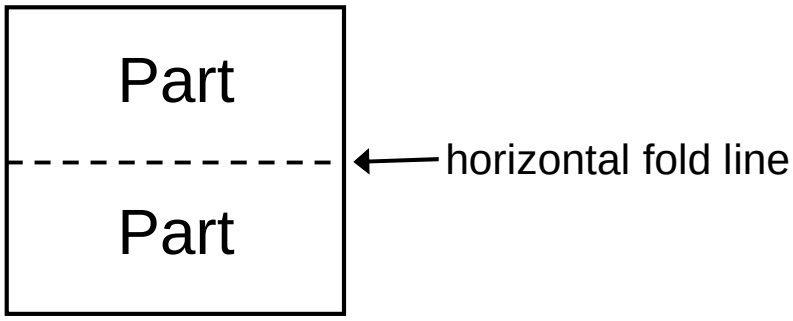
# EXAMPLE 2

Construct a concrete model to represent a fractional part of a whole object.

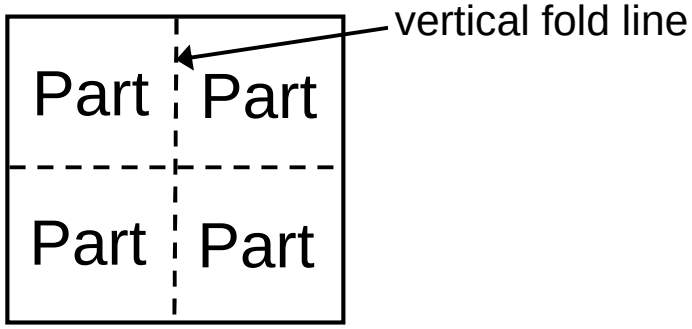
Your teacher will give you a square piece of white paper. The square represents 1 whole.



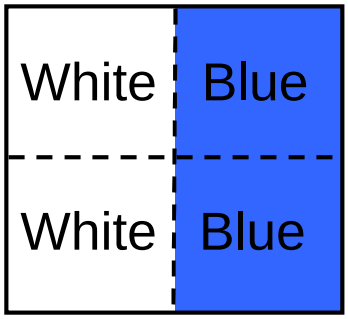

Fold the paper in half **horizontally** to make 2 equal parts.



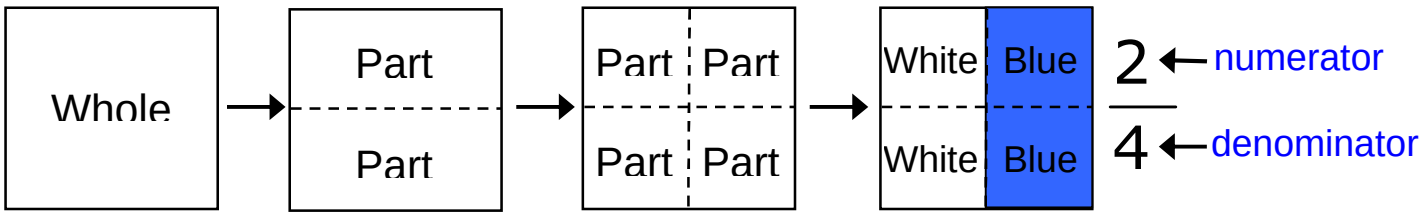

Next fold the paper in half **vertically** to make 4 equal parts.

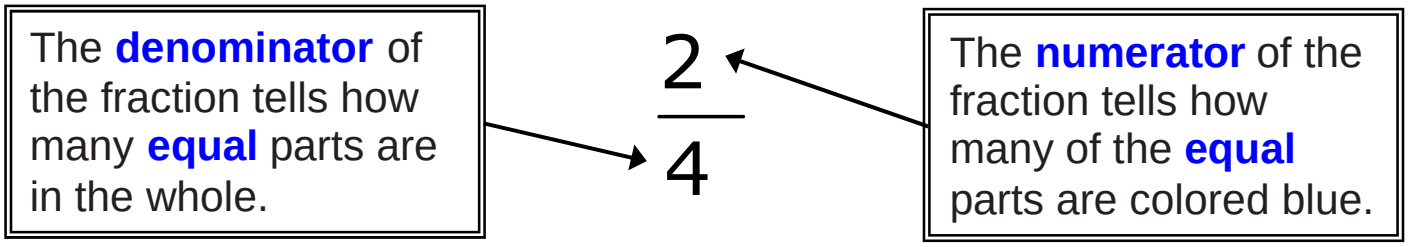


Leave the 2 parts on the left side white and color the 2 parts on the right side blue.




What fraction of the piece of paper is colored blue?






- The fraction $\frac{2}{4}$ is read as ***two fourths***.
- The fraction $\frac{2}{4}$ represents that 1 out of 2 equal parts of the piece of paper are colored blue.
- The piece of paper shows $\frac{2}{4}$ of the piece of paper is blue.

Use scissors to cut your square into 4 equal parts - 2 white parts and 2 blue parts.

Stack the 4 parts to verify that you have 4 equal parts.

# Fractional Part of a Set of Objects

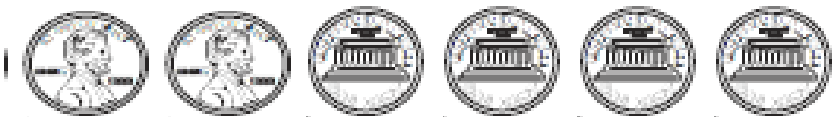
Use objects to model fractions that represent part of a set of objects.

## EXAMPLE 1

Construct a concrete model to represent a fractional part of a set of objects.

Your teacher will give you a set of 6 pennies.

Turn the pennies so that 2 of the pennies are "heads up" and 4 of the pennies are "tails up".



What fraction of the set of pennies is "tails up'?

$\frac{4}{6}$ ← numerator

denominator

The **denominator** of the fraction tells how many pennies are in the set.

$\frac{4}{6}$

The **numerator** of the fraction tells how many of the pennies in the set are "tails up".

$\frac{4}{6}$ ← numerator

denominator

- The fraction $\frac{4}{6}$ is read as ***four sixths***.
- The fraction $\frac{4}{6}$ represents that 4 out of 6 of the pennies in the set are "tails up".
- The set of pennies shows that $\frac{4}{6}$ of the pennies are "tails up".

# EXAMPLE 2

Construct a concrete model to represent a fractional part of a set of objects.

Your teacher will give you 4 green triangles a and 5 red trapezoids.

Use the pattern blocks to create a set with 4 green pattern blocks and 2 red pattern blocks.

What fraction of the set of pattern blocks is red?

$\frac{2}{6}$ ← numerator

$\frac{2}{6}$ ← denominator

The **denominator** of the fraction tells how many pattern blocks are in the set.

$\frac{2}{6}$

The **numerator** of the fraction tells how many of the pattern blocks in the set are red.

- The fraction $\frac{2}{6}$ is read as ***two sixths***.
- The fraction $\frac{2}{6}$ represents that 2 out of 6 of the pattern blocks in the set are red.
- The set of pattern blocks shows that $\frac{2}{6}$ of the pattern blocks are red.

# Problem-Solving 1

Your teacher will give you and your partner a baggie with color tiles to use for this activity.

**1.** Use 8 blue color tiles to model 1 whole rectangle with 8 equal parts.

**2.** Draw a sketch of your model.

**3.** Replace blue color tiles with red color tiles to model $\frac{1}{2}$ of the whole rectangle in red and $\frac{1}{2}$ of the whole rectangle in blue.

**4.** Draw a sketch of your model.

**5.** How many tiles in your model are blue?

**6.** How many tiles in your model are red?

**7.** What fraction represents the blue part of the whole in your model?

**8.** Explain why the answer to question 7 is correct.

**9.** What fraction represents the red part of the whole in your model?

**10.** Explain why the answer to question 7 is correct.

# Fractions are Parts of Things

- Each partner will choose materials from your fraction kit to model this fraction:

$$\frac{4}{6}$$

**Talk with your partner about the model.**

- What fraction is represented by the model?
- What part of the model represents the denominator of the fraction?
- What part of the model represents the numerator of the fraction?
- How do you write the fraction $\frac{4}{6}$ in words?

# Fractions on a Number Line

A number line can be used to show fractions.

The length from 0 to 1 on the number line represents one whole.

The number line can be divided into any number of equal parts, or lengths.

# Fractions Greater Than One and Less Than or Equal to One

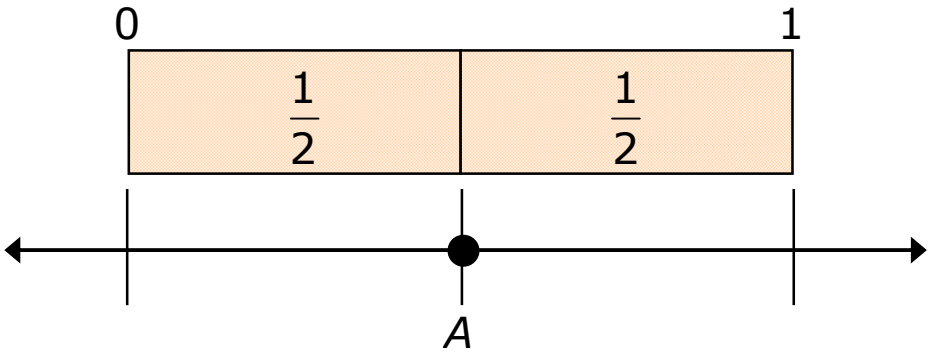
If you are given a specified point on a number line, you can determine a corresponding fraction greater than zero and less than or equal to one.

# EXAMPLE 1

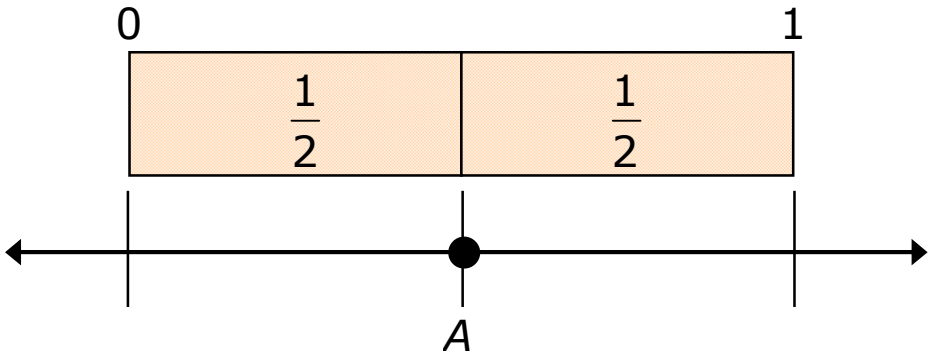
The model shows two fraction bars above a number line.

Point *A* is located on the number line.

What fraction does Point *A* represent?




- The number line is divided into 2 equal sections.
- There are 2 equal fraction bars above the number line.
- The first fraction bar on the left is the same length as the first section marked on the number line.
- The next fraction bar is the same length as the second section marked on the number line and ends at 1.




- This means that the two fraction bars are equal to 1 whole.
- This also means that the two fraction bars are equal to $\frac{2}{2}$ on the number line.
- The end of 1 fraction bar marked $\frac{1}{2}$ is at the same place as the second mark on the number line.

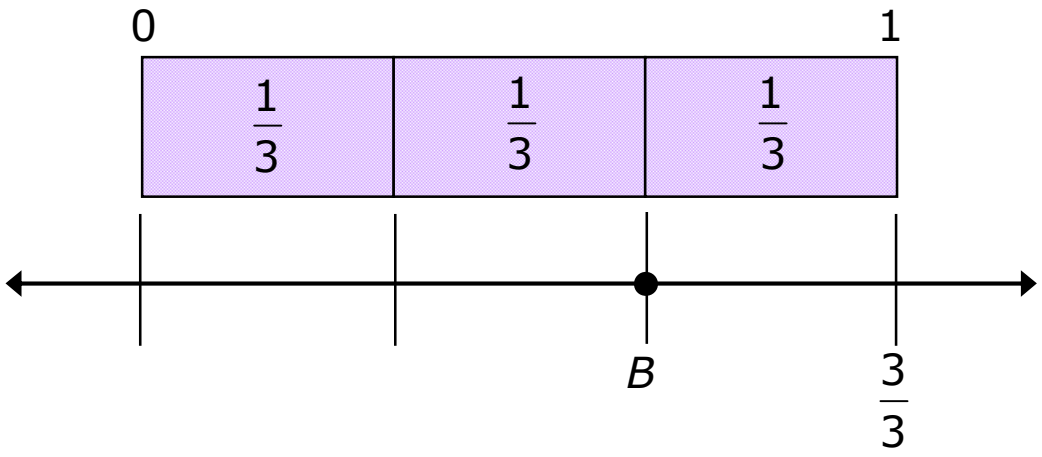
So, Point *A* represents the fraction $\frac{1}{2}$ on this number line.

# EXAMPLE 2

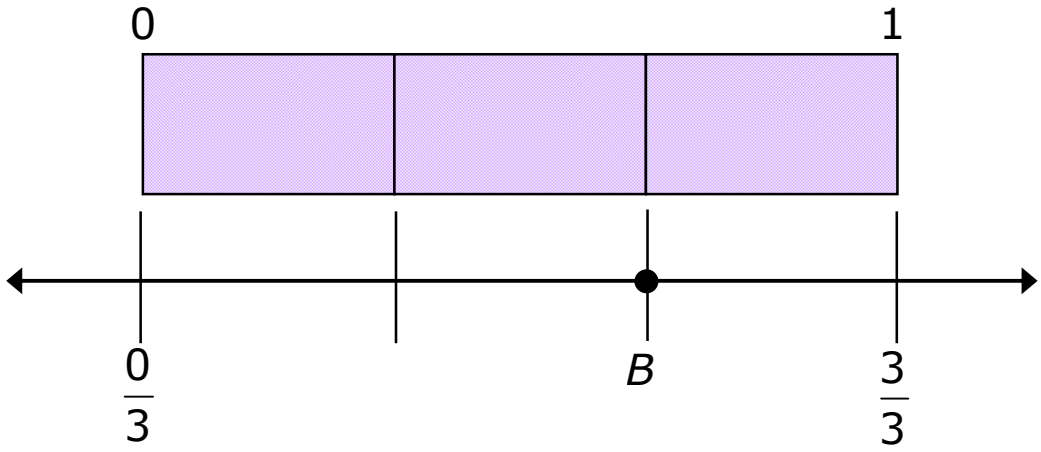
The model shows three fraction bars above a number line.

Point *B* is located on the number line.

What fraction does Point *B* represent?




- The number line is divided into 3 equal sections.
- There are 3 equal fraction bars above the number line.
- The first fraction bar is the same length as the first section on the number line.
- The next fraction bar is the same length as the second section on the number line.
- The next fraction bar is the same length as the third section on the number line.

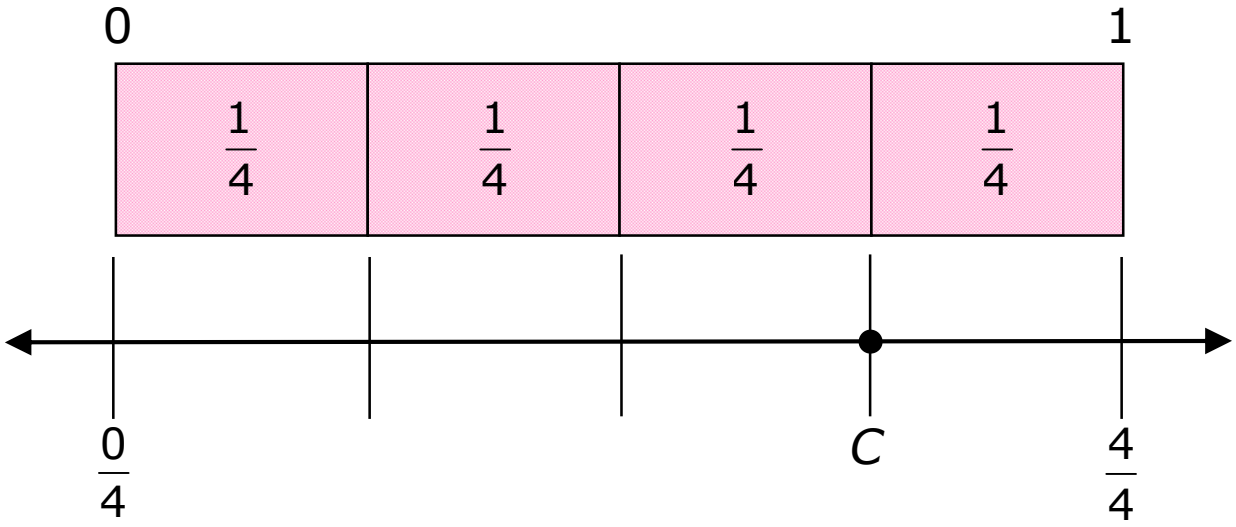



- This means that the three fraction bars are equal to 1 whole.
- This also means that the three fraction bars are equal to $\frac{3}{3}$ on the number line.
- The end of the second fraction bar marked $\frac{1}{3}$ is at the same place as the end of the second section after zero and $\frac{0}{3}$ on the number line.

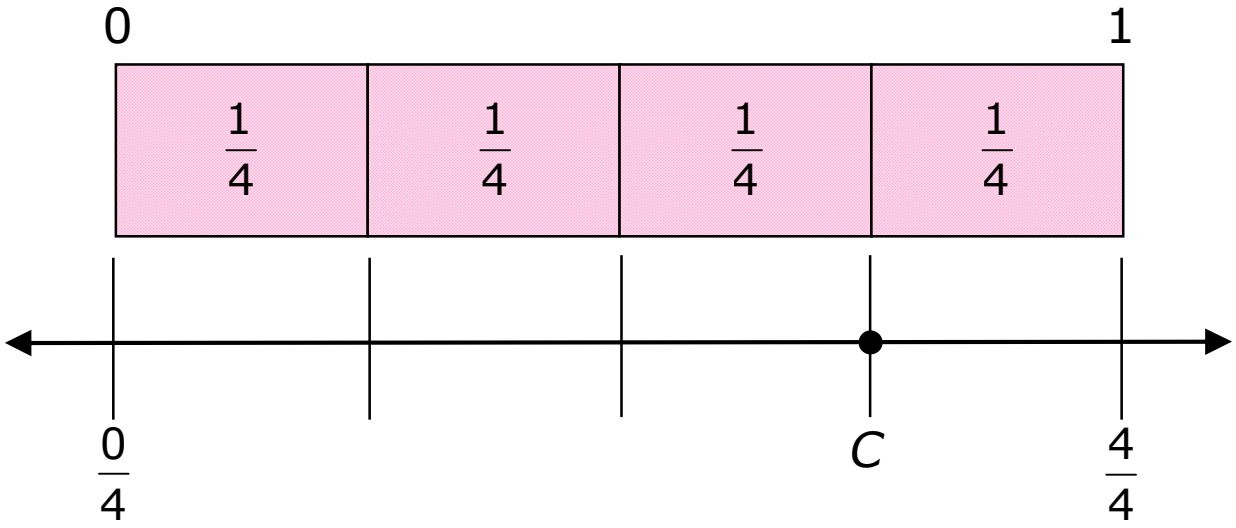
So, Point *B* represents the fraction $\frac{2}{3}$ on this number line. This means that Point *B* is located at $\frac{2}{3}$ of the distance on the number line between 0 or $\frac{0}{3}$ and 1 or $\frac{3}{3}$.

# EXAMPLE 3

The model shows four fraction bars above a number line. Point *C* is located on the number line. What fraction does Point *C* represent?




- The number line is divided into 4 equal sections.
- There are 4 equal fraction bars above the number line.
- The first fraction bar is the same length as the first section on the number line.
- The next fraction bar is the same length as the second section on the number line.
- The next fraction bar is the same length as the third section on the number line.
- The next fraction bar is the same length as the fourth section on the number line.




- This means that the four fraction bars are equal to 1 whole.
- This also means that the four fraction bars are equal to $\frac{4}{4}$ on the number line.
- The end of the third fraction bar marked $\frac{1}{4}$ is at the same place as the end of the third section after 0 and $\frac{0}{4}$ on the number line.

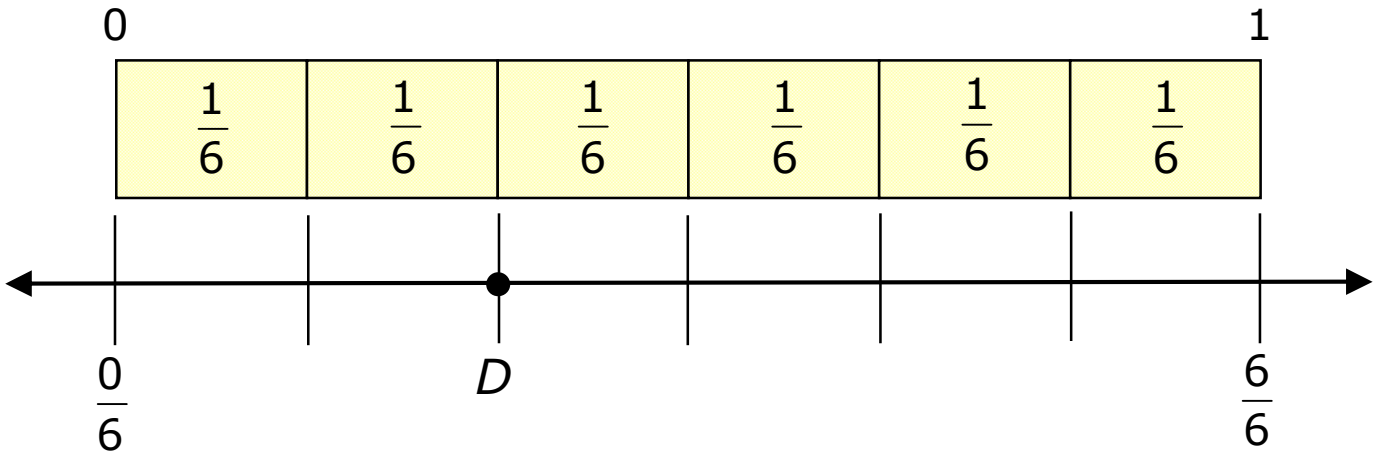
So, Point *C* represents the fraction $\frac{3}{4}$ on this number line. This means that Point *C* is located at $\frac{3}{4}$ of the distance on the number line between 0 or $\frac{0}{4}$ and 1 or $\frac{4}{4}$.

# EXAMPLE 4

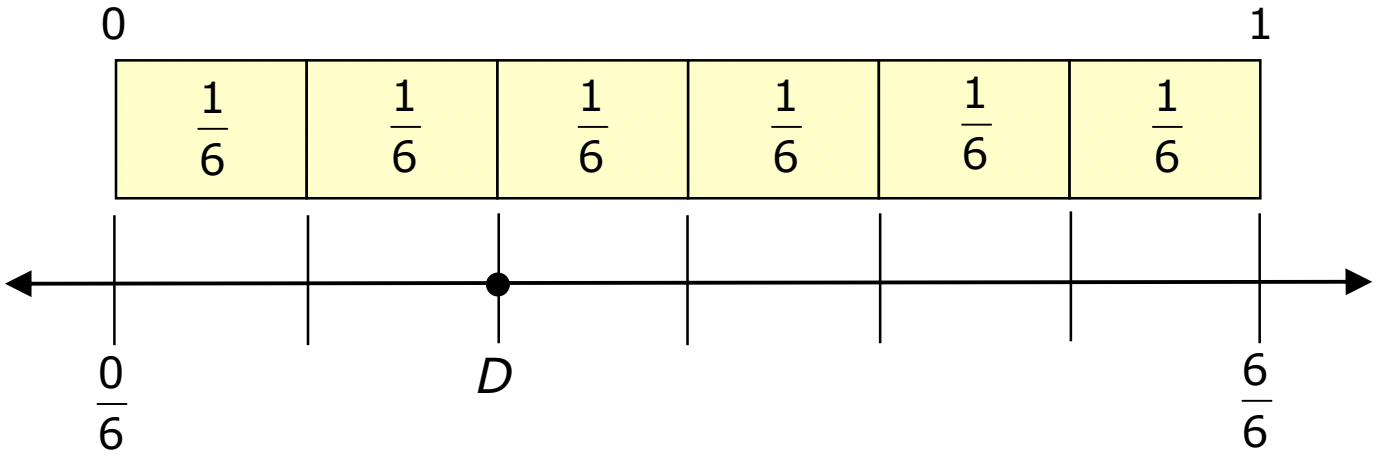
The model shows six fraction bars above a number line.

Point *D* is located on the number line.

What fraction does Point *D* represent?




- The number line is divided into 6 equal sections.
- There are 6 equal fraction bars above the number line.
- The first fraction bar is the same length as the first number line section, so the first section on the number line is $\frac{1}{6}$ of the length of the number line.




- The next fraction bar is the same length as the second number line section, so the second section is $\frac{2}{6}$ of the length of the number line.

So, Point *D* represents the fraction $\frac{2}{6}$ on this number line.

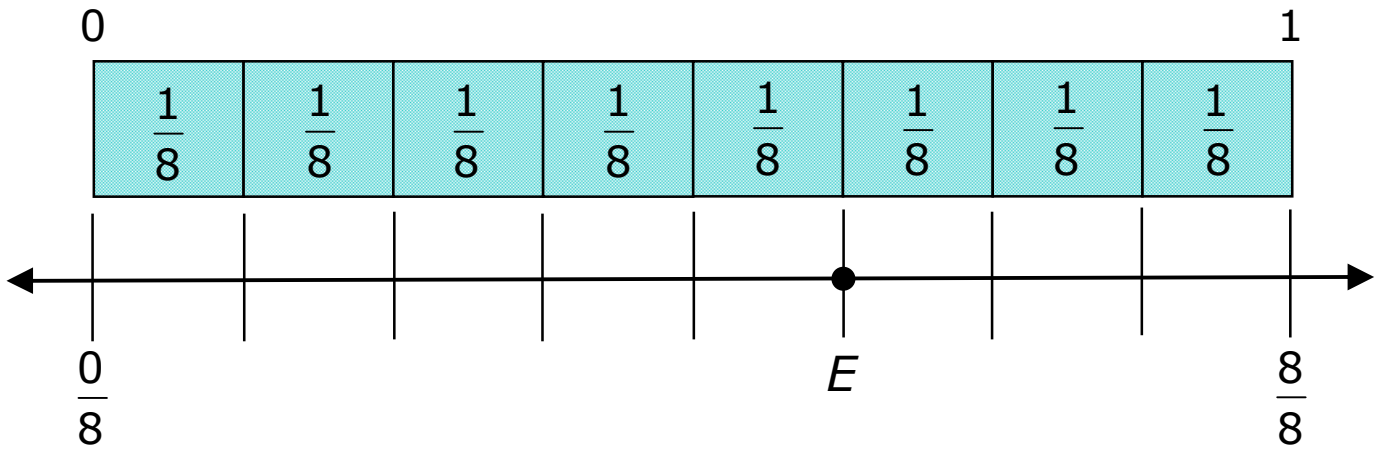
This means that Point *D* is located at $\frac{2}{6}$ of the distance on the number line between 0 or $\frac{0}{6}$ and 1 or $\frac{6}{6}$.

# EXAMPLE 5

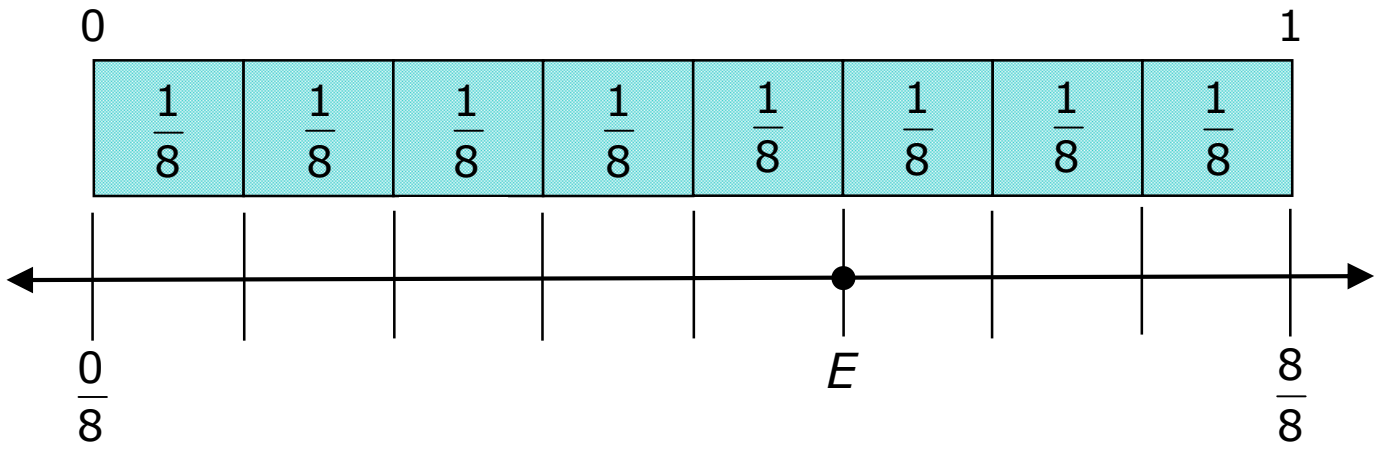
The model shows eight fraction bars above a number line.

Point *E* is located on the number line.

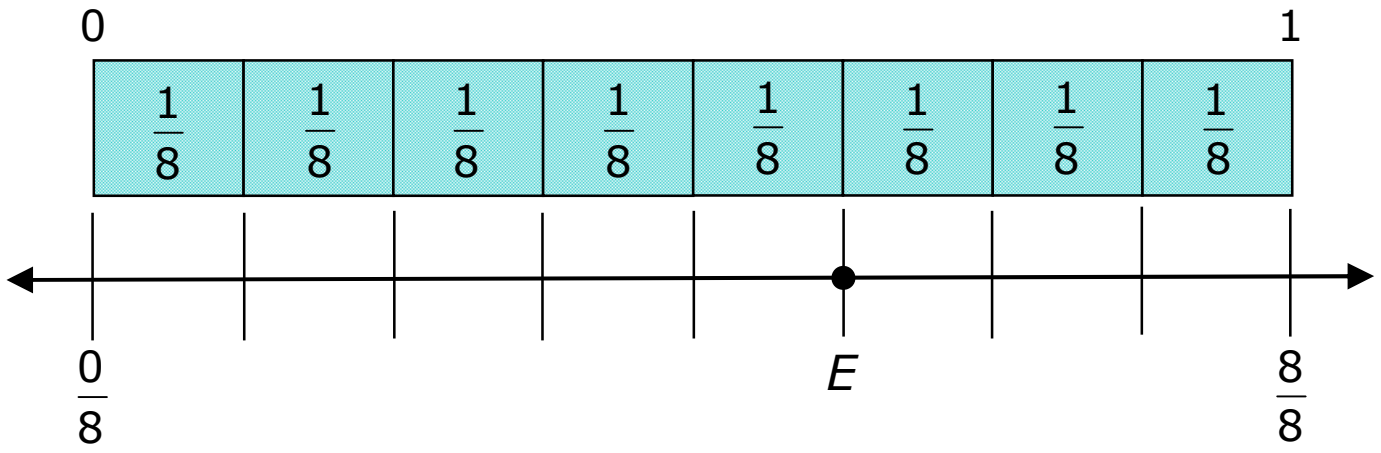
What fraction does Point *E* represent?




- The number line is divided into 8 equal sections.
- There are 8 equal fraction bars above the number line.
- The first fraction bar is the same length as the first number line section, so the first section on the number line is $\frac{1}{8}$ of the length of the number line.




- The next fraction bar is the same length as the second number line section, so the second section is $\frac{2}{8}$ of the length of the number line.
- The next fraction bar is the same length as the third number line section, so the third section is $\frac{3}{8}$ of the length of the number line.
- The next fraction bar is the same length as the fourth number line section, so the fourth section is $\frac{4}{8}$ of the length of the number line.




- The next fraction bar is the same length as the fifth number line section, so the fifth section is $\frac{5}{8}$ of the length of the number line.

So, Point *E* represents the fraction $\frac{5}{8}$ on this number line.

This means that Point *E* is located at $\frac{5}{8}$ of the distance on the number line between 0 or $\frac{0}{8}$ and 1 or $\frac{8}{8}$.

# Problem-Solving 2

The Garcia family is traveling on summer vacation to Big Bend National Park in Texas.

They will stop for gas when they are $\frac{1}{4}$ and $\frac{3}{4}$ of the way from their house to Big Bend.

Represent these distances on a number line.

**STEP 1:** Draw a blank number line.

Draw four equal fraction strips end-to-end above the line.

**STEP 2:** At the end of each fraction strip, draw a mark on the line to divide the line into four equal sections.

Each of these marks represents $\frac{1}{4}$ of the distance on the number line.

**STEP 3:** Count the fourths from zero to 1 and label the distances from zero as $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$, and $\frac{4}{4}$ .

**STEP 4:** Draw a point at $\frac{1}{4}$ to represent the distance from 0 to $\frac{1}{4}$.

Label this point *G1* to represent the first stop on the trip for gas.

**STEP 5:** Draw a point at $\frac{3}{4}$ to represent the distance from 0 to $\frac{3}{4}$.

Label this point *G2* to represent the second stop on the trip for gas.

**1.** Explain why you have represented the distances the Garcia family will stop for gas when they are $\frac{1}{4}$ of the distance from their house to Big Bend.

**2.** Explain why you have represented the distances the Garcia family will stop for gas when they are $\frac{3}{4}$ of the distance from their house to Big Bend.