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## Summer Scholars Mathematics Rising 7th Grade

### Management Guide pages

- Cover and Table of Contents (3 pages)
- How to Use This Resource pages (6 pages)
- Grade Level Details pages (6 pages)

### Teacher's Guide pages

- Cover (1 page)
- Days 1–2 Overview (1 page)
- Day 1 Lesson (5 pages)
- Day 2 Lesson (3 pages)

### Student Guided Practice Book pages

- Cover (1 page)
- Day 1 Student Pages (5 pages)
- Day 2 Student Pages (6 pages)

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# SUMMER Scholars

## Mathematics

# Management Guide

Rising 7th and Rising 8th Grades



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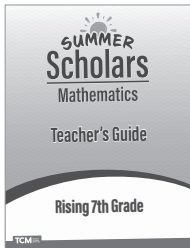
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# How to Use This Resource

The *Summer Scholars Mathematics* curriculum has been designed to meet the needs of summer learning programs. Scaffolded lessons, mathematical discourse, and STEAM activities are presented in a flexible format to make learning (and teaching) fun and effective for everyone.

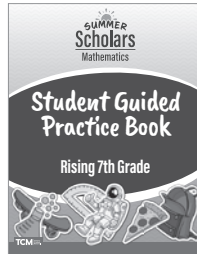
## What's Included?

### Teacher's Guide



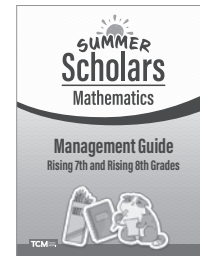
The daily lessons enhance instruction with research-based mathematics instructional practices.

### Student Guided Practice Book



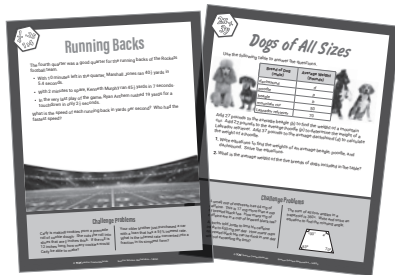
This book encourages students' mathematical fluency with multiple opportunities to apply learning.

### Management Guide



This guide helps teachers plan effectively with flexible lesson pacing and a scope and sequence designed specifically for varied summer settings.

## 12 Mathematical Discourse Task Cards



These cards provide rich problem-solving tasks for students to solve and discuss collaboratively. They are provided in both print and digital format.

## Smithsonian STEAM Readers



These books and the included STEAM challenges foster content-area literacy and encourage students to collaboratively solve real-world problems.

## Digital Resources



These resources increase student engagement and enhance instruction. Family Engagement Letters are provided for a strong school-home connection.

## Classroom Library with 10 Books



These mathematics- and science-focused books inspire curiosity and a love of reading.

# How to Use This Resource (cont.)

## Scaffolded Mathematics Instruction

The student-centered Gradual Release of Responsibility model is embedded into each of the mathematics lessons. Within every two-day lesson, the responsibility shifts from the teacher (I Do) to the student (You Do).

**Icons indicate student groupings: whole group, collaborative, and independent.**

**Stopwatch icons indicate suggested durations.**

**Each lesson page and student page clearly indicates the instructional day.**

**Assessment opportunities are provided in every lesson.**

**There are many ways for students to access the student activity pages:**

- use individual books (purchased separately)
- make copies from provided book
- project pages on an interactive whiteboard
- print pages from digital resources
- share on digital devices (see page 33 for more information)

**Day 7**  
Rational Numbers

### Order of Rational Numbers

**Warm-Up** [Icon: Whole Group]

- Before the lesson, write integers on sticky notes. There should be enough sticky notes for each student to have one. The integers should not be consecutive and should include positive and negative numbers and zero.
- Give a sticky note to each student. Have students line up in order from least to greatest without talking by displaying their notes to each other.
- When students have finished, have them say their numbers, beginning with the least number. Have them post their notes on the board or on chart paper in order and then be seated.
- Choose a negative number, and ask students to describe the distance the number is from zero. Ask, "Is the number less than or greater than zero?" (less than) Now choose a positive number, and say, "Describe the distance the number is from zero. Is the number less than or greater than zero?" (greater than) Say, "Let's compare these two numbers. Which number is greater? Which number is less? How can we write an inequality for these numbers using a less-than symbol? How can we write an inequality for these numbers using a greater-than symbol? Write both inequalities on the board or on chart paper. Emphasize the correct way to read and write the inequality."

**Language and Vocabulary** [Icon: Collaborative]

- Prior to class, prepare three sheets of chart paper, one titled Negative, one titled Zero, and one titled Positive. Write the following vocabulary terms on the board or on chart paper:
  - equal to
  - inequality
  - greater than
  - less than
- Ask students to explain what *greater than* means and write the symbol. They should know that greater than means that a number has a bigger value and is expressed using the symbol  $>$ . Ask students what *less than* means and write the symbol. They should know that less than means that the number has a smaller value and is expressed using the symbol  $<$ . Ask, "When do we choose  $<$  or  $>$ ?" (When two numbers have different values.)
- Group students in pairs, and give each student a sticky note to each pair. Say, "I'll be giving you a profit, loss, and breaking even. Write an example of the use of a number, the use of a negative number, and the use of zero." (Students might write: profit and 300.)
- Invite pairs of students to attach their sticky notes to the board. If they have placed their sticky notes, explain their reasonings.

Integers on sticky notes should be enough sticky notes for each student to have one. The integers should not be consecutive and should include positive and negative numbers and zero.

**Language and Vocabulary** [Icon: Collaborative]

**1. Prior to class, prepare three sheets of chart paper, one titled Negative, one titled Zero, and one titled Positive. Write the following vocabulary terms on the board or on chart paper:**

- equal to
- inequality
- greater than
- less than

**Day 7**  
Rational Numbers

### Order of Rational Numbers

**We Do** [Icon: Whole Group]

- Display *Hot and Cold* from page 39 of the *Student Guided Practice Book*. Say, "Let's look at another example." Students will begin by writing two inequalities for the two warmest temperatures. Ask, "What are the two warmest temperatures in the list?" (The two positive temperatures are warmer than the negative temperatures.) Ask, "How can we compare these temperatures using an inequality sign?" Guide students to write the inequalities  $145 > 20$  and  $20 < 145$ . Ask, "How can we write a sentence using the these inequalities to explain what the inequalities mean?" (The temperature 145 degrees is warmer than 20 degrees. The temperature 20 degrees is cooler than 145 degrees.)
- Say, "Identify the two coldest temperatures. How can we determine which is colder?" (The negative temperatures are the coldest.) Have students write inequality statements to compare the numbers and then write sentences to compare the temperatures. Students should write  $-80 < -60$  and  $-60 > -80$  and then  $-80$  degrees is colder than  $-60$  degrees.

**You Do** [Icon: Collaborative]

- Have students complete *Business Plan* from page 40 of the *Student Guided Practice Book*. Provide the sentence frames from step 4 of the *We Do* section of the lesson to help students explain their reasonings.
- Have students share their inequalities and reasonings. If students have difficulty explaining their reasonings, remind them to use the sentence frames and vocabulary terms.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

### Business Plan

**Day 7**

Directions: Use the predictions given to solve the questions.

Loss of \$5,000.00 Profit of \$150,000.00 Profit of \$50,000.00 Loss of \$15,000.00. Breaking Even

Ms. Guthrie is opening a business. She has the following predictions:

Name: \_\_\_\_\_ Date: \_\_\_\_\_

### Hot and Cold

**Day 7**

Directions: Use the temperatures given to answer the questions.

$145^{\circ}\text{C}$ ,  $-80^{\circ}\text{C}$ ,  $-60^{\circ}\text{C}$ ,  $20^{\circ}\text{C}$

On the Celsius temperature scale,  $0^{\circ}\text{C}$  is the temperature at which water freezes. The temperature at which water boils is  $100^{\circ}\text{C}$ .

- Write an inequality to compare the two warmest temperatures.
- Write a sentence to explain your inequality using the words warmer and cooler.
- Write an inequality to compare the two coldest temperatures.
- Write a sentence to explain your inequality using the words warmer and cooler.
- Write an inequality to compare the warmest and coldest temperatures.
- Write a sentence to explain your inequality using the words warmer and cooler.

# How to Use This Resource *(cont.)*

## Mathematical Discourse Task Cards

The Mathematical Discourse Task Cards present rich math problems for students to solve and discuss collaboratively. They include two challenge problems.

**3D PRINTING**

Jackson is using a 3D printer to make a model house. The house is made with a rectangular prism for the body and a square pyramid for the roof.

- The roof has a height of 3 cm.
- The prism's length and width are 5 cm each.
- The triangular faces of the roof all have a slant height of 4 cm.

If Jackson needs  $240 \text{ cm}^3$  of plastic for printing, what is the missing dimension (height) of the rectangular prism?

Jackson decides that he does not like the color of the printing plastic he chose and decides that he needs to paint the model house. If he uses 2 coats of paint on all exposed faces, what is the total surface area that will be covered?

**Challenge Problems**

Kai is building a table. He has  $480 \text{ inches}^2$  of wood for the table legs. The wood is one long piece. The length and width are both 2 inches. How long will each table leg be?

Lily is painting the trapezoid-shaped faces of a birdhouse that is in the shape of a trapezoidal prism. The parallel sides of the trapezoid's faces are 15 cm and 20 cm long. If she uses  $640 \text{ cm}^2$  to paint the two trapezoids, what would be the height of the trapezoids?

Cards can be displayed for the whole class.

Challenge problems ask students to think more deeply about the mathematical concept.

Cards are reproduced in the *Student Guided Practice Book* for individual use.

Day 19

Name: \_\_\_\_\_ Date: \_\_\_\_\_

**3D PRINTING**

Jackson is using a 3D printer to make a model house. The house is made with a rectangular prism for the body and a square pyramid for the roof.

- The roof has a height of 3 cm.
- The prism's length and width are 5 cm each.
- The triangular faces of the roof all have a slant height of 4 cm.

If Jackson needs  $240 \text{ cm}^3$  of plastic for printing, what is the missing dimension (height) of the rectangular prism?

Jackson decides that he does not like the color of the printing plastic he chose and decides that he needs to paint the model house. If he uses 2 coats of paint on all exposed faces, how much surface area will Jackson end up painting?

**Challenge Problems**

Kai is building a table. He has  $480 \text{ inches}^2$  of wood for the table legs. The wood is one long piece. The length and width are both 2 inches. How long will each table leg be?

Lily is painting the trapezoid-shaped faces of a birdhouse that is in the shape of a trapezoidal prism. The parallel sides of the trapezoid's faces are 15 cm and 20 cm long. If she uses  $640 \text{ cm}^2$  to paint the two trapezoids, what would be the height of the trapezoids?

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14824—Summer Scholars: Mathematics

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# How to Use This Resource *(cont.)*

## STEAM Challenges

There are five STEAM Challenges included in each level of *Summer Scholars*. Each challenge is completed over five days to give students ample time to investigate, test, and retest their ideas. In addition to meeting specific criteria, students are also challenged to improve their work over the five days.

**STEAM CHALLENGE**

**Define the Problem**  
You are a volunteer at a zoo in your area. The staff at the zoo has asked you to create a new food enrichment toy that can be used in one of the primate (monkey, ape, lemur) enclosures at the zoo. You get to choose which primate you create the enrichment toy for.

**Constraints:** You may only use the materials provided to you.

**Criteria:** Your enrichment toy must create a challenge for the animal to get food. Also, it must be appropriate for the primate based on their behaviors, diet, and overall needs.

**Research and Brainstorm**  
What type of primate will you create the food enrichment toy for? What types of food enrichment items are used in zoos for different primates? What do you like and dislike about those designs? What will be challenging or stimulating about the toy you create?

**Design and Build**  
Sketch two or more designs for your food enrichment toy. Label the parts and the materials. Choose the design you think will work best and be most stimulating for the animal. Then, build your enrichment toy.

**Test and Improve**  
Place items in your enrichment toy to represent the animal's food or treats (small pebbles, beads, etc.). Show it to others. Explain how it works and why it would be a good source of enrichment for the primate you chose. Then, model how it works. Would it be easy for a zoo employee to prepare? Would it be challenging and stimulating for the animal to use? How can you make it better? Modify your design and rebuild it as needed. Reassess how well it meets the criteria.

**Reflect and Share**  
Was your second design better than your first? How do you know? What surprises or problems did you encounter during this challenge? How did you solve them?

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Day 1

Build background knowledge and spark student interest with engaging readers and short texts.

Students reflect on the process and their final products.

**Animal Health at the Zoo**

**Materials and Preparation**  
• Prepare supplies for groups to use while building (beads, 3 cardboard tubes, construction paper, 10 craft sticks, 2 empty water bottles, 6 paper cups, 6 paper plates, 3 feet of string, masking tape).

**Read Aloud**  
1. Review the information from the previous day's read-aloud.  
2. Read another section of the *Animal Health at the Zoo* book. Pause periodically to discuss new information and questions students may have.

**Build**  
1. Explain to students that when they build their models, they must follow their team design plans exactly. Explain that they will have an opportunity to change or improve their designs after they present them.  
2. Review classroom expectations for working with materials. Give teams time to build models.

**Test**  
1. Gather teams for testing. Tell students that each team will demonstrate their model at the front of the classroom. Explain that teams will offer feedback after each test.  
2. Refer students to *Food Enrichment Toy Test Results* from page 18 of the *Student Guided Practice Book*. Allow time for each team to test their model. A successful model stimulates and challenges the animal and is appropriate for the selected primate based on their behavior, diet, and overall needs.

**Think about It**  
Directions: Respond to the questions to reflect on the process you used to complete the STEAM challenge.

- Which feature of your team's design makes it most successful?
- Which feature of your team's design makes it unique?
- Which feature of your team's food enrichment toy makes it stimulating for the animal?
- During this challenge, what did you contribute?
- What was a surprise or issue your team encountered during this challenge?
- How did your team solve the issue?
- How would you modify your design to make it suitable for another type of primate? Identify the new type of primate, and explain how you would adapt your model.

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19  
Day 3

Activity sheets lead students through the Engineering Design Process.

Materials needed for each challenge are clearly listed. A full list of all STEAM Challenge materials is included in the digital resources.



# How to Use This Resource *(cont.)*

## Classroom Library

There are many benefits to wide reading, including an increase in vocabulary development. Reading widely increases listening comprehension and contributes to increased reading comprehension. It can be done through independent reading or through teacher read-alouds. Richard Anderson, Paul Wilson, and Linda Fielding's (1988) research shows that the amount of words read per year greatly increased based on the minutes of independent reading completed per day.

Anderson, Wilson, and Fielding ranked students by the number of minutes they read per day. For example, a student in the 70th percentile read almost 10 minutes per day. These students encountered a little more than 600,000 words per year, while a student in the 90th percentile, who read approximately 21 minutes per day, encountered over 1.8 million words each year. Students who encounter more new words apply the strategies they have been taught, and they start to learn the meanings of new words. All these factors associated with reading widely lead to increased comprehension.

*Summer Scholars* includes a classroom library of 10 books in each level. While these books can help students read widely, they also cover a variety of math and science topics. This can spark student interest and lead to additional connections in grade-level math concepts.

These books can be used as read-alouds, independent reading, or in small groups. They are a flexible tool that can help teachers tailor *Summer Scholars* to meet their unique needs. These books are also available digitally. See page 53 for more information.



# How to Use This Resource *(cont.)*

## Assessment

Assessment is a critical piece of any intervention or summer school program. *Summer Scholars* includes several opportunities for assessment.

- Each kit includes a preassessment and a postassessment to measure student growth. These assessments are provided in the *Student Guided Practice Book*. They can also be accessed as both Google Forms™ and Microsoft Forms® documents. See below for more information. The pages can be ripped out of the student books to make implementation easier.
- Alignments of the preassessments and postassessments are provided digitally. They show the lesson and standard that each question assesses. This can be used to guide further instruction.
- The activity sheets from the *Student Guided Practice Book* can be used as formative assessments.
- Quick Check activities provide the teacher with valuable insight, which enables them to better support students.
- The digital games can also be used to monitor student progress and math fluency.

## Digital Assessment in Summer Scholars

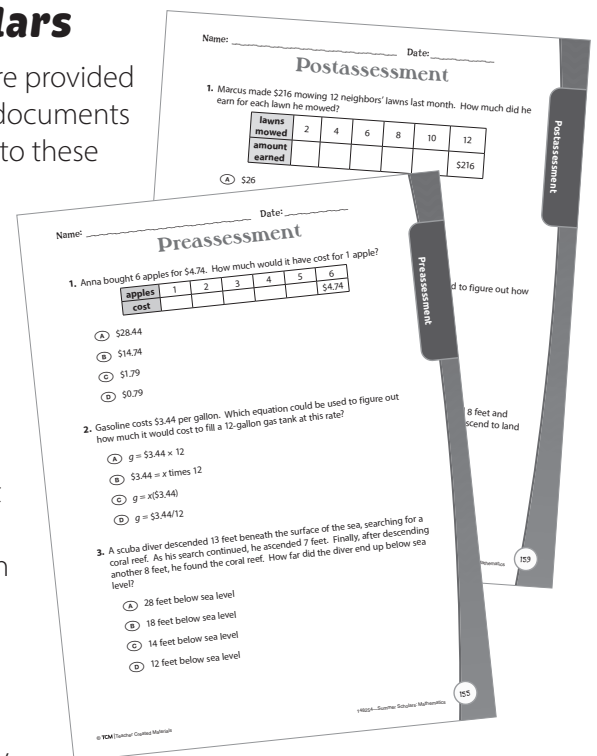
Digital versions of the preassessments and postassessments are provided as fillable PDFs. They can also be accessed as Google Forms™ documents and Microsoft Forms® documents. Please see page 52 for links to these resources.


### Using Google Forms™

The Google Forms™ version of each assessment is best for use with Google Classroom. The links on page 52 prompt a copy of the assessment to be saved to your Google Drive™. From there, a share link can be copied and shared with students to take the assessment from any device that has a web browser and internet connection. Having the assessment in Google Drive™ allows you to easily collect and analyze student data and results. These results can then be shared with administrators as needed.

### Using Microsoft Forms®

The Microsoft Forms® version of the assessment is best for use with Office 365 Education. The links on page 52 prompt a copy of the assessment to be saved to your OneDrive account. From there, a share link can be copied and shared with students to take the assessment from any device that has a web browser and internet connection. Having the assessment in OneDrive allows you to collect and analyze student data and results. These results can then be shared with administrators as needed.





**SUMMER**  
**Scholars**

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**Mathematics**

**Rising 7th Grade**

**Grade Level Details**

# Rising 7th Grade Scope and Sequence

|       |                           | Mathematics Skills and Concepts<br>60–65 minutes per day  |                          | Problem-Solving and Discourse<br>10–15 minutes per day  |   | STEAM<br>45 minutes per day  |          |
|-------|---------------------------|---|--------------------------|---|---|--|----------|
|       |                           | Mathematics Focus   | Standards                | Mathematical Discourse Card   | Standard  | Challenge Title and STEAM Step   | Standard |
| Day 1 | Using Ratios and Rates    | Apply qualitative and quantitative reasoning to solve mathematical and real-world problems related to ratios and rates.   | "Apples to Apples"       | Reason abstractly and quantitatively to solve a problem. Understand that quantities are numbers with labels of corresponding units.   | <i>Animal Health at the Zoo</i><br>Define the Problem and Make a Plan   | Make sense of problems and plan, solve, justify, and evaluate solutions.                                 |          |
| Day 2 |                           |   |                          |   | <i>Animal Health at the Zoo</i><br>Learn Content, Design, and Build     |  |          |
| Day 3 | Using Percent             | Apply ratio relationships and rate reasoning to solve mathematical and real-world percentage problems by demonstrating an understanding of the relationship between the whole, a given part, and the percent. | "Testing Your Knowledge" | Reason abstractly and quantitatively to solve a problem. Understand that quantities are numbers with labels of corresponding units.   | <i>Animal Health at the Zoo</i><br>Test                                 | Use appropriate tools, including real objects and techniques, to solve problems.                         |          |
| Day 4 |                           |   |                          |   | <i>Animal Health at the Zoo</i><br>Improve                              |  |          |
| Day 5 | Division with Fractions   | Extend previous understanding of multiplication and division to multiply and divide positive fractions with procedural fluency and interpret the quotients in real-world problems.                            | "Running Backs"          | Look for and make use of structure while solving math problems. Understand that analyzing structure means to look at how the mathematics in the task is organized to solve. | <i>Animal Health at the Zoo</i><br>Reflect and Share                    | Apply mathematics to solve problems arising in everyday life, society, and the workplace.                |          |
| Day 6 |                           |   |                          |   | <i>Cells</i><br>Learn Content, Understand the Challenge, and Brainstorm | Define a simple design problem reflecting the need or want that includes specified criteria for success. |          |
| Day 7 | Order of Rational Numbers | Extend previous understanding of numbers to understand the value of, plot, order, and compare rational numbers from mathematical and real-world contexts.   | "Let It Snow"            | Use appropriate tools strategically to solve problems. Understand that tools can be physical, such as a ruler, or mental, such as strategic thinking.                       | <i>Cells</i><br>Design and Build  | Use appropriate tools, including real objects and techniques, to solve problems.                         |          |
| Day 8 |                           |   |                          |   | <i>Cells</i><br>Test and Reflect  |  |          |

# Rising 7th Grade Scope and Sequence *(cont.)*

| Mathematics Skills and Concepts<br>60–65 minutes per day |   | Problem-Solving and Discourse<br>10–15 minutes per day |   | STEAM   |  |
|--|---|--|---|---|--|
|  |   |  |   | Challenge Title and STEAM Step  | Standard   |
| Mathematics Focus  | Standards   | Mathematical Discourse Card                            | Standard  | Challenge Title and STEAM Step  | Standard   |
| Day 9<br>Evaluating Expressions                          | Read, write, and evaluate algebraic expressions, including exponents, using substitution, and Order of Operations.                  | "Going to the Movies"                                  | Look for and express regularity in repeated reasoning. Understand that generalizing is a process where specific instances are applied to more than one case.                | <i>Cells</i><br>Redesign and Rebuild                                    | Apply mathematics to solve problems arising in everyday life, society, and the workplace.                |
| Day 10   |   |  |   | <i>Cells</i><br>Retest and Share  |  |
| Day 11   | Apply the properties of the Order of Operations to generate equivalent algebraic expressions with integer coefficients.             | "Video Games"  | Reason abstractly and quantitatively to solve a problem. Understand that quantities are numbers with labels of corresponding units.   | <i>Gravitational Interactions</i><br>Define the Problem and Make a Plan | Make sense of problems and plan, solve, justify, and evaluate solutions.                                 |
| Day 12   |   |  |   | <i>Gravitational Interactions</i><br>Learn Content, Design, and Build   |  |
| Day 13   | Write, model, and solve one-variable, one-step equations in mathematical and real-world problems using addition and subtraction.    | "Dogs of All Sizes"                                    | Look for and make use of structure while solving math problems. Understand that analyzing structure means to look at how the mathematics in the task is organized to solve. | <i>Gravitational Interactions</i><br>Test                               | Use appropriate tools, including real objects and techniques, to solve problems.                         |
| Day 14   |   |  |   | <i>Gravitational Interactions</i><br>Improve                            |  |
| Day 15   | Write, model, and solve one-variable, one-step equations in mathematical and real-world problems using multiplication and division. | "Shelter Donation"                                     | Construct viable arguments and critique the reasoning of others. Understand how to use evidence to justify thinking and respectfully critique the reasoning of others.      | <i>Gravitational Interactions</i><br>Reflect and Share                  | Apply mathematics to solve problems arising in everyday life, society, and the workplace.                |
| Day 16   |   |  |   | <i>Plate Tectonics</i><br>Learn Content, Challenge, and Brainstorm      | Define a simple design problem reflecting the need or want that includes specified criteria for success. |

# Rising 7th Grade Scope and Sequence *(cont.)*

|        |                                     | Mathematics Skills and Concepts<br>60–65 minutes per day  |           | Problem-Solving and Discourse<br>10–15 minutes per day |   | STEAM<br>45 minutes per day   |   |
|--------|-------------------------------------|---|-----------|--|---|---|---|
|        |                                     | Mathematics Focus   | Standards | Mathematical Discourse Card                            | Standard  | Challenge Title and STEAM Step                                      | Standard  |
| Day 17 | Solutions to Inequalities           | Determine if a given value(s) make(s) an inequality true or false using substitution.   |           | "Understanding Inequalities"                           | Reason abstractly and quantitatively to solve a problem. Understand that quantities are numbers with labels of corresponding units.   | <i>Plate Tectonics</i><br>Design and Build                          | Use appropriate tools, including real objects and techniques, to solve problems.          |
| Day 18 |                                     |   |           |  |   | <i>Plate Tectonics</i><br>Test and Reflect                          |   |
| Day 19 | Independent and Dependent Variables | Use variables to write an equation that represents the relationship between independent and dependent quantities from a graph or table in mathematical and real-world situations. |           | "Pizza Party"  | Use appropriate tools strategically to solve problems. Understand that tools can be physical, such as a ruler, or mental, such as strategic thinking.                       | <i>Plate Tectonics</i><br>Redesign and Rebuild                      | Apply mathematics to solve problems arising in everyday life, society, and the workplace. |
| Day 20 |                                     |   |           |  |   | <i>Plate Tectonics</i><br>Retest and Share                          |   |
| Day 21 | Unit Volume                         | Determine the volume of right rectangular prisms where dimensions are positive rational numbers using visual models and applying the formulas $V = lwh$ and $V = Bh$ .            |           | "Popcorn Promotion"                                    | Look for and express regularity in repeated reasoning. Understand that generalizing is a process where specific instances are applied to more than one case.                | <i>How to Become a Fossil</i><br>Define the Problem and Make a Plan | Make sense of problems and plan, solve, justify, and evaluate solutions.                  |
| Day 22 |                                     |   |           |  |   | <i>How to Become a Fossil</i><br>Learn Content, Design, and Build   |   |
| Day 23 | Surface Area                        | Determine the surface area of three-dimensional figures where dimensions are positive rational numbers using the figure's net.  |           | "Sorting Out Surface Area"                             | Look for and make use of structure while solving math problems. Understand that analyzing structure means to look at how the mathematics in the task is organized to solve. | <i>How to Become a Fossil</i><br>Test                               | Use appropriate tools, including real objects and techniques, to solve problems.          |
| Day 24 |                                     |   |           |  |   | <i>How to Become a Fossil</i><br>Improve                            |   |
| Day 25 | Culminating Activity                |   |           |  |   | <i>How to Become a Fossil</i><br>Reflect and Share                  | Apply mathematics to solve problems arising in everyday life, society, and the workplace. |

# Rising 7th Grade STEAM Challenges and Materials

This chart includes descriptions and needed materials for the five STEAM Challenges.

| Name                              | Description  | Materials  |
|-----------------------------------|--|--|
| <i>Animal Health at the Zoo</i>   | Teams will design and create food-enrichment toys to be used by primates.                                  | <ul style="list-style-type: none"> <li>• beads</li> <li>• 10 craft sticks</li> <li>• 3 ft. of string</li> <li>• 6 paper plates</li> <li>• 2 large, empty water bottles</li> <li>• construction paper</li> <li>• 6 paper cups</li> <li>• 3 cardboard tubes</li> <li>• masking tape</li> </ul>       |
| <i>Cells</i>                      | Groups will collaborate to make 3D models of a cell.   | <ul style="list-style-type: none"> <li>• construction paper</li> <li>• 2 craft foam balls</li> <li>• different colors of modeling clay</li> <li>• 2 paper plates</li> <li>• 5 pipe cleaners</li> <li>• plastic wrap</li> <li>• 10 toothpicks</li> </ul>  |
| <i>How to Become a Fossil</i>     | Teams will create games to teach players about fossils. The games will include models or puzzles.          | <ul style="list-style-type: none"> <li>• 1 poster board</li> <li>• construction paper</li> <li>• modeling clay</li> <li>• 3 ft. of string</li> <li>• 10 note cards</li> <li>• 10 craft sticks</li> <li>• 1 number cube</li> <li>• masking tape</li> <li>• 6 paper plates</li> </ul>                |
| <i>Plate Tectonics</i>            | Groups will design and build vertical evacuation structures for communities that could be hit by tsunamis. | <ul style="list-style-type: none"> <li>• 10 note cards</li> <li>• foil pan with high sides</li> <li>• water to fill pan</li> <li>• modeling clay</li> <li>• sand</li> <li>• 15 straws</li> <li>• 10 sugar cubes</li> <li>• 3 washers</li> </ul>  |
| <i>Gravitational Interactions</i> | Teams will engineer model sections of roller coasters that a marble can safely "ride."                     | <ul style="list-style-type: none"> <li>• 10 sheets of construction paper</li> <li>• masking tape</li> <li>• 20 craft sticks</li> <li>• modeling clay</li> <li>• 5 long cardboard tubes</li> <li>• 5 short cardboard tubes</li> <li>• foil</li> <li>• 1 poster board</li> <li>• 1 marble</li> </ul> |

# Rising 7th Grade Classroom Library Information

This chart includes important information about the books included in the classroom library.

| Book Title   | Lexile® Measure | *Guided Reading Level | Summary   |
|--|-----------------|-----------------------|---|
| <i>All About Light and Sound</i>                                 | 700L            | W                     | Light and sound help us recognize objects and noises! Read to find out how vibrations, radiant energy, wavelength, frequency, amplitude, reflection, optics, and sound waves help us to see and hear the world around us. |
| <i>Battle of the Bands: Using Data and Graphs</i>                | 770L            | V                     | Follow the story of a battle of the bands while learning how to read and construct statistical graphs!  |
| <i>How Do They Make That?: Fractions, Decimals, and Percents</i> | 850L            | V                     | Practice working with fractions, decimals, and percentages while learning how popular food items are made!  |
| <i>Investigating Electromagnetism</i>                            | 770L            | Y                     | Electromagnetics are everywhere—inside our homes, in our computers, even our televisions! Explore the history of electromagnetics and how they work through numerous images and supportive text.                          |
| <i>Marie Curie: Pioneering Physicist</i>                         | 720L            | V                     | Learn all about Marie Curie's incredible life and how she discovered and worked with radium for many years in this fascinating biography.   |
| <i>Pack It Up: Surface Area and Volume</i>                       | 820L            | T                     | Practice measuring surface area and volume while following the story of a family as they pack and move into a new house!  |
| <i>Sea Creatures: Solving Equations and Inequalities</i>         | 900L            | W                     | Readers will learn about unique creatures of the deep while completing engaging practice problems to familiarize themselves with functional equations, equivalent equations, inequalities, and algebraic expression.      |
| <i>Tornado Chasers: Measures of Central Tendency</i>             | 830L            | V                     | Learn about measures of central tendency while following the lives and work of some brave individuals—tornado chasers!  |
| <i>Watch It Grow: Simplifying and Evaluating Expressions</i>     | 860L            | X                     | Learn how scientists use algebraic expressions to explore the growth of amoebas, euglenas, and bacteria!  |
| <i>The Wonder of Our Solar System</i>                            | 730L            | S                     | Come along and explore the wonders of our solar system in this exciting title! Learn about the sun, the planets in our solar system, the Milky Way galaxy, constellations, dwarf planets, asteroids, and comets!          |

\*These titles have been officially leveled using the F&P Text Level Gradient™ Leveling System.





# SUMMER Scholars

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## Mathematics

## Teacher's Guide

## Rising 7th Grade

# Days 1–2 Overview

## Using Ratios and Rates

### Learning Outcome

- Use ratio and rate reasoning to solve real-world and mathematical problems (e.g., by reasoning about tables of equivalent ratios or equations).

### Focus

The lesson will address this focus question: *How can you use ratios and unit rates to solve real-world problems?* You may wish to write the focus question on the board or chart paper and read it aloud to students.

### Student Misconceptions

Students may have difficulty applying their knowledge of equivalent fractions to solve problems using ratios. They are accustomed to reducing fractions by dividing the numerator and denominator by the same number but may not be able to use the process in reverse by multiplying both the numerator and denominator by the same number to find equivalent fractions. Using diagrams and charts can help students be successful.

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## Mathematical Discourse

### Learning Outcome

- Reason abstractly and quantitatively to solve a problem. Understand that quantities are numbers with labels of corresponding units.

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## Animal Health at the Zoo

### Learning Outcome

- Use mathematical knowledge to define an engineering problem and design solutions.

### STEAM Vocabulary

|           |           |
|-----------|-----------|
| habitats  | simulated |
| instincts | species   |
| reproduce | zoology   |

### Materials

- *Student Guided Practice Book* (pages 4–14)
- *Apples to Apples* task card
- *Animal Health at the Zoo* book
- chart paper
- sticky notes
- markers

\*You may wish to assemble one set of STEAM materials for students to reference (see page 10).

# Using Ratios and Rates

## Warm-Up

1. Draw the table on the board or on chart paper.

|              |   |   |   |   |   |
|--------------|---|---|---|---|---|
| <b>boys</b>  | 1 | 2 | 3 | 4 | 5 |
| <b>girls</b> | 3 |   |   |   |   |

Say, "This table tells us that for every 1 boy, there are 3 girls. Let's complete the table together. If there are 2 boys, how many girls are there?" (6) Continue filling in the table. Discuss with students any patterns they see and how they found the solutions.

2. Say, "We can write these numbers as ratios. Since there is 1 boy for every 3 girls, we can write this as 1:3, 1 to 3, or  $\frac{1}{3}$ . Let's write the next pair of numbers as a ratio. For every 2 boys, there are 6 girls." Choose a student to write the ratio on the board or on chart paper in three different ways. (2:6, 2 to 6,  $\frac{2}{6}$ ) Students should recognize that the two ratios are equivalent.
3. Tell students to write the remaining pairs of numbers as ratios in three different ways. Choose students to share their answers, and discuss why these ratios are equivalent.

## Language and Vocabulary

1. Prior to the lesson, make a chart by dividing a sheet of chart paper into three columns. Label the columns *Vocabulary Word*, *Definition*, and *Example/Drawing*. In the first column, write the following words:

equivalent

ratio

rate

unit rate

rate table

2. Review each word with students, and write the definitions in the appropriate column on the chart paper.
3. Place students in small groups. Distribute five sticky notes to each group. Ask each group to write examples and/or draw pictures for each word on the sticky notes.
4. When groups are finished, have them place their sticky notes in the correct columns on the chart. Review the examples and drawings with the class. Keep the chart paper posted for the duration of the lesson.

# Using Ratios and Rates

## I Do

- Say, "Today, we will use ratios and unit rates to solve real-world problems. Let's look at a problem together." Write the following problem on the board or on chart paper: *April watched the vehicles that passed through an intersection near her home. She found that for every 15 vans, there were 3 pickup trucks. She counted 25 vans. How many trucks did she count?* Draw a rate table to help students organize the information given.

|               |          |          |           |          |          |
|---------------|----------|----------|-----------|----------|----------|
| <b>vans</b>   |          |          | <b>15</b> |          |          |
| <b>trucks</b> | <b>1</b> | <b>2</b> | <b>3</b>  | <b>4</b> | <b>5</b> |

- Ask, "What is the ratio for the number of vans to the number of pickup trucks?" Students should say that the ratio of the number of vans to the number of trucks is 15:3. Ask, "How can we write this ratio as a unit ratio?" (5:1)
- Write the number 5 above the 1 in the table. Say, "So, for every 1 pickup truck, there are 5 vans. Let's continue filling in the table until we get to 25 vans. For every 2 trucks, how many vans will there be? (10) How do you know?" Choose students who can explain their solutions to share aloud. Students should say that they added groups of 5 each time or multiplied the number of trucks by 5. Ask, "How can we write this as a ratio?" (10:2)
- Say, "From the information given in the problem, we know that for every 3 trucks, there are 15 vans. Does that follow our pattern? Show me a thumbs-up if you agree or a thumbs-down if you disagree." Choose a student who is showing a thumbs-up to explain his or her reasoning. If there are any students showing a thumbs-down, ask them to explain why. Say, "Let's check our answer together now. If we continue our pattern, 10 vans plus 5 more will give us 15 vans, or 3 trucks multiplied by 5 gives us 15 vans."
- Say, "How should we fill in the next part of the table? Talk with a partner." Choose a student to explain the answer. Students should agree that for every 4 trucks, there are 20 vans.
- Fill in the last part of the table. Students should discover that for every 25 vans, there will be 5 trucks. Ask students to explain how they know. Ask students what they notice about all the ratios. They should recognize that these ratios are equivalent. Explain to students that you have used the unit ratio to create a table with pairs of numbers that represent equivalent ratios. You also continued to fill in the table until you found 25 vans and could answer the question.

# Using Ratios and Rates

## We Do

1. Display *Ice Cream* from page 4 of the *Student Guided Practice Book*. Say, "Let's look at the situation: *Jeffrey has a part-time job at an ice cream store. One of his customers purchased 8 gallons of ice cream and paid \$56.00. How much would she pay for 5 gallons of ice cream?*"
2. Ask students how to find a unit rate for the cost per gallon. Remind them that they are finding a ratio of dollars to gallons, in which the number of gallons is 1. Show students that you will use the dollars and gallons from the unit rate to label each column. Say, "What is the unit rate for this problem?" Students should agree that the unit rate for this problem is \$7.00 for 1 gallon of ice cream.
3. Ask students how to find the numbers in the next column of the table. Remind them to use the unit rate to make equivalent ratios for each part of the table.
4. Have students discuss how to find the next pair of numbers in the table. Students may suggest adding groups of \$7.00 to the cost each time or multiplying the number of gallons by \$7.00.
5. Follow the same procedure outlined in step 4 to complete the table. Tell students to write the solution and explain their reasoning. Students may say that to find a unit rate, they need to divide the units and find an equivalent ratio or rate they can multiply the units. To help students explain their reasoning, provide the following sentence frames:

- To find a unit rate, I \_\_\_\_\_.
- To find an equivalent ratio, I \_\_\_\_\_.

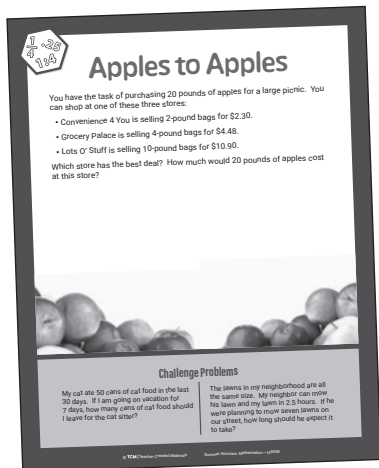
6. Ask students to complete the activity sheet. When they finish, ask them to compare their answers and explanations with those of other students.

**Support for Language Learners:** Write *equal* and *equivalent* on the board or on chart paper. Explain that *equal* means that two numbers represent exactly the same amount. For example, 2 apples plus 6 apples equals, or is the same as, 8 apples. *Equivalent* means that two things represent the same relationship. For example, the ratio of 6 apples to 8 oranges and the ratio of 12 apples to 16 oranges both mean that for every 3 apples, there are 4 oranges. They are both equivalent to the ratio 3:4.

## You Do

1. Have students complete *On Track* from page 5 of the *Student Guided Practice Book*. Remind students to find unit rates and use tables to find their answers. Provide the sentence frames from step 5 of the We Do section to help students explain their reasoning.
2. Have students share their solutions and reasoning. If students have difficulty explaining their reasoning, remind them to use the vocabulary terms.

# Apples to Apples



## Math Skill—Unit Rate

Building on their mathematical knowledge, students should understand that a *proportion* is an equation that shows that two ratios or two fractions are equivalent. It's important for students to develop a deep understanding of proportional relationships. Give students opportunities to solve problems in a variety of ways using proportional reasoning.

**Support for Language Learners:** As students participate in the task, encourage nonverbal responses to check for understanding. For example, students can share a thumbs-up or thumbs-down to indicate whether they agree or disagree with a strategy or to share if they think the answer is correct. Nonverbal cues are especially helpful for learners whose spoken English may not be as developed as their listening comprehension.

## Procedure

1. Make the math real for students. Explain to students that a *unit rate* is a comparison of a quantity to one of a different quantity. When we say we've walked 12,000 steps in a day, we are comparing the 12,000 steps to the 1 day. Say, "If I walked 8 miles in 2 hours, I walked 4 miles per hour. That means that 4 miles per 1 hour is a unit rate." ( $8 \text{ miles} \div 2 \text{ hours} = 4 \text{ miles per hour}$ ) Then, ask students, "If you go to tech class and type 450 words in 10 minutes, how would you find the unit rate?" ( $450 \text{ words} \div 10 \text{ min} = 45 \text{ words per minute}$ )
2. Display the *Apples to Apples* task card, and read aloud the text. Give students the opportunity to ask clarifying questions before starting the task.
3. Allow time for students to collaborate with partners to complete the task from page 6 of the *Student Guided Practice Book*. (Students will complete the challenge problems on the next day of instruction.)
4. Have partners discuss the Discourse Prompts.

### Discourse Prompts

- How does unit rate relate to the *Apples to Apples* task?
- What other strategies could be used to solve the problem?

## Lesson Support

**Answer:** Lots O' Stuff; total cost \$21.80

Lots O' Stuff  $\$10.90 \div 10 \text{ lbs.} = \$1.09 \text{ per lb.}$ ; Grocery Palace  $\$4.48 \div 4 \text{ lbs.} = \$1.12 \text{ per lb.}$ ; Convenience 4 You  $\$2.30 \div 2 \text{ lbs.} = \$1.15 \text{ per lb.}$

**Possible Student Misconceptions:** Look for students who may stop at finding the unit rate and forget to multiply to find the total (e.g., students may forget to multiply by 20 pounds of apples).

# Animal Health at the Zoo

## Materials and Preparation

- Prepare a set or list of supplies to show students (beads, 3 cardboard tubes, construction paper, 10 craft sticks, 2 empty water bottles, 6 paper cups, 6 paper plates, 3 feet of string, masking tape).

## Read Aloud

1. Write the word *zookeeper* on the board. Activate students' prior knowledge on the role of zookeepers by asking students to create a class word web that represents the daily responsibilities and tasks of a zookeeper.
2. Read aloud a section of the *Animal Health at the Zoo* book. Revisit the word web, and ask students to suggest additional words that would make the web more complete. Have students suggest challenges that zookeepers may encounter while caring for different types of animals.

## Define the Problem

1. Have students identify different types of primates, and record their responses on the board. Ask students to make predictions about how one of these primates finds food in its natural habitat, including challenges the primate may encounter in the wild.
2. Reveal the STEAM Challenge by displaying pages 28–29 of the *Animal Health at the Zoo* book. Have students follow along on page 7 of the *Student Guided Practice Book*. As you read, have students state the specific tasks they will accomplish during each step of the engineering design process.

3. Refer students to *Make a Plan* from page 8 of the *Student Guided Practice Book*. Have students write quick summaries of the challenge with partners. Summaries should include constraints and criteria.
4. Have students complete the My Design portion of the page independently. Students will complete the Team's Design section on the next day of instruction.

## Vocabulary Activity

1. Write the vocabulary words on the board or on chart paper (*habitats, instincts, reproduce, simulated, species, zoology*). Have each student choose the word they are most familiar with. Then, ask each student to generate their own definition for the word, use the word in a sentence, and sketch a visualization that represents the word.
2. Invite students to share their definitions, sentences, and visualizations for each vocabulary word. Ask them to suggest how each definition could be made more complete after sharing, and generate a class definition for each word.

# Using Ratios and Rates

## Progress Monitoring

1. Have students complete the *Quick Check* from page 9 of the *Student Guided Practice Book* to gauge students' progress toward mastery of the learning outcomes.
2. Based on the results of the *Quick Check* and your observations during the lesson, identify students who may benefit from additional instruction in the learning outcomes. These students should be placed in a small group for reteaching.

## Rotations

Place students in two groups. Work with one group on the Refocus activity while the other group completes the Practice activity. Rotate after 15 minutes. Work with the second group on the Extend activity while the first group completes the Practice activity.

### Refocus

1. Show a diagram with 10 Xs and 5 Os written so that 1 O is next to each pair of Xs.

|       |       |
|-------|-------|
| X X O | X X O |
| X X O | X X O |
| X X O |       |

2. Draw lines on the diagram so students see 5 groups, each with 2 Xs and 1 O. Be sure students understand that each group shows the unit ratio, 2 Xs per 1 O.
3. Ask students how they could have found the unit ratio without the drawing. Show students how to turn the information into a table. Label the columns *X* and *O*. As you look at the successive rows of 2 Xs and 1 O, fill in the corresponding numbers in the table.
4. Ask students how to determine how many Xs there would be if there were 10 Os. Students may suggest multiplying by 2 or continuing to fill in the table until they reach 10. Be sure that each student is comfortable with at least one of these methods.
5. If time allows, support students as they complete Question 1 from *Refocus* on page 10 of the *Student Guided Practice Book*. If not, students will complete both problems from this page during the Practice time.

### Extend

1. Ask students how they could use the unit rate to write an equation to solve ratio word problems. For example, if gasoline costs \$3.65/gallon, ask students how to write an equation to represent the total amount of money needed to purchase a certain number of gallons of gasoline. Students should write  $T = 3.65n$ . Remind them to identify the letters: *T* is the total cost, and *n* is the number of gallons.
2. Support students as they complete *Extend Learning Task* from page 11 of the *Student Guided Practice Book*.

### Practice

- **Refocus Group Practice:** Have students complete the questions on *Refocus* from page 10 of the *Student Guided Practice Book* to reinforce their learning.
- **Extension Group Practice:** Have students complete *Independent Practice* from page 12 of the *Student Guided Practice Book* to reinforce their learning.



# Using Ratios and Rates

## Math in the Real World



1. Display *Math in the Real World: Comparison Shopping* from page 13 of the *Student Guided Practice Book*. Have a student read the task aloud. Tell students to summarize or explain the task to their partners. Have a few students share their summaries.
2. Ask students to think about what information they will need to solve the task and what the task is asking them to do. Then, have them share with partners. Ask a few students to share aloud. Students should indicate that they know Ricardo needs to buy 650 pencils. At Store A, he can get 250 pencils for \$20.00, and at Store B, he can get 300 pencils for \$27.00. They need to find out which is the better buy and how much Ricardo would pay at the better price. Have students work in groups of two or three to complete the task.
3. As students work, circulate and ask focusing, assessing, and advancing questions:
  - How could unit rates determine the better buy?
  - How can you use unit rates to find the total cost?
4. Observe how students are solving the task, and choose a few groups who solved the task in different ways to share their solutions and reasoning. Compare the representations presented. Students should find the unit rate for 1 pencil to compare prices by dividing the amount of money by the number of pencils. At Store A, each pencil costs \$0.08, and at Store B, each pencil costs \$0.09. Store A is the better buy. Ricardo will spend \$52.00 to buy 650 pencils from Store A. Make sure students explain their reasoning as they share solutions.
5. As groups share their solution paths, reasoning, and strategies, ask questions:
  - How can you explain what \_\_\_\_\_ said in a different way?
  - Do you agree or disagree with the solution path and reasoning? Why?
  - Which solution path makes the most sense to you? Why?

**Support for Language Learners:** Share these sentence frames to help students explain their reasoning.

- Store \_\_\_\_\_ has the better buy because \_\_\_\_\_.
- The unit rate of \_\_\_\_\_ per \_\_\_\_\_ is larger/smaller for Store A/B.

# Apples to Apples

## Challenge Problems

1. Allow time for students to finish their work on the *Apples to Apples* task from the previous day of instruction.
2. Have pairs of students work together to complete the challenge problems.

My cat ate 50 cans of cat food in the last 30 days. If I am going on vacation for 7 days, how many cans should I leave for the cat sitter?

**Answer:** 12 cans per day (50 cans  $\div$  30 days =  $1\frac{2}{3}$  cans per day;  $1\frac{2}{3}$  cans per day  $\times$  7 days =  $11\frac{2}{3}$  cans)

The lawns in my neighborhood are all the same size. My neighbor can mow his lawn and my lawn in 2.5 hours. If he were planning to mow 7 lawns on our street, how long should he expect it to take?

**Answer:** 8.75 hours (2.5 hours  $\div$  2 lawns = 1.25 hours per lawn; 1.25 hours per lawn  $\times$  7 lawns = 8.75 hours)

# Animal Health at the Zoo

## STEAM Challenge

## Materials and Preparation

- Prepare a set or list of supplies to show students (beads, 3 cardboard tubes, construction paper, 10 craft sticks, 2 empty water bottles, 6 paper cups, 6 paper plates, 3 feet of string, masking tape).

## Read Aloud

1. Ask a volunteer to share a quick, one-sentence summary of what was read yesterday in the *Animal Health at the Zoo* book.
2. Continue reading aloud from the book for about five minutes. Pause periodically to discuss new information and answer any questions students may have.

## Science Connection

1. Refer students to *Simulating a Natural Habitat* from page 14 of the *Student Guided Practice Book*. Tell students that they will collect and summarize information relating to animal feeding, reproduction, or enrichment in zoos.

2. Organize students in groups of three, with one student in each group representing an aspect of animal behavior (feeding, reproduction, enrichment). Have students complete *Simulating a Natural Habitat* and share their summaries in their groups.

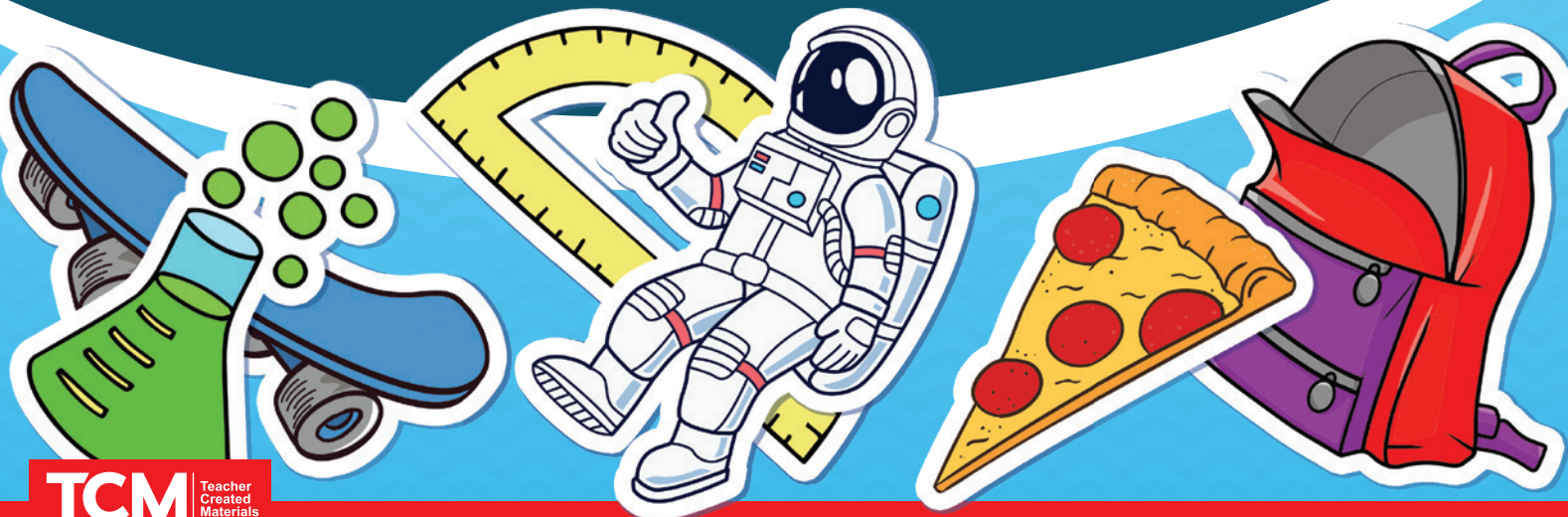
## Design

1. Organize students in teams, and ask teams to have members share the designs they created on the previous day of instruction using *Make a Plan* from page 8 of the *Student Guided Practice Book*.
2. Have groups choose, sketch, and label team designs on the Team's Design section of *Make a Plan*. Each team should incorporate ideas from individual students' designs. (Team designs must be submitted for teacher approval before building begins.)
3. Tell students they will build models of their team designs on the next day of instruction.

SUMMER  
**Scholars**  
Mathematics

# Student Guided Practice Book

Rising 7th Grade



Name: \_\_\_\_\_ Date: \_\_\_\_\_

# Ice Cream



Day 1

**Directions:** Complete the table to find the solution.

- 1 Jeffrey has a part-time job at an ice cream store. One of his customers purchased 8 gallons of ice cream and paid \$56.00. How much would she pay for 5 gallons of ice cream?

|           |   |   |   |   |   |   |   |       |
|-----------|---|---|---|---|---|---|---|-------|
| Gallons   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8     |
| Cost (\$) |   |   |   |   |   |   |   | 56.00 |

Solution: \_\_\_\_\_

-  Explain your reasoning.

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- 2 Jeffrey notices that the shop sells 10 chocolate cones for every 30 strawberry cones. How many strawberry cones would the shop expect to sell if it sold 6 chocolate cones?

|                  |   |   |   |   |   |   |   |   |   |    |
|------------------|---|---|---|---|---|---|---|---|---|----|
| Chocolate Cones  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Strawberry Cones |   |   |   |   |   |   |   |   |   | 30 |

Solution: \_\_\_\_\_

-  Explain your reasoning.

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Name: \_\_\_\_\_ Date: \_\_\_\_\_

# On Track

**Directions:** Complete the table to find the solution.

- 1 Jack ran laps on the track at his middle school. He ran 48 laps in 8 days. He ran the same number of laps each day. How many laps did he run in 4 days?

|             |   |   |   |   |   |   |   |    |
|-------------|---|---|---|---|---|---|---|----|
| <b>Days</b> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8  |
| <b>Laps</b> |   |   |   |   |   |   |   | 48 |

Solution: \_\_\_\_\_

-  **Explain your reasoning.**

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- 2 For every 24 hours Jenny studies, her sister Emily studies 8 hours. If Emily studies 3 hours, how long does Jenny study?

|              |   |   |   |   |   |   |   |    |
|--------------|---|---|---|---|---|---|---|----|
| <b>Emily</b> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8  |
| <b>Jenny</b> |   |   |   |   |   |   |   | 24 |

Solution: \_\_\_\_\_

-  **Explain your reasoning.**

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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Day 1



# Apples to Apples

You have the task of purchasing 20 pounds of apples for a large picnic. You can shop at one of these three stores:

- Convenience 4 You is selling 2-pound bags for \$2.30.
- Grocery Palace is selling 4-pound bags for \$4.48.
- Lots O' Stuff is selling 10-pound bags for \$10.90.

Which store has the best deal? How much would 20 pounds of apples cost at this store?



## Challenge Problems

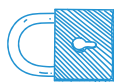
My cat ate 50 cans of cat food in the last 30 days. If I am going on vacation for 7 days, how many cans of cat food should I leave for the cat sitter?

The lawns in my neighborhood are all the same size. My neighbor can mow his lawn and my lawn in 2.5 hours. If he were planning to mow 7 lawns on our street, how long should he expect it to take?

# STEAM CHALLENGE

## Define the Problem

You are a volunteer at a zoo in your area. The staff at the zoo have asked you to create a new food enrichment toy that can be used in one of the primate (monkey, ape, lemur) enclosures at the zoo. You get to choose which primate you create the enrichment toy for.



**Constraints:** You may only use the materials provided to you.



**Criteria:** Your enrichment toy must create a challenge for the animal to get food. Also, it must be appropriate for the primate based on their behaviors, diet, and overall needs.



## Research and Brainstorm

What type of primate will you create the food enrichment toy for? What types of food enrichment items are used in zoos for different primates? What do you like and dislike about those designs? What will be challenging or stimulating about the toy you create?



## Design and Build

Sketch two or more designs for your food enrichment toy. Label the parts and the materials. Choose the design you think will work best and be most stimulating for the animal. Then, build your enrichment toy.



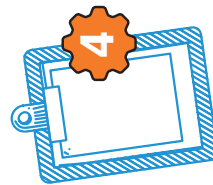
## Test and Improve

Place items in your enrichment toy to represent the animal's food or treats (such as small beads). Show it to others. Explain how it works and why it would be a good source of enrichment for the primate you chose. Then, model how it works. Would it be easy for a zoo employee to prepare? Would it be challenging and stimulating for the animal to use? How can you make it better? Modify your design and rebuild it as needed. Reassess how well it meets the criteria.



## Reflect and Share

Was your second design better than your first? How do you know? What surprises or problems did you encounter during this challenge? How did you solve them?



Name: \_\_\_\_\_ Date: \_\_\_\_\_

# Make a Plan

**Directions:** Summarize the challenge. Then, sketch your design to solve the challenge.

**Challenge:** \_\_\_\_\_  
\_\_\_\_\_

## My Design

**Directions:** Sketch your team's design. Label the materials needed.

## Team's Design



# Quick Check

**Directions:** Choose all ratios that are equivalent to the given ratio.

- 1 The ratio of dogs to cats is 4:3.
- (A) The ratio of dogs to cats is 7:6.
  - (B) The ratio of dogs to cats is 16:9.
  - (C) The ratio of dogs to cats is 12:9.
  - (D) The ratio of dogs to cats is 20:15.

**Directions:** Choose the solution that correctly matches the situation.

- 2 A park has 15 maple trees for every 5 locust trees. If there are 3 locust trees, how many maple trees are there? Complete the table to help you find the solution.
- (A) 3
  - (B) 9
  - (C) 6
  - (D) 12

|                     |   |   |   |   |    |
|---------------------|---|---|---|---|----|
| <b>Locust Trees</b> | 1 | 2 | 3 | 4 | 5  |
| <b>Maple Trees</b>  |   |   |   |   | 15 |

**Directions:** Solve.

- 3 Roxanne is making her own Halloween costume. She bought 6 yards of fabric for \$24.00. How much will 4 yards of fabric cost? Use any method. Explain your reasoning.

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Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Directions:** Solve.

- 1 The ratio of Xs to Os is 10:5. If there are 3 Os, how many Xs are there? Fill in the table to find the solution.

|          |   |   |   |   |    |
|----------|---|---|---|---|----|
| <b>O</b> | 1 | 2 | 3 | 4 | 5  |
| <b>X</b> |   |   |   |   | 10 |

Solution: \_\_\_\_\_

- Explain your reasoning.

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- 2 The ratio of pears to pineapples is 12:4. If there are 5 pineapples, how many pears are there? Fill in the table to find the solution to the question.

|                   |   |   |   |    |   |
|-------------------|---|---|---|----|---|
| <b>Pineapples</b> | 1 | 2 | 3 | 4  | 5 |
| <b>Pears</b>      |   |   |   | 12 |   |

Solution: \_\_\_\_\_

- Explain your reasoning.

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# Extend Learning Task

**Directions:** Write an equation for each ratio.

- 1 \$72 for 8 bags of peanuts.  
Write the unit rate.

\_\_\_\_\_

Write the equation.

\_\_\_\_\_

-  Explain your thinking.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- 2 The ratio of girls to boys is 25 to 5.  
Write the unit ratio.

\_\_\_\_\_

Write the equation.

\_\_\_\_\_

-  Explain your thinking.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Name: \_\_\_\_\_ Date: \_\_\_\_\_

# Independent Practice

**Directions:** Find the unit rate and complete the table to find the solution. Explain your answer.

- 1 Patrick receives an allowance of \$7.00 each week. What is the total amount he receives in 4 weeks?

| Weeks          | 1 | 2 | 3 | 4 |
|----------------|---|---|---|---|
| Allowance (\$) |   |   |   |   |

Unit Rate: \_\_\_\_\_

 **Explanation:**

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- 2 One 10-ounce soft drink contains about 8 teaspoons of sugar. How much sugar would be in three 10-ounce drinks?

| Soft Drink (10 oz.) | 1 | 2 | 3 | 4 |
|---------------------|---|---|---|---|
| Sugar (tsp.)        |   |   |   |   |

Unit Rate: \_\_\_\_\_

 **Explanation:**

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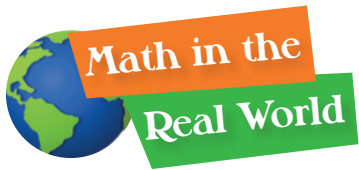
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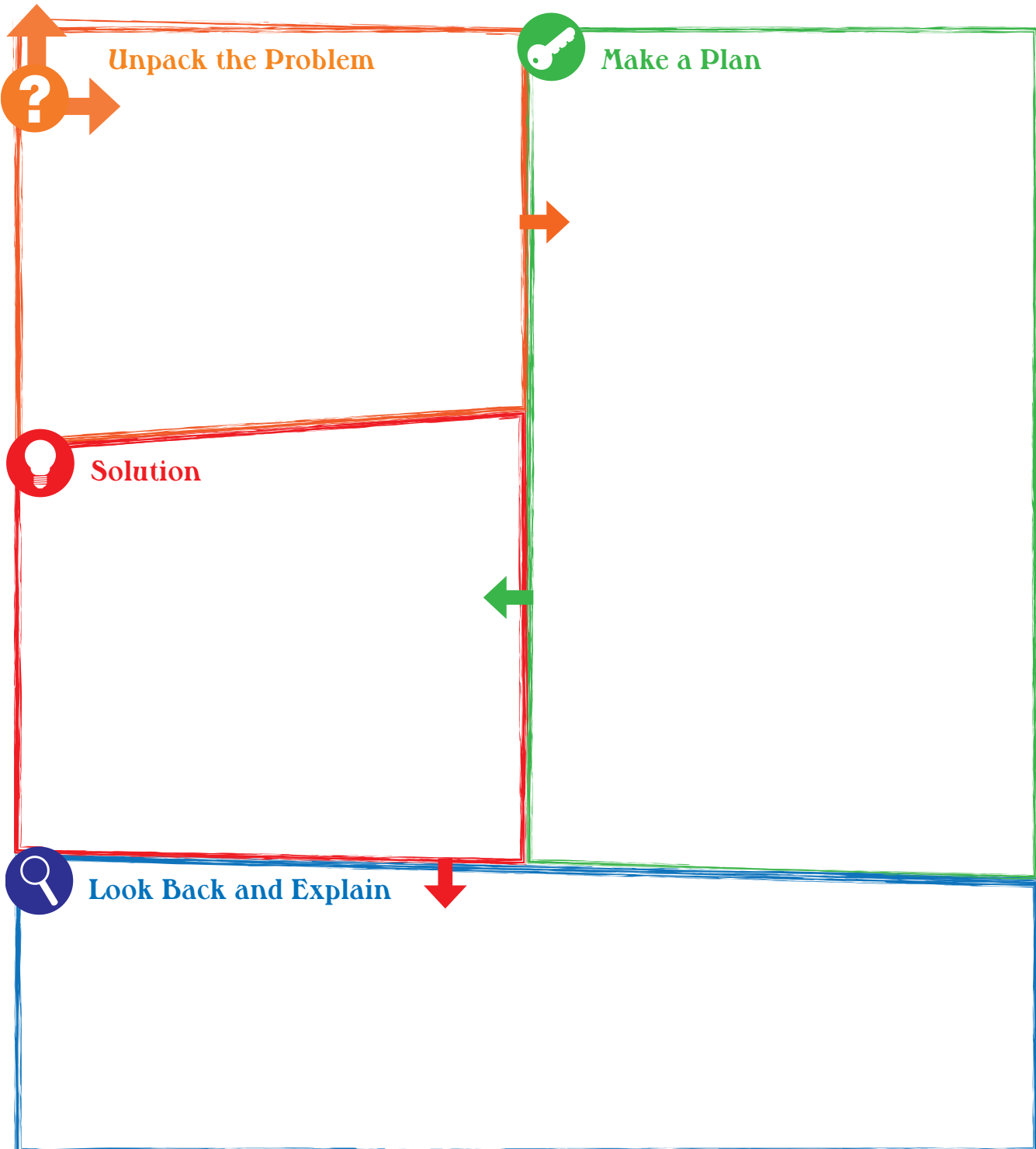
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# Comparison Shopping

Day 2

Ricardo is buying supplies for the school store. He needs 650 pencils. At Store A, he can buy 250 pencils for \$20.00. At Store B, he can buy 300 pencils for \$27.00. Which is the better buy? How much would Ricardo pay at the better price?



Name: \_\_\_\_\_ Date: \_\_\_\_\_

# Simulating a Natural Habitat

Day 2

**Directions:** Summarize information relating to animal feeding, reproduction, or enrichment from *Animal Health at the Zoo*.

**Animal behavior:** \_\_\_\_\_

| Task   | Summary |
|--|---------|
| Use key terms and concepts from the text to explain how animals engage in this activity in their natural habitats. |         |
| How do animals do this activity differently in captivity?  |         |
| How do zookeepers simulate this activity for animals in captivity?   |         |
| Include any other relevant information relating to this topic.   |         |