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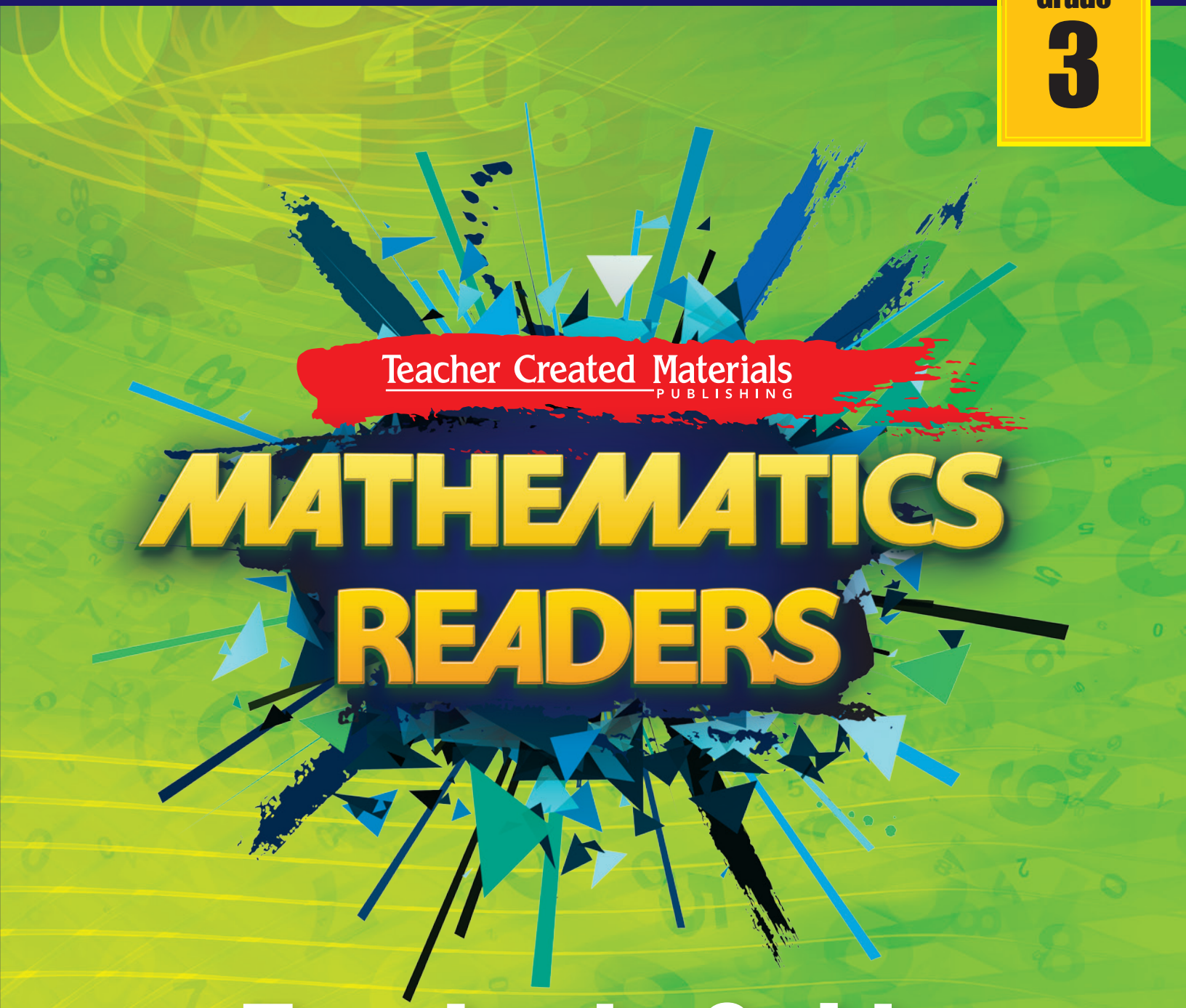
Mathematics Readers—Level 3

This sample includes the following:

To Create a World in which Children Love to Learn!

Grade 3



Teacher Created Materials PUBLISHING

MATHEMATICS READERS

Teacher's Guide

Table of Contents

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Unit 1: Operations and Algebraic Reasoning

Unit 2: Fractions

Unit 3: Measurement and Data

Unit 4: Geometry

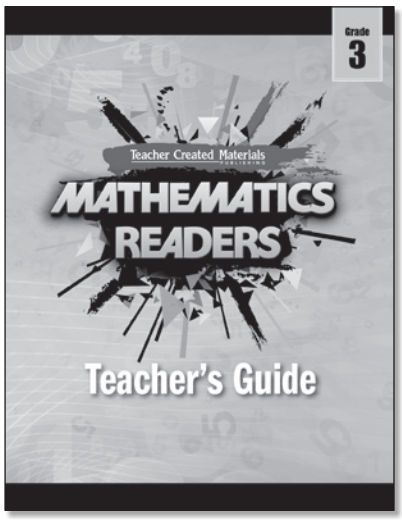
Appendix

How to Use This Product

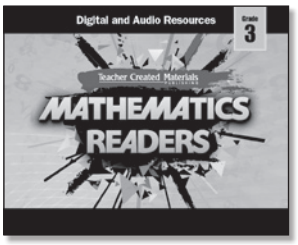
Kit Components

6 copies of 20 books

Teacher's Guide



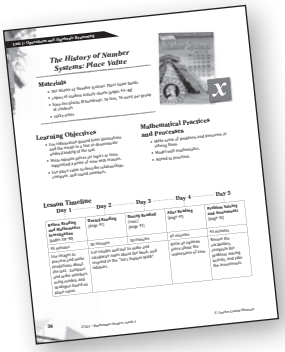
Digital and Audio Resources



How to Use This Product *(cont.)*

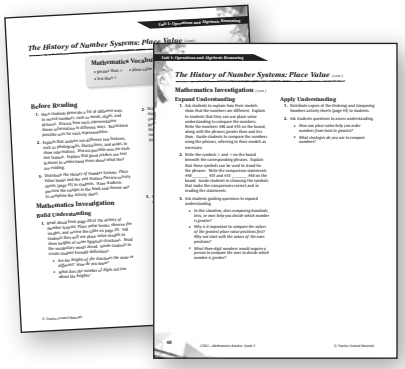
Teacher's Guide

Each five-day lesson sequence is organized in a consistent format for ease of use.



Overview

- The overview page includes learning objectives, a materials list, and a suggested timeline for the lesson.

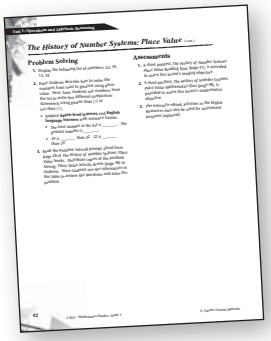


Day 1

- Students are introduced to the book and the math concept or skill.
- Students build, expand, and apply understanding of the math concept or skill with concrete, representational, and abstract activities.

Days 2, 3, and 4

- Students complete reading and writing activities, as well as the "Let's Explore Math" sidebars.



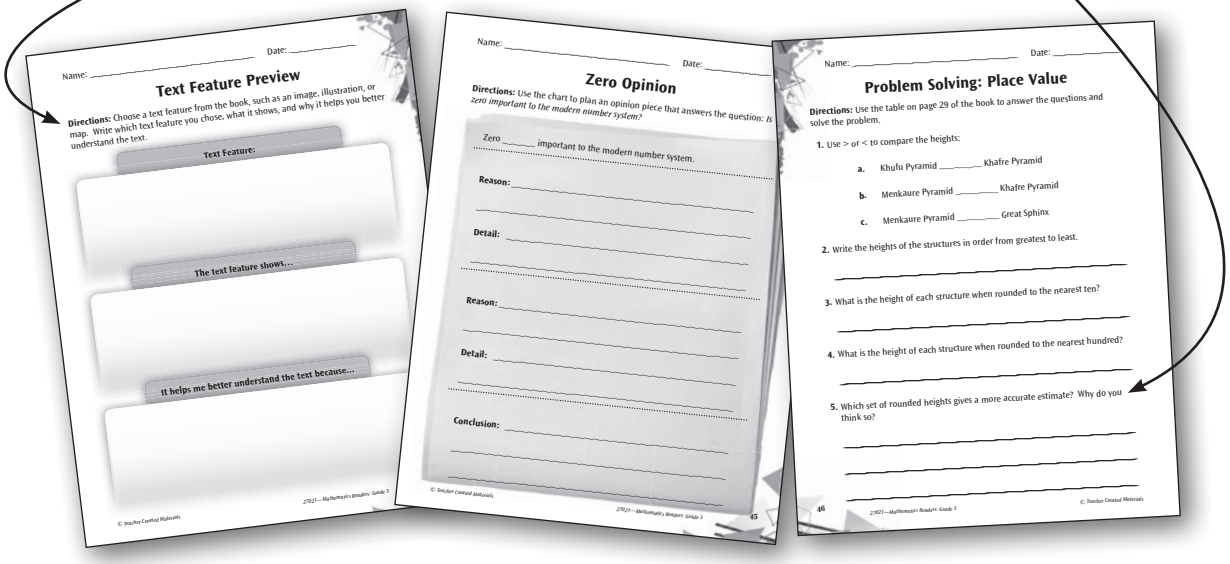
Day 5

- Students take what they've learned and apply it in context in the Problem Solving activity.
- Students take the reading and mathematics assessments.

How to Use This Product *(cont.)*

Student Activity Sheets and Assessments

clear directions and activities that promote higher-order thinking skills



Name: _____ Date: _____

Text Feature Preview

Directions: Choose a text feature from the book, such as an image, illustration, or map. Write which text feature you chose, what it shows, and why it helps you better understand the text.

Text Feature:

The text feature shows...

It helps me better understand the text because...

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27021—Mathematics Readers: Grade 3

Name: _____ Date: _____

Zero Opinion

Directions: Use the chart to plan an opinion piece that answers the question: *Is zero important to the modern number system?*

Zero _____ important to the modern number system.

Reason: _____

Detail: _____

Reason: _____

Detail: _____

Conclusion: _____

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27021—Mathematics Readers: Grade 3

45

Name: _____ Date: _____

Problem Solving: Place Value

Directions: Use the table on page 29 of the book to answer the questions and solve the problem.

1. Use > or < to compare the heights:
   - a. Khufu Pyramid _____ Khafre Pyramid
   - b. Menkaure Pyramid _____ Khafre Pyramid
   - c. Menkaure Pyramid _____ Great Sphinx
2. Write the heights of the structures in order from greatest to least.
3. What is the height of each structure when rounded to the nearest ten?
4. What is the height of each structure when rounded to the nearest hundred?
5. Which set of rounded heights gives a more accurate estimate? Why do you think so?

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27021—Mathematics Readers: Grade 3

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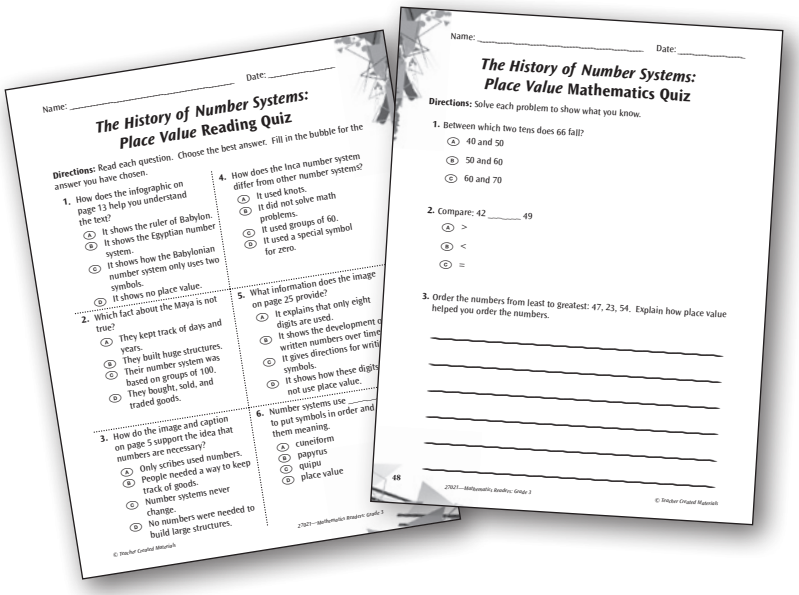
reading and math quizzes with text-dependent questions



Name: _____ Date: _____

***The History of Number Systems:* Place Value Reading Quiz**

Directions: Read each question. Choose the best answer. Fill in the bubble for the answer you have chosen.

1. How does the infographic on page 13 help you understand the text?
   - (A) It shows the ruler of Babylon.
   - (B) It shows the Egyptian number system.
   - (C) It shows how the Babylonian number system only uses two symbols.
   - (D) It shows no place value.
2. Which fact about the Maya is not true?
   - (A) They kept track of days and years.
   - (B) They built huge structures.
   - (C) Their number system was based on groups of 100.
   - (D) They bought, sold, and traded goods.
3. How do the image and caption on page 5 support the idea that numbers are necessary?
   - (A) Only scribes used numbers.
   - (B) People needed a way to keep track of goods.
   - (C) Number systems never change.
   - (D) No numbers were needed to build large structures.
4. How does the Inca number system differ from other number systems?
   - (A) It used knots.
   - (B) It did not solve math problems.
   - (C) It used groups of 60.
   - (D) It used a special symbol for zero.
5. What information does the image on page 25 provide?
   - (A) It explains that only eight digits are used.
   - (B) It shows the development of written numbers over time.
   - (C) It gives directions for writing symbols.
   - (D) It shows how these digits do not use place value.
6. Number systems use _____ to put symbols in order and them meaning.
   - (A) cuneiform
   - (B) papyrus
   - (C) quipu
   - (D) place value

27021—Mathematics Readers: Grade 3

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Name: _____ Date: _____

***The History of Number Systems:* Place Value Mathematics Quiz**

Directions: Solve each problem to show what you know.

1. Between which two tens does 66 fall?
   - (A) 40 and 50
   - (B) 50 and 60
   - (C) 60 and 70
2. Compare: 42 _____ 49
   - (A) >
   - (B) <
   - (C) =
3. Order the numbers from least to greatest: 47, 23, 54. Explain how place value helped you order the numbers.

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27021—Mathematics Readers: Grade 3

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How to Use This Product *(cont.)*

Pacing and Instructional Setting Options

The following pacing and instructional setting options show suggestions for how to use this product. *Mathematics Readers* is flexibly designed and can be used in tandem with a core curriculum within a mathematics block, literacy block, or both. Teachers should customize pacing according to student need (instruction may need to be extended over more days) and the teacher's preferred instructional frameworks, such as Guided Math or Guided Reading. This suggestion reflects one lesson per book for each of the 20 books. Each lesson spans 5 instructional days and requires 30–45 minutes, for a total of approximately 65 hours over the course of 100 days.

Day	**1**	**2**	**3**	**4**	**5**
Activity	Before Reading and Mathematics Investigation	During Reading	During Reading *(cont.)*	After Reading	Problem Solving and Assessments
Instructional Time	45 minutes	30 minutes	30 minutes	45 minutes	45 minutes

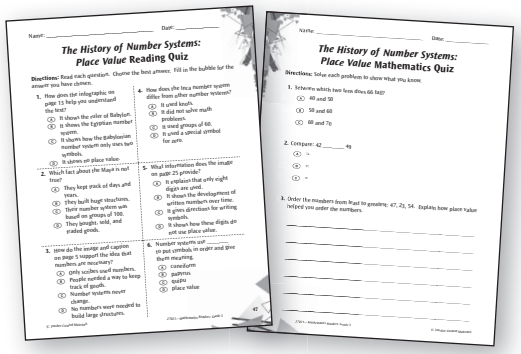
***Mathematics Readers* within the Guided Math and Balanced Literacy Frameworks**
Classroom Environment of Numeracy and Literacy—The books in *Mathematics Readers* contribute to an environment of numeracy and literacy by immersing students in real-world connections to mathematics and by giving students the opportunity to learn outside of content-area silos.
Whole-Class Instruction—The Before Reading activity in each *Mathematics Readers* lesson is a great opportunity to activate students' prior knowledge and capture their interest in a topic.
Small-Group Instruction—The lessons in *Mathematics Readers* offer flexibility that allows students to complete Before Reading, Mathematics Investigation, During Reading, and After Reading activities in small groups or any other preferred instructional setting, depending on student need. These activities have differentiation suggestions and targeted objectives, and give students time to work with manipulatives and models.
Workshop—The During Reading, After Reading, and Problem Solving activities in each *Mathematics Readers* lesson can be completed during Math or Reading Workshop, in centers or at workstations, depending on students' previous learning experiences and their need for teacher support.
Conferencing—The Problem Solving activity and assessments in each *Mathematics Readers* lesson offer multiple opportunities for teachers and students to confer about concepts and ideas.
Assessment—*Mathematics Readers* offers multiple formative and summative assessment opportunities. Teachers can gain insight into student learning through reading and mathematics quizzes, small-group observations, analysis of written assignments, and a culminating activity.

How to Use This Product *(cont.)*

Assessment

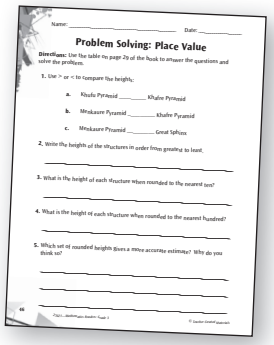
Mathematics Readers offers multiple assessment opportunities. You can gain insight into student learning through reading and mathematics quizzes, small-group observations, analysis of written assignments, and a culminating activity. These formal and informal assessments provide you with the data needed to make informed decisions about what to teach and how to teach it. This is the best way for you to know who is struggling with various concepts and how to address difficulties that students are experiencing with the curriculum.

Mathematics and Reading quizzes—At the end of each lesson in this Teacher's Guide are two quizzes—one to assess the reading objective and one to assess the mathematics objective. These short assessments include text-dependent questions and may be used as open-book evaluations.



Mathematics and Reading Quizzes

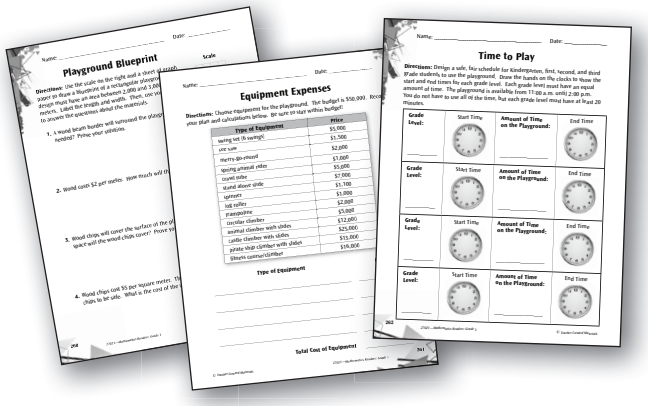
Problem Solving activity—Each lesson includes a multistep problem solving activity that can be used to assess understanding of the mathematical concepts or skills.



Problem Solving Activity

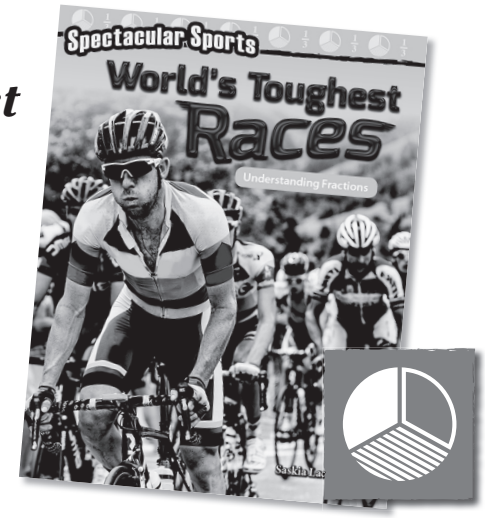
Culminating activity—The culminating activity asks students to apply what they have learned throughout the units in an engaging and interactive way. Students use what they have learned to create new ideas in a real-life context.

Progress monitoring—There are several points throughout each lesson when useful evaluations can be made. These evaluations can be made based on group, paired, and individual discussions and activities.



Culminating Activity

Spectacular Sports: World's Toughest Races: Understanding Fractions



Materials

- *Spectacular Sports: World's Toughest Races: Understanding Fractions* books
- copies of student activity sheets (pages 131–136)
- sentence strips (one per student)
- newspaper article about a race, if available

Learning Objectives

- Use information gained from illustrations and the words in a text to demonstrate understanding of the text.
- Write informative/explanatory texts in which students introduce a topic, use facts and definitions to develop points, and provide a concluding statement or section.
- Understand fractions as quantities formed by equal parts of a whole that can be represented as distances from zero on a number line.

Mathematical Practices and Processes

- Make sense of problems and persevere in solving them.
- Model with mathematics.
- Attend to precision.

Lesson Timeline

Day 1 ····· Day 2 ····· Day 3 ····· Day 4 ····· Day 5

Before Reading and Mathematics Investigation (pages 127–128)	**During Reading** (page 129)	**During Reading** *(cont.)* (page 129)	**After Reading** (page 129)	**Problem Solving and Assessments** (page 130)
45 minutes	30 minutes	30 minutes	45 minutes	45 minutes
Use text features to preview and make predictions about the text. Partition strips and number lines to show equal parts, and solve problems using these models.	Identify text features and math models, explain how they enhance understanding, and respond to the "Let's Explore Math" sidebars.		Write a newspaper article about a race.	Review the vocabulary, complete the problem solving activity, and take the assessments.

Spectacular Sports: World's Toughest Races: Understanding Fractions *(cont.)*

Mathematics Vocabulary

- equal parts
- fraction
- whole

Before Reading

1. Ask students whether they have ever competed in a race. Generate a list of races, such as running, biking, and swimming. Brainstorm challenges participants might have to overcome for each race.
2. Explain that good readers use text features to overcome the challenges of understanding a text. Explain that sidebars, captions, and diagrams are all helpful text features.
3. Distribute the *Spectacular Sports: World's Toughest Races: Understanding Fractions* books to students. Have students use text features to preview the book and predict challenges that athletes might face during each race.
4. Have students predict the mathematics that might be related to the topic based on one text feature from the book.

Mathematics Investigation

Build Understanding

1. Read aloud from page 28 of the *Spectacular Sports: World's Toughest Races: Understanding Fractions* books. Ask students to imagine that Taj and three of his friends don't want to race the entire course length just yet. To train, they'll do a relay—they'll each complete a section of the course. Read the vocabulary words aloud. Guide students to create student-friendly definitions.
   - *What's the fairest way to compete in a relay?*
   - *What makes one part of the whole course equal to another part of the whole course?*
   - *What is a math word that describes parts of a whole?*
2. Distribute sentence strips to students. Explain that each strip represents one whole length of the course. Ask students how they can use the strips to show the parts of the race that Taj and his three friends will complete.
   - Have **above-level learners** use additional strips with differing lengths to show how the equal-sized parts of the course change as the course length is increased or decreased.
   - Confirm that **below-level learners** and **English language learners** have not misinterpreted "Taj and his three friends" as a total of three people.
3. Ask students guiding questions to build understanding.
   - *How many equal parts are in the whole?*
   - *How might folding the strip help?*
   - *If more friends want to join the relay, what happens to the size of the parts?*

Spectacular Sports: World's Toughest Races: Understanding Fractions *(cont.)*

Mathematics Investigation *(cont.)*

Expand Understanding

1. Ask students to explain how their strips show where one athlete stops running and the next athlete begins. Explain to students that they can use fractions to label the distance from the beginning of the strip to each point.
2. Ask students to use fractions to identify the distance from the beginning of the strip that each starting point/endpoint represents. Have students label the strips. Have them practice saying the fractions aloud ($\frac{0}{4}$, $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$, $\frac{4}{4}$).
3. Ask students guiding questions to expand understanding.
   - *What number in the fraction tells the number of parts in the whole?*
   - *What number in the fraction tells how far an athlete is from 0?*
   - *How is the whole course length shown as a fraction?*
   - *What did you label the halfway point?*
   - *What fraction of the relay does each athlete complete?*

Apply Understanding

1. Distribute copies of the *Finding the Finish Line* activity sheets (page 131) to students. Explain that each number line represents one whole course length. Point out that only 0 and 1 are given.
2. Have students partition the number lines according to the designated number of athletes. Then, have students label each point as a distance from 0 using fractions.
3. Ask students questions to assess understanding.
   - *How many equal parts must the number line have? How do you know?*
   - *How are you checking to make sure the parts are all the same size?*
   - *Would it help to find where half would be located on any of the number lines?*
   - *What other fractions can you plot that might help?*

Spectacular Sports: World's Toughest Races: Understanding Fractions *(cont.)*

During Reading

1. Distribute the *Spectacular Sports: World's Toughest Races: Understanding Fractions* books to students. As a group, read pages 6–7. Discuss how the photographs, captions, maps, and other text features provide additional information or help readers better understand the text.
    - You may choose to display the Interactiv-eBook for a more digitally enhanced reading experience.
    - For **below-level learners** and **English language learners**, you may choose to play the audio recording as students follow along to serve as a model of fluent reading. This may be done in small groups or at a listening station to help struggling readers practice fluency and build comprehension.
2. Distribute copies of the *Understanding Text Features* activity sheets (page 132) to students. Have students complete the activity sheets as they read, identifying text features that helped them better understand the text. Have students describe one math model that helps them better understand the problem.
3. Have the class compare and contrast text features they found. Discuss important text features that students may not have identified. Discuss how the identified math models help problem solvers visualize the math situation.
    - Have **above-level learners** create their own text features that would help readers better understand the text and write a math problem with a model to accompany their text features.
4. Have students complete the "Let's Explore Math" sidebars as they read the book. Or, you may choose to have them revisit the text a second time to complete the sidebars. Review student responses as a class.

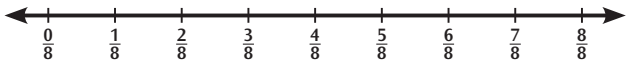
After Reading

1. Distribute the *Spectacular Sports: World's Toughest Races: Understanding Fractions* books to students. Ask students to discuss how the races might be described differently in a newspaper article for the sports section rather than the book. For example, a newspaper article might mention the names of front-runners, describe the challenges more in-depth, include numbers to describe distances and times, or include quotations from participants. If available, read a newspaper article about a local race.
2. Explain to students that they will write a sports section newspaper article about one of the races from the book. Distribute copies of the *Racing News* activity sheets (page 133) to students. Have students use the activity sheets to brainstorm ideas for their articles. Remind them that newspaper articles begin with a hook to grab the reader's attention and end with an interesting conclusion. You may choose to have students publish their articles using a newspaper generator app.

Spectacular Sports: World's Toughest Races: Understanding Fractions *(cont.)*

Problem Solving

1. Display a number line similar to the one below.



2. Have students describe the number line to partners using the terms *fraction*, *equal parts*, and *whole*.
   - Support **below-level learners** and **English language learners** with sentence frames.
     - *The number line is organized into _____ equal parts.*
     - *_____ is a fraction of the whole because _____.*
3. Read the Problem Solving prompt aloud from page 28 of the *Spectacular Sports: World's Toughest Races: Understanding Fractions* books. Distribute copies of the *Problem Solving: Understanding Fractions* activity sheets (page 134) to students. Have students use the workspace to solve the problem.

Assessments

1. A short posttest, *Spectacular Sports: World's Toughest Races: Understanding Fractions* Reading Quiz (page 135), is provided to assess this lesson's reading objective.
2. A short posttest, *Spectacular Sports: World's Toughest Races: Understanding Fractions* Mathematics Quiz (page 136), is provided to assess this lesson's mathematics objective.
3. The Interactiv-eBook activities in the Digital Resources may also be used for assessment purposes (optional).

Name: _____ Date: _____

Finding the Finish Line

Directions: Taj and his friends completed three relays. Four kids were in the first relay, two in the second, and eight in the third. Mark the number lines to show the equal parts of the relay that each kid completed. Then, use fractions to label each point's distance from 0.

Relay 1

0 1

Relay 2

0 1

Relay 3

0 1

1. How did you know where to mark the equal parts of each relay?

_____

_____

2. Which relay would you want to compete in? Why?

_____

_____

Name: _____ Date: _____

Understanding Text Features

Directions: Find and list three text features and one math model from the book. Write how each text feature helps a reader better understand the text. Describe how the math model helps a problem solver better understand the math situation.

Page	Text Feature	How It Helps You
Page	**Math Model**	**How It Helps You**

Name: _____ Date: _____

Racing News

Directions: Plan a newspaper article about one of the races from the book using the chart below. Then, write your article on a separate sheet of paper.

Headline

"Hook" for Introduction

Details (Where, when, why, and how does the race take place?)

A Direct Quote (Who has something interesting to say about the race?)

Text Feature (What caption, map, or other diagram will help the reader better understand the text?)

By the Numbers (What math, measurements, or fractions will help the reader have a better picture of the race?)

Conclusion

Name: _____ Date: _____

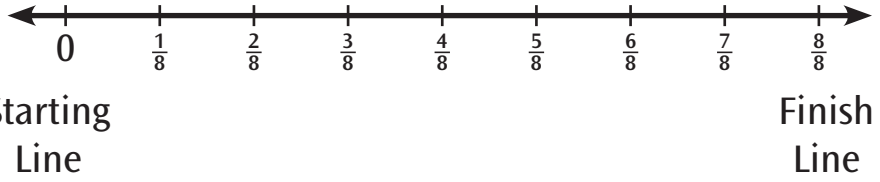
Problem Solving: Understanding Fractions

Directions: Use the clues to plot Taj and his friends at their current points in the race on the number line. Then, answer the questions. Use the workspace to plan, solve, and explain your thinking.

Clues

- Taj is at the $\frac{4}{8}$ marker.
- Ada is $\frac{6}{8}$ of the way from the finish line.
- Sean is at the $\frac{1}{8}$ marker.
- Dora is $\frac{6}{8}$ of the way to the finish line.
- Jen is $\frac{3}{8}$ of the way to the finish line.
- Ben is $\frac{1}{8}$ of the way from the finish line.

1 km Course



1. Who is closer to the $\frac{4}{8}$ marker on the course: Dora or Jen?

_____

2. Is Ben closer to the $\frac{4}{8}$ marker or the finish line? How do you know?

_____

_____

Name: _____ Date: _____

Spectacular Sports: World's Toughest Races: Understanding Fractions Reading Quiz

Directions: Read each question. Choose the best answer. Fill in the bubble for the answer you have chosen.

1. What condition makes the Badwater 135 a brutal race?

- (A) extreme cold
- (B) heavy rain
- (C) intense heat
- (D) light winds

2. What information does the caption on page 17 give to the reader?

- (A) The San Francisco Ultramarathon is long.
- (B) Part of the San Francisco Ultramarathon is run overnight.
- (C) People watch racers from the sidewalk.
- (D) The course has a lot of steep hills.

3. The Antarctica Marathon is described as "a standard marathon." What does this mean?

- (A) The course is a little over 26 miles (42 kilometers) long.
- (B) It is run in freezing cold temperatures and biting winds.
- (C) Racers have to bring a crew along to help them.
- (D) The course has obstacles.

4. What does *3100* mean in the Self-Transcendence 3100 Race?

- (A) There are 3,100 racers.
- (B) It takes 3,100 days to finish.
- (C) The race is 3,100 miles long.
- (D) Racers go around 3,100 city blocks.

5. How do the photographs on pages 14–15 help a reader better understand the Patagonian Expedition Race?

- (A) They show that racers compete by themselves.
- (B) They picture the most recent winners.
- (C) They display the exact route of the course.
- (D) They show that biking and kayaking take place during the race.

6. Even though many athletes in these tough races feel pain and fatigue in challenging conditions, they _____.

- (A) quit
- (B) endure
- (C) run
- (D) work together

Name: _____ Date: _____

Spectacular Sports: World's Toughest Races: Understanding Fractions Mathematics Quiz

Directions: Solve each problem to show what you know.

1. Which fraction is closest to $\frac{1}{2}$?

(A) $\frac{1}{8}$

(B) $\frac{3}{8}$

(C) $\frac{7}{8}$

2. Which number line shows fourths?

(A)

(B)

(C)

3. If the wholes are the same size, which parts are larger: thirds or sixths? Explain your reasoning.

_____

_____

_____

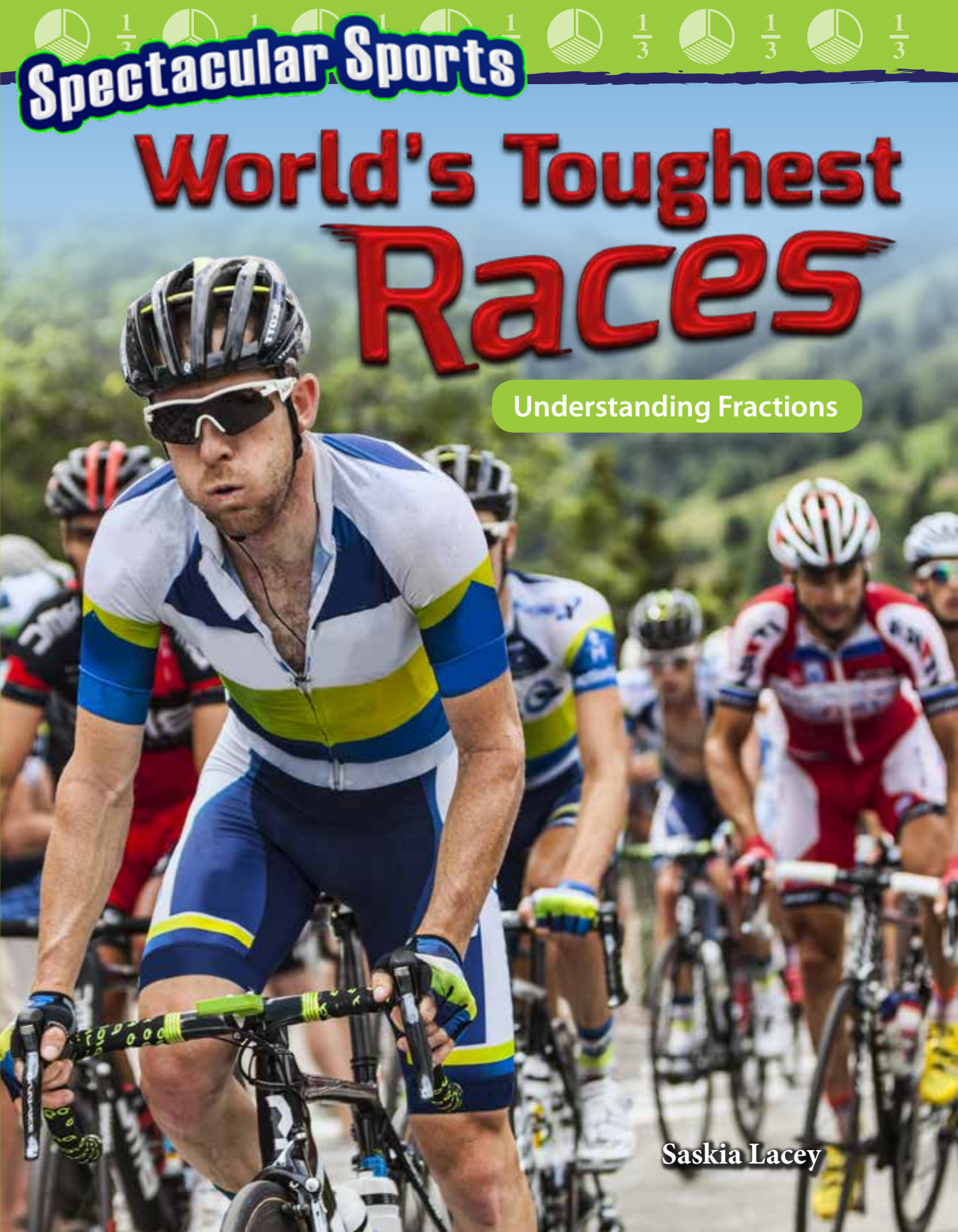
_____

_____

Spectacular Sports

World's Toughest Races

Understanding Fractions



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References Cited: Gray, Will. 2012. "Interview with Nick Gracie of Team Adidas TERREX/Prunesco." SleepMonsters Ltd. http://www.sleepmonsters.com/v2_races.php?article_id=7503
McIntosh, Amanda. 2011. "Lessons Learned at Badwater." Badwater University. http://www.badwater.com/university/lessons-learned-at-badwater/
Windsor, Richard. 2016. "Chris Froome: 'Before counts for nothing. I'm hungrier than ever for success.'" Cycling Weekly. http://www.cyclingweekly.co.uk/news/racing/tour-de-france/chris-froome-counts-nothing-im-hungrier-ever-success-234616

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Table of Contents

Built to Be Brutal

The world of racing is changing. Courses are longer. Their settings are more extreme. Obstacles are stranger and more dangerous. Athletes want to try things that seem impossible. They want a chance to prove their strength.

So, races are created. Obstacles are built. Incredible courses are designed to test the strongest of the strong. Athletes train hard. They need to be ready for icy **terrains**, desert winds, and steep climbs. They must have superhuman endurance.

These races are built to be **brutal**. They are not for everyday athletes. Only serious competitors need apply. You may have heard of some of these races, but you probably don't know them all. Have you ever heard of the Antarctica Marathon? What about the Jungle Marathon? Does the Tough Mudder® ring any bells? Each has its own difficulties. All are super tough. Which is the toughest? You be the judge.

Contestants compete in the Beaver Run, Lithuania's version of the Tough Mudder obstacle course.

Athletes make their way through the Antarctica Marathon course.

Tough Around the World

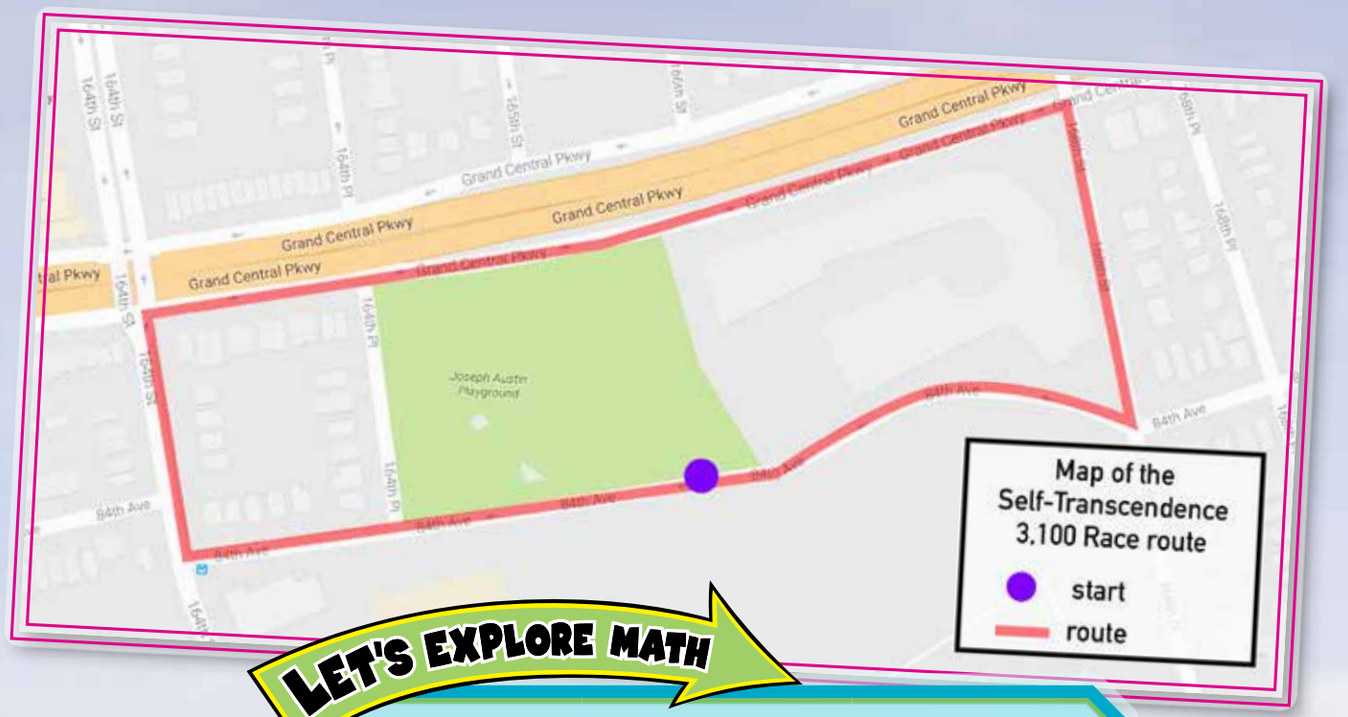
The first course seems simple. Racers do not face weird hurdles. There are no wild locations. The weather is not extreme. In this race, there is just one city block. Easy, right? Well…maybe not.

The Self-**Transcendence** (tran-SEN-dents) 3100 Race takes place every year in Queens, New York. The race is 3,100 miles (5,000 kilometers) long. That is like running all the way across the United States! And, there is one more challenge. Runners have to finish the race within 52 days. Athletes must run almost 60 mi. (100 km) a day to finish on time.

It may seem impossible. But, the athletes who finish have a lot to brag about. It is the longest footrace in the world!

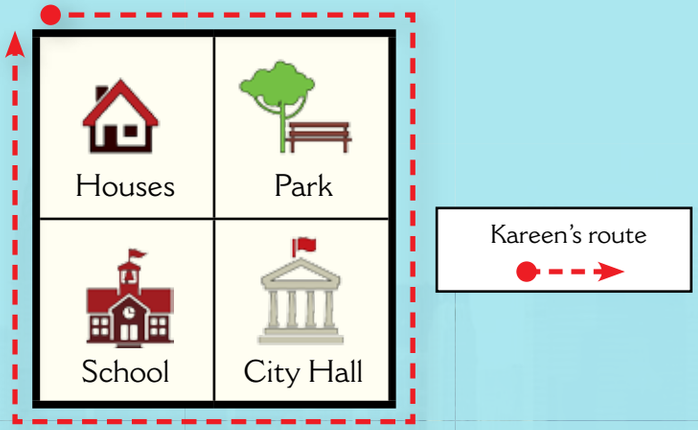
Many runners don't want to just finish the race. They want to beat the record. In 2015, the winner finished in just 40 days, 9 hours. He had to run a little over 76 mi. (122 km) each day.

Ashprihanal Aalto set the record in 2015.



LET'S EXPLORE MATH

Kareen takes a walk around her block every day. Her city block looks like this:



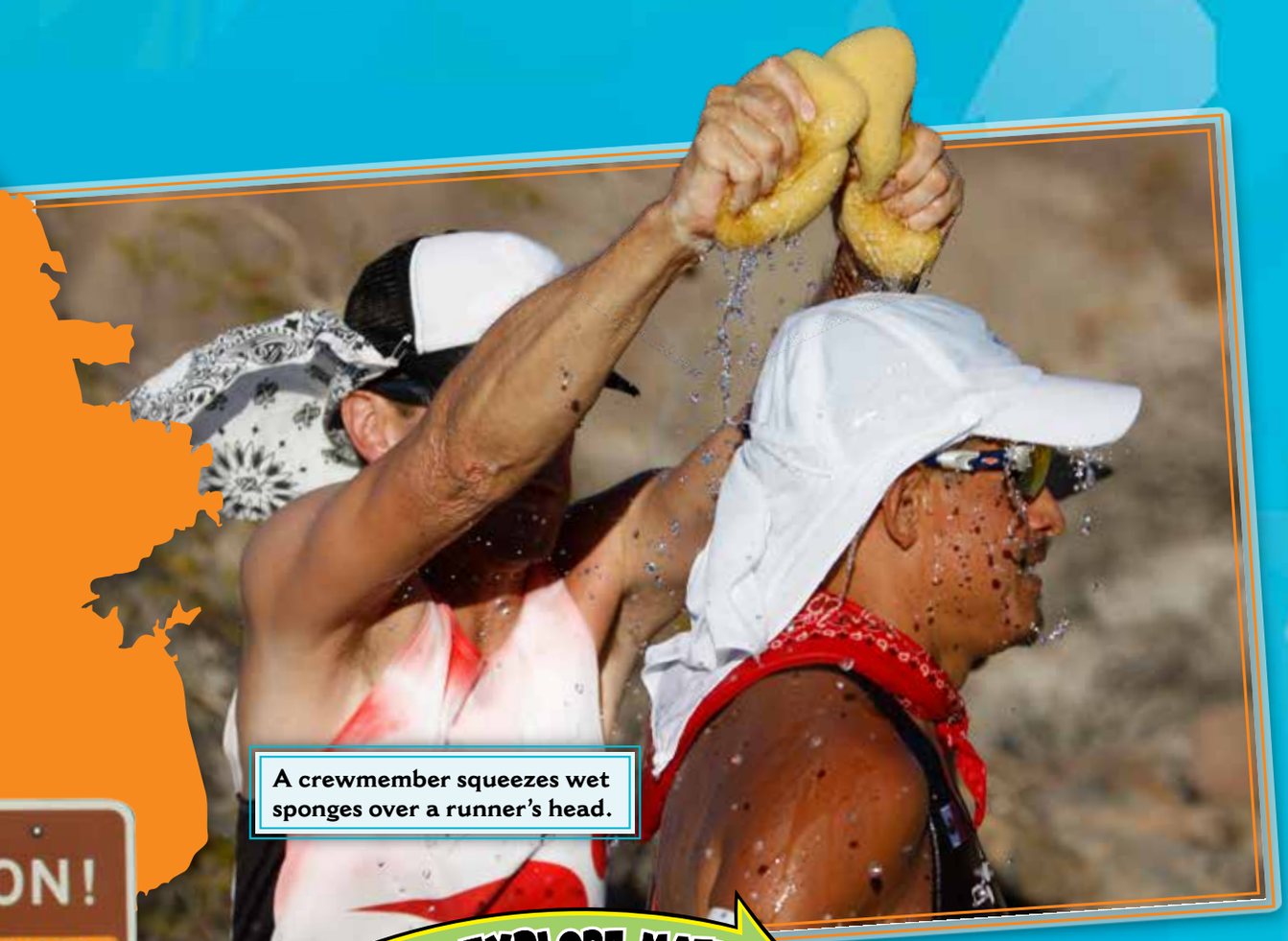
1. How many **parts** make up Kareen's **whole** block?
2. What do you notice about the size of each part of the block?
3. What **fraction** of the block is City Hall?

Badwater® 135

The Badwater 135 is not an easy race. Runners travel 135 mi. (217 km) through the Death Valley desert in July. If you're thinking about running, then be sure to bring plenty of water! Death Valley lives up to its name. It is the hottest place on Earth. To make it to the finish line, racers have crews that help them stay calm and cool. The crews follow the runners as they race. They make sure runners keep going. They also help keep them safe.

One crewmember, Amanda McIntosh, was worried about the heat. "When I stepped out of the van, it was like jumping into an oven." But by the end of the race, Amanda was almost a **convert**. "While I still **contend** that this is not a race for me…I now understand the **allure** of Badwater." The racers impressed her. She was amazed by how they pushed past the intense heat.

Runners try to stay cool in the extreme heat.



A crewmember squeezes wet sponges over a runner's head.

LET'S EXPLORE MATH

Crewmembers at the Badwater 135 carry extra bottles of water and ice to hand to the runners. The water that is left in one runner's bottle is shaded on the model.

1. Does the water bottle have more or less than half remaining?
2. What fraction of the water in the bottle does the runner have left?
3. What fraction of the water in the bottle did the runner already drink?

Josie Benson competes in the 2014 Jungle Marathon and places first among female competitors.

Marathon through the Amazon

The Jungle Marathon is one of the toughest races in the world. It takes place in the Amazon jungle. It is hot, humid, and very dangerous. Runners have to **endure** temperatures over 100 degrees Fahrenheit (40 degrees Celsius). So, don't try this race if you are scared to sweat!

It's not just heat that makes this race tough. The course is over 150 mi. (240 km) long. Athletes must survive in the wild. They must build shelters and live off the land. They have to be ready and aware at all times. Danger lurks in every corner. There is plenty to be wary of in the jungle. There are big predators. Anacondas and jaguars lurk in the jungle. There are insects that bite and sting. Creatures like tarantulas crawl underfoot.

This race may not be easy, but the payoff is huge. Runners are not just in it for a medal. They also want to experience the untamed beauty of the Amazon.

pink-toed tarantula

jaguar

Antarctica Marathon

If the Jungle Marathon sounds too hot for you, you may want to check out the Antarctica Marathon. Biting winds hit runners along the way. **Subzero** temperatures are common. But, runners prepare for this. After all, it is in Antarctica—the coldest place on Earth!

This icy race is a standard marathon—a little over 26 mi. (42 km). But, this race is anything but standard. It takes great skill to be able to run through the freezing cold.

Winter Vinecki is one of those skilled racers. When she was just 14 years old, she ran the Antarctica Marathon. She finished the race in less than 5 hours. This is a big deal for any age!

But Winter did not stop there. She set a goal to run a marathon on every continent. And she did! Winter was the youngest racer to do this.

A pack of runners start their adventure on the Antarctica Marathon.

Winter Vinecki

A French team suits up for this adventure in endurance.

The M.O.B. (Mind Over Body) team from Canada takes on the mountain biking portion of the race.

Patagonian Expedition Race

The Patagonian (pa-tuh-GOH-nyuhn) Expedition Race is famous for its beauty. There are mountains and plains. There are glaciers and deserts. You name it, this race has it! Athletes on the course feel lucky. Not many people get to see the wonders of this area up close.

Training for this race can be like a guessing game. Each year, the course changes. Athletes are never sure what will be around the corner. But, they *can* be sure that their bodies will be pushed. Teams of four must work together to climb, run, bike, and kayak to the finish line.

The route is revealed 24 hours before the race begins. Athletes must be able to think on their feet. Every decision is a way to get ahead or fall behind.

One of the course's greatest athletes is Nick Gracie. His team has won four times! Gracie says that when people ask him where they should travel, his answer is always the same: Chilean Patagonia. Gracie says, "It's the most beautiful place I've ever been on the planet."

The U.S. team kayaks through southern Chilean Patagonia.

Fierce Frisco

The San Francisco Ultramarathon® is a little over 52 mi. (84 km) long. That is the length of two marathons! Athletes start racing at midnight and keep running through the next day. The course is not easy. San Francisco has tough terrain. There are many steep hills. Even the strongest athletes are nervous to run the race.

To qualify as a finisher, athletes must run the nighttime part of the race in five hours or less. Then, they have to run the daytime part of the race in six hours or less. This is part of the reason why so many of the runners keep running through their **fatigue**. One more step feels like one too many. But, they keep going because it is an honor to run the course.

The race is limited to only 100 of the best athletes. Each of these runners competes for a cause. By racing, they will raise money for the charity of their choice. Their legs will get weak. Their lungs will burn. But these ultra-athletes keep fighting their way to the finish line.

Ultramarathon runners start the race before dawn.

Let's Explore Math

Enzo is running a mile on a course.

1 Mile

1. Enzo started at 0 on the course. What fraction of a mile has Enzo already run?
2. What fraction of a mile does Enzo still need to run if he wants to run a whole mile?

Outrageous Obstacle Courses

Ready, set, groan! The toughest athletes know how to push through the pain. When they are tired, they keep moving. When they fall, they get back up. Great athletes thrive in crazy conditions.

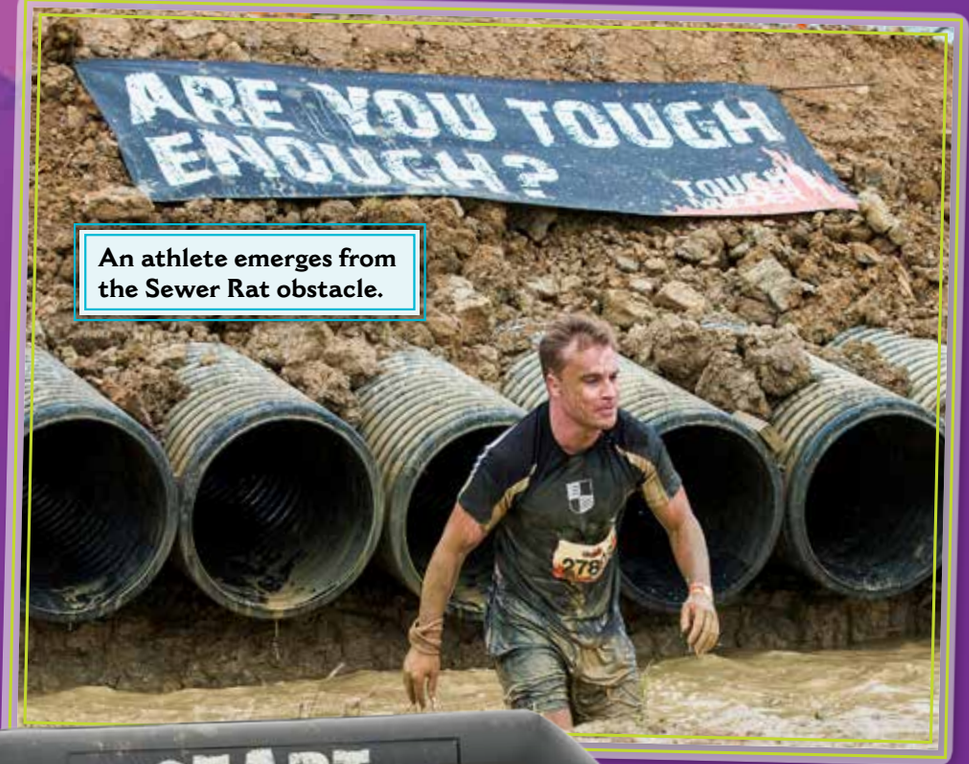
The Tough Mudder is a perfect example. This obstacle course has many different parts. Each obstacle has a silly name. There is the Funky Monkey® 2.0, the Cage Crawl®, and the Block Ness Monster. But trying these events is *anything* but funny. One obstacle has athletes run through a field filled with hanging **live wires**! Raise your hand if getting zapped by 10,000 volts sounds like a good time? Anyone?

Tough Mudder athletes try to reach the bell without falling into the water.

LET'S EXPLORE MATH

Elise is planning an obstacle course in the circular field next to her school. Even though the course won't be as extreme as the Tough Mudder, it is sure to be fun for her and her friends!

1. How many parts make up the whole obstacle course?
2. What do you notice about the size of each part of the obstacle course?
3. What fraction of the obstacle course is being used for hopscotch?

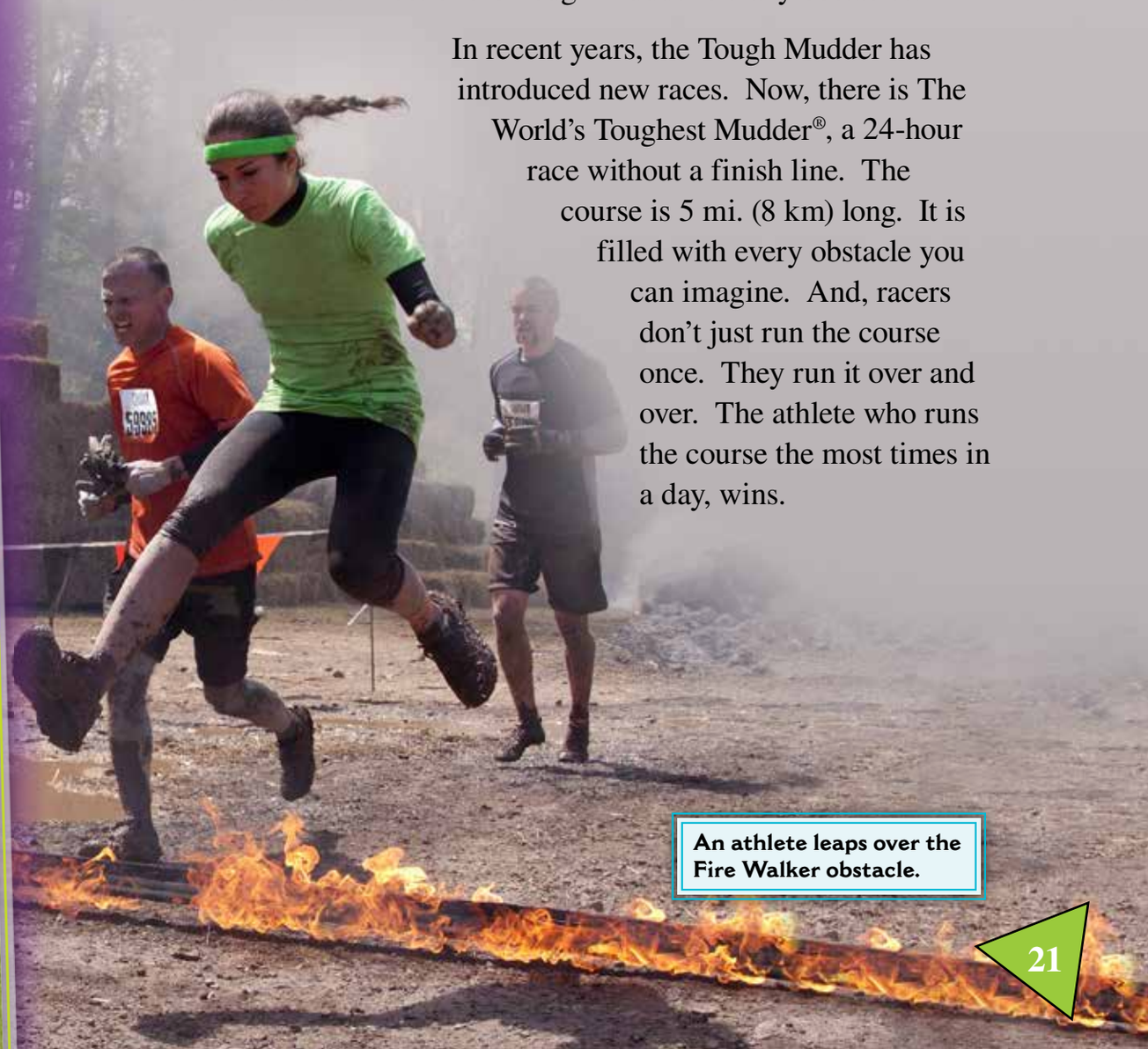


An athlete emerges from the Sewer Rat obstacle.

With a puff of orange smoke, runners set out to conquer the Tough Mudder.

But live wires are just one of the Tough Mudder's terrors. There are also obstacles with extreme temperatures. One features a dumpster filled with freezing water. Wading through pounds of ice is a teeth-chattering task. Some athletes choose to test the waters before they jump in—big mistake. The only way to make it through this ice-cold challenge is to take the plunge. The same can be said for most of the Tough Mudder's crazy obstacles.

In recent years, the Tough Mudder has introduced new races. Now, there is The World's Toughest Mudder®, a 24-hour race without a finish line. The course is 5 mi. (8 km) long. It is filled with every obstacle you can imagine. And, racers don't just run the course once. They run it over and over. The athlete who runs the course the most times in a day, wins.



An athlete leaps over the Fire Walker obstacle.

Bike Across Borders

Some athletes prefer to race on two wheels rather than on two feet. Every year, some of the world's best cyclists put their pedals to the test and compete in Race Across America. The course goes from California to Maryland. Cyclists may compete alone or in teams. Most cycling contests have scheduled rest days. But, Race Across America does not. This makes it harder to compete alone. Cyclists on teams can spend less time riding and more time resting. This is helpful as they bike from coast to coast.

But, the distance is not the only challenge. Athletes must complete the race in just 12 days. That means they must ride about 250 mi. (400 km) every day. That is some serious mileage! Most people don't even like to drive that far in a day. Imagine what it must be like on a bike!

The best cyclists only rest for about 90 minutes each day. The rest of the time they ride. How is this possible? Perhaps only Race Across America cyclists will ever know!

A support crew vehicle follows a racer.

Cyclists start the race in Oceanside, California.

Le Tour de France®

Le Tour de France is a race with a long history. It takes place over many weeks. Cyclists cover thousands of miles. They ride through many countries. For over 100 years, athletes have fought to win the famous race. All of them want to wear the yellow jersey given to the winner.

The first race was in the summer of 1903. It started and ended in Paris. There were 60 competitors. Fast forward to 2016. Nearly 200 cyclists competed. What a difference 100 years makes!

In 2016, Chris Froome won Le Tour de France for the third time. The champion is still excited about racing. Froome believes that cyclists start as equals each year. He says, "What has gone before counts for nothing. This year I am hungrier than ever for success." These are the words of a committed athlete.

Chris Froome completes a time trial wearing the famous yellow jersey.

LET'S EXPLORE MATH

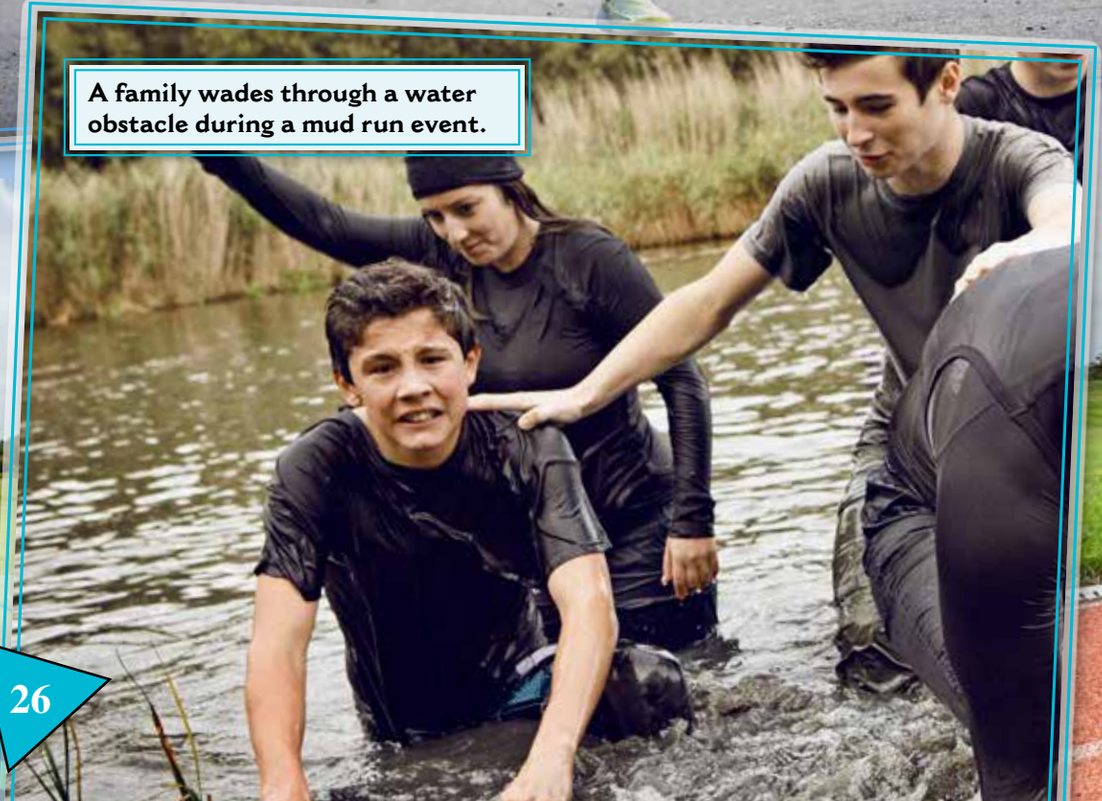
Cyclists racing in Le Tour de France represent many countries. Teams wear similar jerseys. Each team wants to win!

Take a look at the graphic below. Cyclists are wearing three colors.

1. What fraction of the cyclists are in red?
2. What fraction of the cyclists are in blue?
3. What fraction of the cyclists are not in yellow?

Athletes race through Paris in 1926.

These young athletes race in the 2-km Kids Run at the Laguna Phuket International Marathon™ in Thailand.



A family wades through a water obstacle during a mud run event.

Dream Big

Athletes train for years before competing in the world's toughest races. These are extreme courses. They are designed to inspire the toughest athletes from around the world. From Paris to Patagonia, top-level athletes test their skills. One thing all of the athletes have in common is their drive to compete.

But, even the best athletes have to start somewhere! Do you have what it takes to compete in one of these races? You just might! Explore races near you. You'll find that there are races for athletes of all experience levels. Or, maybe you just want to take a walk around the block. All that matters is that you lace up your shoes and go!

Problem Solving

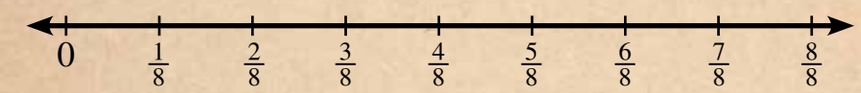
Taj and his friends love to ride bikes. But, they aren't quite ready for the **grueling** Le Tour de France. So, they have started their own race, Le Tour de Park! It's not Le Tour de France, but they have fun just the same. Their course is 1 km long through the park, with markers along the way. Just like the riders of Le Tour de France, Taj and his friends each want to be the winner! Use the clues to plot Taj and his friends at their current points in the race on the number line. Then, answer the questions.

1. Who is closer to the $\frac{4}{8}$ marker on the course: Dora or Jen?
2. Is Ben closer to the $\frac{4}{8}$ marker or the finish line? How do you know?

Clues

- Taj is at the $\frac{4}{8}$ marker.
- Ada is $\frac{6}{8}$ of the way from the finish line.
- Sean is at the $\frac{1}{8}$ marker.
- Dora is $\frac{6}{8}$ of the way to the finish line.
- Jen is $\frac{3}{8}$ of the way to the finish line.
- Ben is $\frac{1}{8}$ of the way from the finish line.

1 km Course



Glossary

allure—power to attract or influence someone

brutal—extremely violent or difficult

contend—to claim or state

convert—someone who has changed their beliefs

endure—to continue past pain or unpleasantness

fatigue—the state of being extremely tired or exhausted

fraction—a number that shows how many equal parts are in a whole and how many of those parts are being described

grueling—very difficult or requiring a lot of effort

live wires—wires that carry an electrical current

parts—pieces that make up a whole

subzero—below 0°F (–18°C)

terrains—certain kinds of land

transcendence—existence beyond normal experience

whole—having all the parts; complete or full

Index

Answer Key

Let's Explore Math

page 7:

1. 4 parts
2. Each part is the same size.
3. $\frac{1}{4}$ of the block

page 9:

1. less than half
2. $\frac{2}{6}$ (or $\frac{1}{3}$)
3. $\frac{4}{6}$ (or $\frac{2}{3}$)

page 17:

1. $\frac{3}{8}$ of a mile
2. $\frac{5}{8}$ of a mile

page 19:

1. 3 parts
2. Each part is the same size.
3. $\frac{1}{3}$ of the obstacle course

page 25:

1. $\frac{4}{8}$ (or $\frac{1}{2}$) are in red.
2. $\frac{2}{8}$ (or $\frac{1}{4}$) are in blue.
3. $\frac{6}{8}$ (or $\frac{3}{4}$) are not in yellow.

Problem Solving

Number lines should show Taj at $\frac{4}{8}$, Ada at $\frac{2}{8}$, Sean at $\frac{1}{8}$, Dora at $\frac{6}{8}$, Jen at $\frac{3}{8}$, and Ben at $\frac{7}{8}$.

1. Jen is closer to the $\frac{4}{8}$ marker.
2. Ben is closer to the finish line. He is $\frac{1}{8}$ km away from the finish line and $\frac{3}{8}$ km away from the $\frac{4}{8}$ marker.

Math Talk

1. What is a fraction?
2. How are fractions different from whole numbers? How are they similar?
3. How can you use a drawing to model a fraction?
4. What is the relationship between a numerator and a denominator?
5. How can you prove that a model of a fraction is correct or incorrect?
6. How would everyday life change if there were no fractions?