i-Ready Classroom Mathematics

OREGON EDITION

Oregon Teacher Toolbox

Resource Sampler

Grade 7

Engaging Resources to Drive

i-Ready Classroom Mathematics, Oregon Edition includes a wealth of resources to meet the needs of all learners. The Oregon Teacher Toolbox resources are accessible through the Teacher Digital Experience via i-ReadyConnect.com.

Easily Access All Grades K–8 Resources on the Oregon Teacher Toolbox:

- Oregon Enhancement Activities E/S
- Activity Sheets E/S
- Assessments *(Lesson Quizzes, Practice Tests, and Unit Assessments—Forms A and B)* E/S
- Cumulative Practice E/S
- Develop Session Videos
- Digital Math Tools Powered by Desmos
- Discourse Cards E/S
- Graphic Organizers E/S
- Games *(Unit Level K–8 and Grade Level K–2)* E/S
- Enrichment Activities E/S
- Family Letters E/S
- Fluency and Skills Practice E/S
- Implementation Support

E/S = Available in English and Spanish

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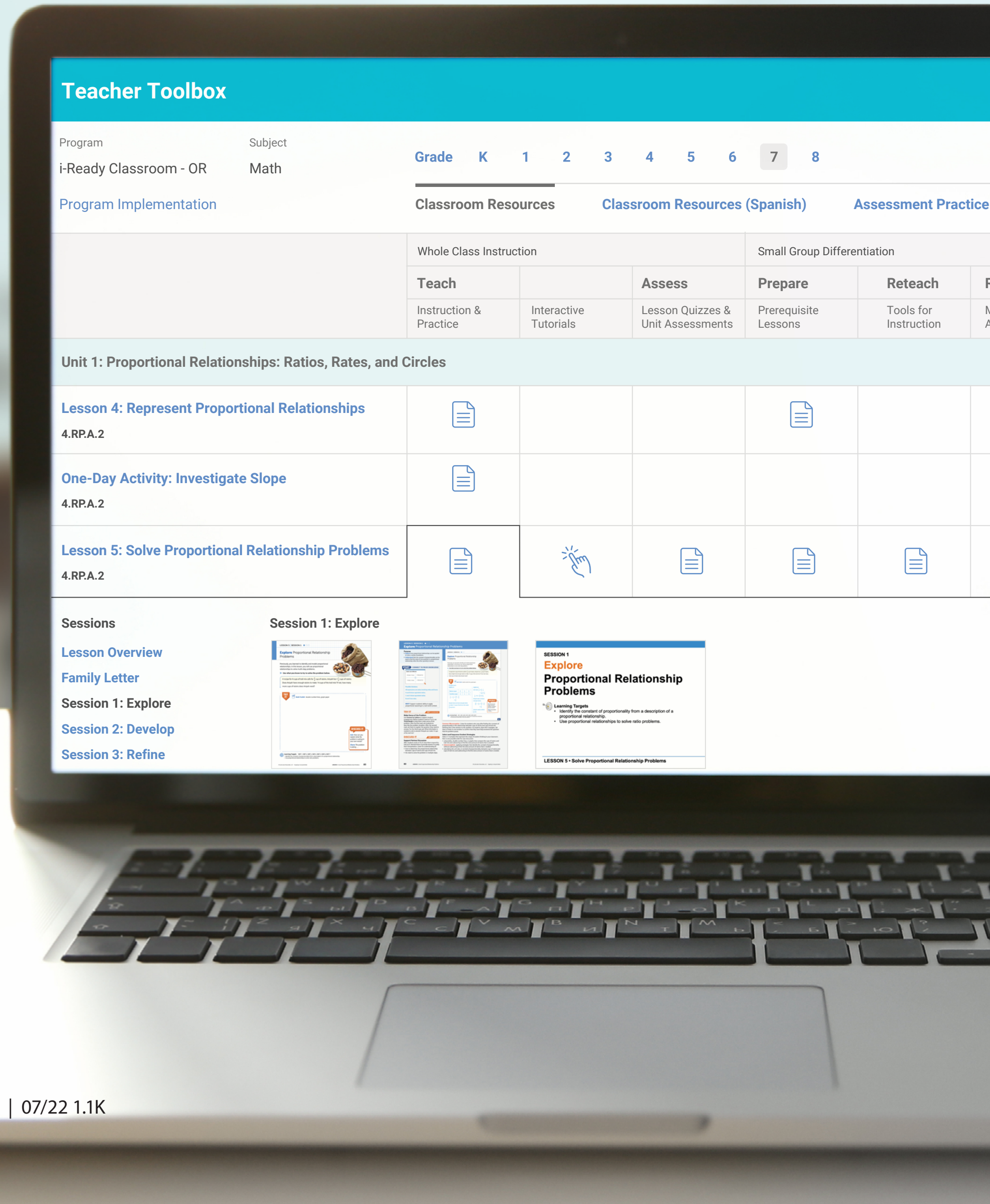
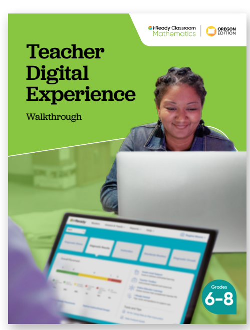


Student Growth

- Interactive Tutorials E/S
- Literacy Connection Activities E/S
- Math Center Activities *(On Level, Below Level, and Above Level)* E/S
- Student Worktext PDFs E/S
- PowerPoint® Slides *(Editable)* E/S
- Prerequisite Lessons E/S
- Professional Learning Videos
- Teacher's Guide PDFs
- Tools for Instruction E/S
- Unit Flow & Progression Videos *(Closed Captioned in English and Spanish)*

Table of Contents

This sampler includes some of the lesson- and unit-level resources available on Oregon Teacher Toolbox for **Unit 4: Algebraic Thinking: Expressions, Equations, and Inequalities**, **Lesson 18: Write and Solve Multi-Step Equations**.

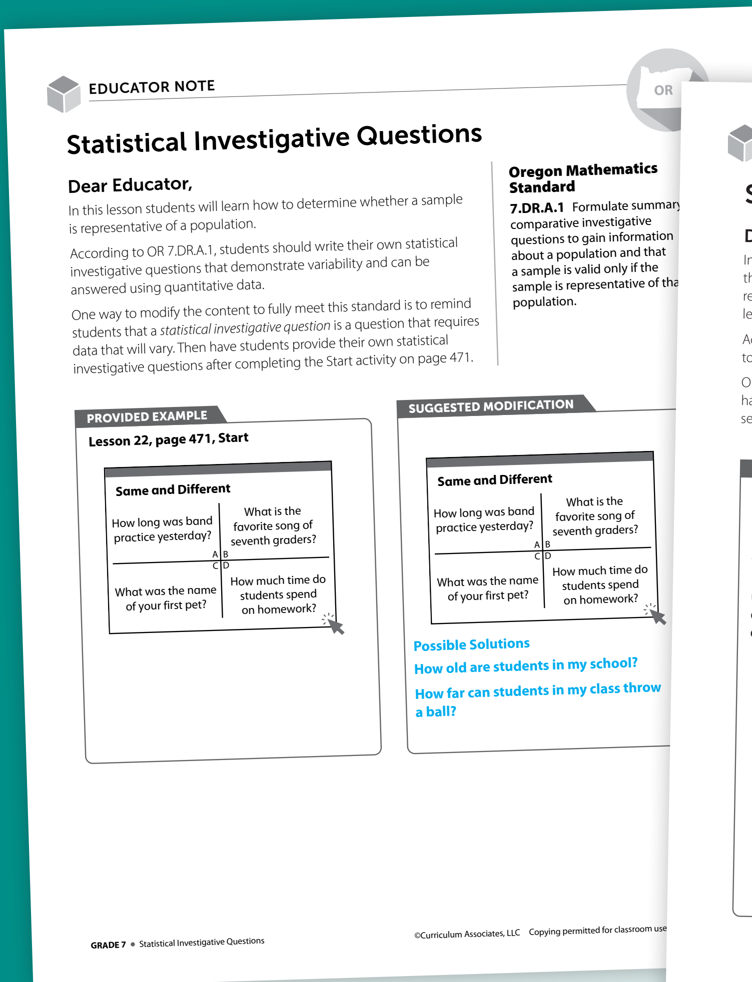


Check out the Teacher Digital Experience Walkthrough to see more digital resources!

Explore all Grades K–8 resources in your demo account. Review the Teacher Digital Experience Walkthrough to see how.

Oregon Enhancement Activities

Oregon Enhancement Activities provide additional notes and activities to ensure all the Oregon Mathematics Standards are addressed. **Following are the two types of Enhancement Activities.**



EDUCATOR NOTE

OR

Statistical Investigative Questions

Dear Educator,

In this lesson students will learn how to determine whether a sample is representative of a population.

According to OR 7.DR.A.1, students should write their own statistical investigative questions that demonstrate variability and can be answered using quantitative data.

One way to modify the content to fully meet this standard is to remind students that a *statistical investigative question* is a question that requires data that will vary. Then have students provide their own statistical investigative questions after completing the Start activity on page 471.

Oregon Mathematics Standard

7.DR.A.1 Formulate summar[y] comparative investigative questions to gain information about a population and that a sample is valid only if the sample is representative of tha[t] population.

PROVIDED EXAMPLE

Lesson 22, page 471, Start

Same and Different

How long was band practice yesterday?	What is the favorite song of seventh graders?
What was the name of your first pet?	How much time do students spend on homework?

SUGGESTED MODIFICATION

Same and Different

How long was band practice yesterday?	What is the favorite song of seventh graders?
What was the name of your first pet?	How much time do students spend on homework?

Possible Solutions

How old are students in my school?

How far can students in my class throw a ball?

GRADE 7 • Statistical Investigative Questions

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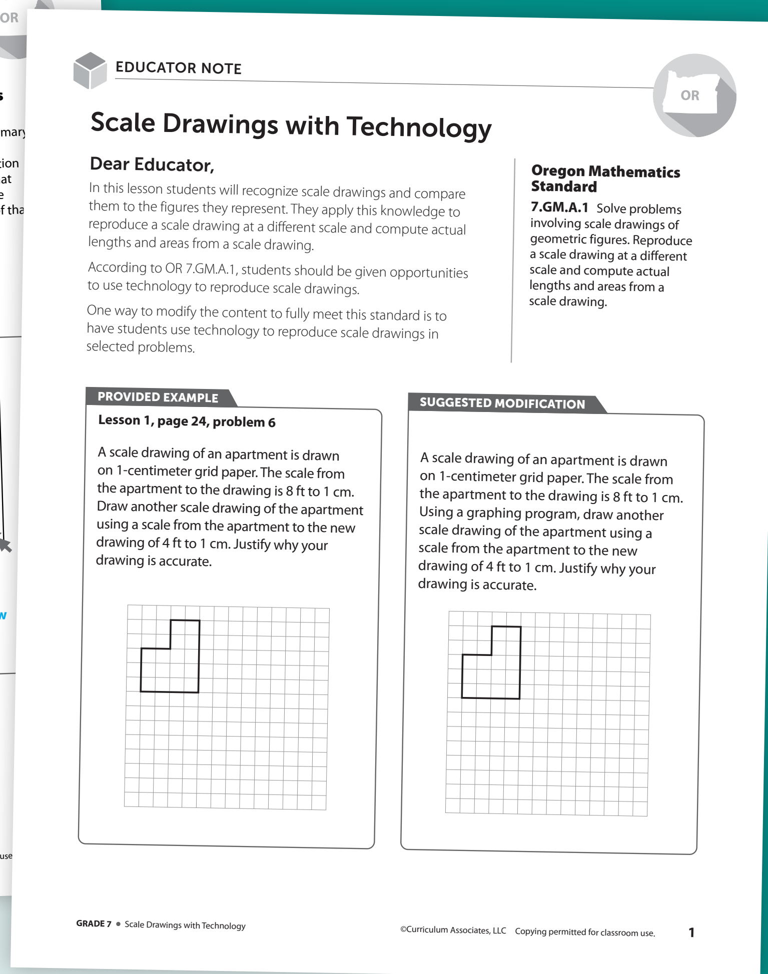

EDUCATOR NOTE

OR

Scale Drawings with Technology

Dear Educator,

In this lesson students will recognize scale drawings and compare them to the figures they represent. They apply this knowledge to reproduce a scale drawing at a different scale and compute actual lengths and areas from a scale drawing.

According to OR 7.GM.A.1, students should be given opportunities to use technology to reproduce scale drawings.

One way to modify the content to fully meet this standard is to have students use technology to reproduce scale drawings in selected problems.

Oregon Mathematics Standard

7.GM.A.1 Solve problems involving scale drawings of geometric figures. Reproduce a scale drawing at a different scale and compute actual lengths and areas from a scale drawing.

PROVIDED EXAMPLE

Lesson 1, page 24, problem 6

A scale drawing of an apartment is drawn on 1-centimeter grid paper. The scale from the apartment to the drawing is 8 ft to 1 cm. Draw another scale drawing of the apartment using a scale from the apartment to the new drawing of 4 ft to 1 cm. Justify why your drawing is accurate.

SUGGESTED MODIFICATION

A scale drawing of an apartment is drawn on 1-centimeter grid paper. The scale from the apartment to the drawing is 8 ft to 1 cm. Using a graphing program, draw another scale drawing of the apartment using a scale from the apartment to the new drawing of 4 ft to 1 cm. Justify why your drawing is accurate.

GRADE 7 • Scale Drawings with Technology

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Educator Notes

- Describe how the content in the *i-Ready Classroom Mathematics, Oregon Edition* instructional program varies from the expectations of the Oregon Mathematics Standards.
- Also include an example of how the content might be modified in order to better address the Oregon Mathematics Standards.

Educator Notes are provided when:

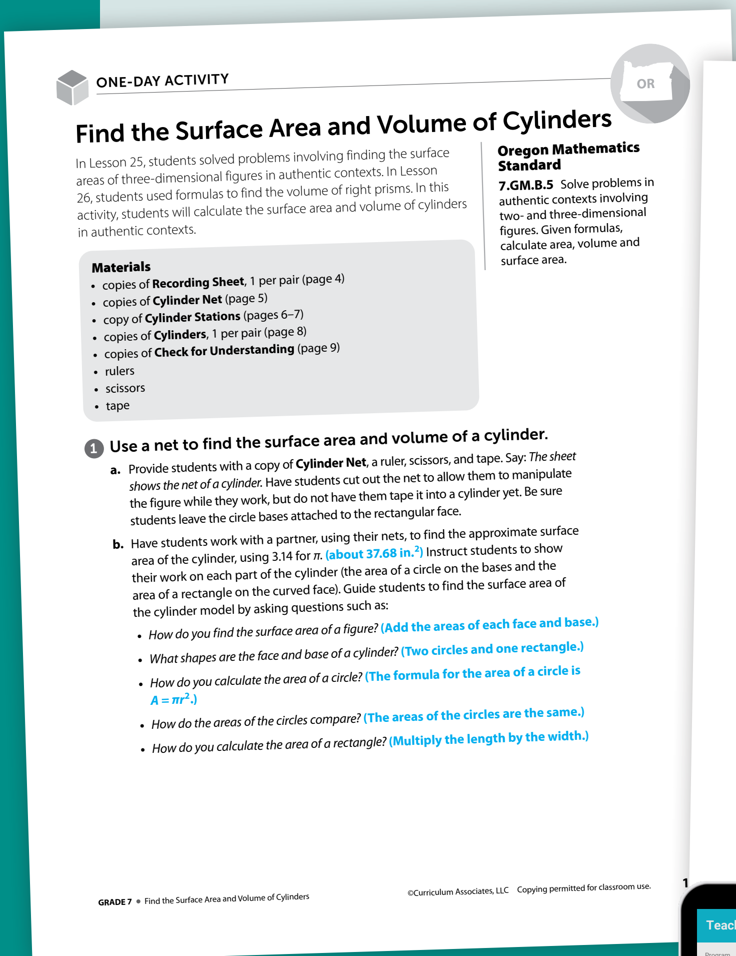
- Oregon Mathematics Standards require different content limits or vocabulary terms OR
- A clear modification can tailor the *i-Ready Classroom Mathematics, Oregon Edition* instructional program to address Oregon expectations

One-Day Activities

- Step-by-step, teacher-led activities with a focus on hands-on tasks for students
- Activity sheets provided within the activity as needed to support student work

One-Day Activities are provided when:

- There is a less comprehensive Oregon Mathematics Standard that is not addressed by the *i-Ready Classroom Mathematics, Oregon Edition* instructional program OR
- The scope of a Oregon Mathematics Standard goes beyond the instruction provided


ONE-DAY ACTIVITY

OR

Find the Surface Area and Volume of Cylinders

In Lesson 25, students solved problems involving finding the surface areas of three-dimensional figures in authentic contexts. In Lesson 26, students used formulas to find the volume of right prisms. In this activity, students will calculate the surface area and volume of cylinders in authentic contexts.

Oregon Mathematics Standard

7.GM.B.5 Solve problems in authentic contexts involving two- and three-dimensional figures. Given formulas, calculate area, volume and surface area.

Materials
- copies of **Recording Sheet**, 1 per pair (page 4)
- copies of **Cylinder Net** (page 5)
- copy of **Cylinder Stations** (pages 6–7)
- copies of **Cylinders**, 1 per pair (page 8)
- copies of **Check for Understanding** (page 9)
- rulers
- scissors
- tape

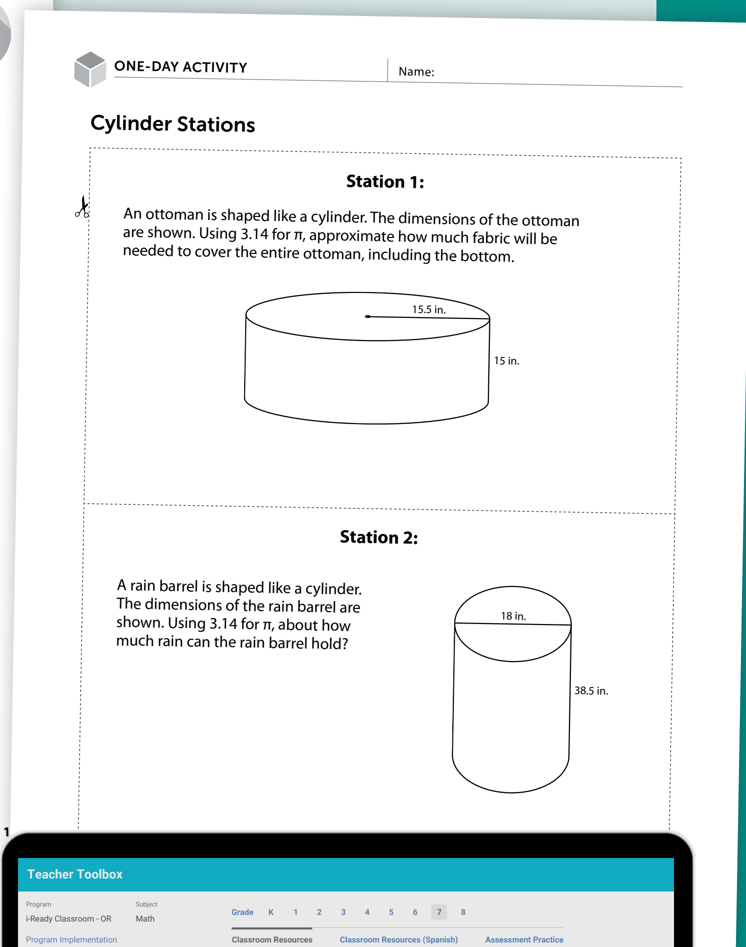
1 Use a net to find the surface area and volume of a cylinder.

a. Provide students with a copy of **Cylinder Net**, a ruler, scissors, and tape. Say: *The sheet shows the net of a cylinder.* Have students cut out the net to allow them to manipulate the figure while they work, but do not have them tape it into a cylinder yet. Be sure students leave the circle bases attached to the rectangular face.

b. Have students work with a partner, using their nets, to find the approximate surface area of the cylinder, using 3.14 for π. **(about 37.68 in.^{2})** Instruct students to show their work on each part of the cylinder (the area of a circle on the bases and the area of a rectangle on the curved face). Guide students to find the surface area of the cylinder model by asking questions such as:

- *How do you find the surface area of a figure?* **(Add the areas of each face and base.)**
- *What shapes are the face and base of a cylinder?* **(Two circles and one rectangle.)**
- *How do you calculate the area of a circle?* **(The formula for the area of a circle is $A = \pi r^2$.)**
- *How do the areas of the circles compare?* **(The areas of the circles are the same.)**
- *How do you calculate the area of a rectangle?* **(Multiply the length by the width.)**

GRADE 7 • Find the Surface Area and Volume of Cylinders ©Curriculum Associates, LLC Copying permitted for classroom use. 1


ONE-DAY ACTIVITY Name:

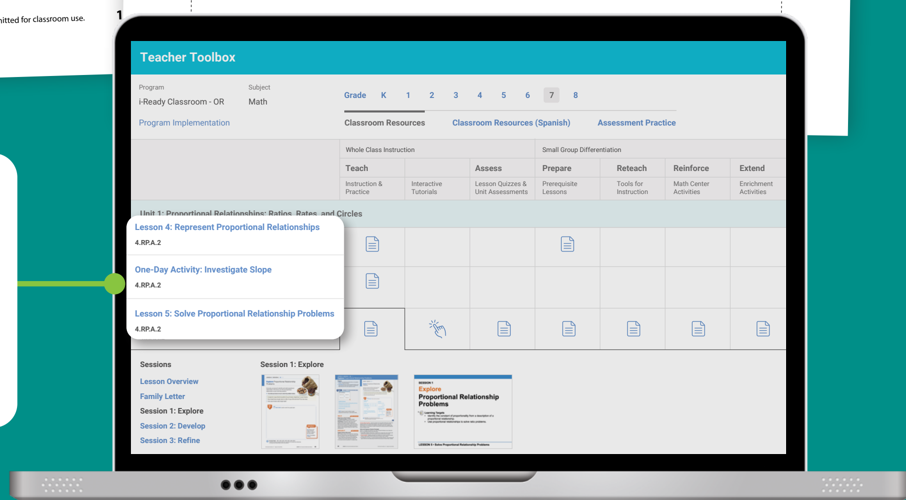
Cylinder Stations

Station 1:

An ottoman is shaped like a cylinder. The dimensions of the ottoman are shown. Using 3.14 for π, approximate how much fabric will be needed to cover the entire ottoman, including the bottom.

Station 2:

A rain barrel is shaped like a cylinder. The dimensions of the rain barrel are shown. Using 3.14 for π, about how much rain can the rain barrel hold?



Teacher pages and student recording sheet shown here. The full activity and additional **Enhancement Activities** can be accessed through the Oregon Teacher Toolbox.

EDUCATOR NOTE

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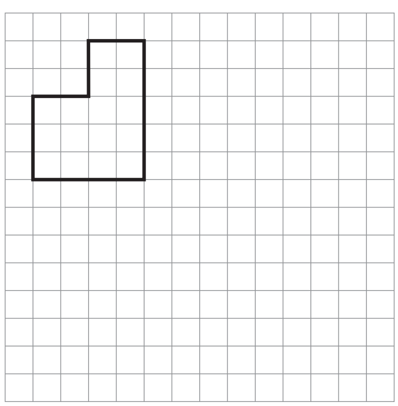

SUGGESTED MODIFICATION

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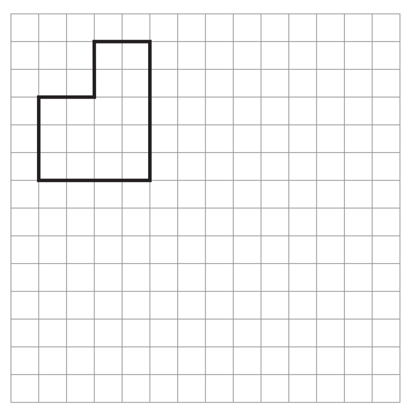

ONE-DAY ACTIVITY

OR

Find the Surface Area and Volume of Cylinders

In Lesson 25, students solved problems involving finding the surface areas of three-dimensional figures in authentic contexts. In Lesson 26, students used formulas to find the volume of right prisms. In this activity, students will calculate the surface area and volume of cylinders in authentic contexts.

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- copies of **Check for Understanding** (page 9)
- rulers
- scissors
- tape

Oregon Mathematics Standard

7.GM.B.5 Solve problems in authentic contexts involving two- and three-dimensional figures. Given formulas, calculate area, volume and surface area.

1 Use a net to find the surface area and volume of a cylinder.

a. Provide students with a copy of **Cylinder Net**, a ruler, scissors, and tape. Say: *The sheet shows the net of a cylinder.* Have students cut out the net to allow them to manipulate the figure while they work, but do not have them tape it into a cylinder yet. Be sure students leave the circle bases attached to the rectangular face.

b. Have students work with a partner, using their nets, to find the approximate surface area of the cylinder, using 3.14 for π. **(about 37.68 in.^{2})** Instruct students to show their work on each part of the cylinder (the area of a circle on the bases and the area of a rectangle on the curved face). Guide students to find the surface area of the cylinder model by asking questions such as:

- *How do you find the surface area of a figure?* **(Add the areas of each face and base.)**
- *What shapes are the face and base of a cylinder?* **(Two circles and one rectangle.)**
- *How do you calculate the area of a circle?* **(The formula for the area of a circle is $A = \pi r^2$.)**
- *How do the areas of the circles compare?* **(The areas of the circles are the same.)**
- *How do you calculate the area of a rectangle?* **(Multiply the length by the width.)**

ONE-DAY ACTIVITY

c. Guide students to connect lengths on the net to the dimensions of the cylinder by asking questions such as:

- *What is the distance around a circle called?* **(circumference)**
- *How does the circumference of the circle in the net relate to the rectangle? How do you know?* **(The width of the rectangle is equal to the circumference of the circle; When I fold the rectangle around the circle, it is the same length as the circumference of the circle.)**
- *How does the height of the rectangle in the net relate to the dimensions of the cylinder it forms?* **(The height of the rectangle is equal to the height of the cylinder, or the distance between the two circular bases.)**

d. Instruct students to tape the net into a cylinder.

e. Have students try to find the approximate volume of the cylinder model, using 3.14 for π. **(about 15.70 in.^{3})** Guide students to find the volume of the cylinder model by asking questions such as:

- *How do you find the volume of a figure?* **(Multiply the area of the base by the height of the figure.)**
- *What shape is the base of the cylinder?* **(A circle.)**
- *How do you calculate the area of a circle?* **(The formula for the area of a circle is $A = \pi r^2$.)**
- *What is the height of the cylinder?* **(5 inches)**

f. Have students share and compare their work with another pair in the class.

2 Practice finding the surface area and volume of a cylinder.

a. Place the **Cylinder Stations** around the room at different locations. Provide pairs of students with a copy of **Recording Sheet** 2.

b. Instruct students to go to each station in any order. At each station, students will find either the surface area or volume of a cylinder.

c. Have students record their solutions to the problems on the Recording Sheet. Guide students to solve the problems by asking questions such as:

- *Is the problem asking you to find the surface area or volume? How do you know?*
- *How do you find the surface area of a cylinder?* **(Add the areas of each face and base.)**
- *How do you find the volume of a cylinder?* **(Multiply the area of the base by the height of the figure.)**

d. Have students share and compare their work on the Recording Sheet. **(Check that students solve the problem at each station.)**

ONE-DAY ACTIVITY

3 Solve a real-world problem by finding the surface area and volume of cylinders.

a. Provide pairs of students with a copy of **Cylinders**. Have students read the problem.

b. Guide students to develop a plan to solve the problem by asking questions such as:

- *What requirements does the company have for selecting a new can?* **(It must contain approximately 2 to $2\frac{2}{3}$ cups of food, or 28.875 to 38.40 cubic inches of food, and must not use too much material.)**
- *How can the company assess how much food each can contains?* **(Find the volume of each type of can.)**
- *What information do you need to determine the volume of each type of can?* **(The area of the base of each can and the height of each can.)**
- *How can the company assess how much material each can uses?* **(Find the surface area of each type of can.)**
- *What information do you need to determine the surface area of each type of can?* **(The radius of the circular base of each can and the height of each can.)**

c. Have students solve the problem, using 3.14 for π to approximate their answers. **(Can A; Can B uses the least amount of material but does not hold enough food. Can A and Can C both hold enough food, but Can C uses more material than Can A.)**

d. Have students share and compare their work with another pair in the class.

4 Check for understanding.

Provide students with **Check for Understanding**. Have students solve the problems on the sheet. **(about 47.10 ft^2; about 9.81 ft^3)**

Observe and monitor students' reasoning and guide or redirect them as necessary. Use the table below to pinpoint where extra support may be needed.

If you observe...	the student may...	Then try...
the student says David needs about 9.8 ft^2 of fabric or about 47.1 ft^3 of foam,	have confused volume with surface area.	asking the student to list situations involving finding volume versus those involving finding surface area.
the student calculates the area of the base of the cylinder using the diameter instead of the radius,	have confused the diameter and radius of a circle.	having the student draw a circle and label its radius, diameter, and circumference.
the student says David needs about 117.75 ft^2 of fabric or about 98.13 ft^3 of foam,	have used the diameter of the circle instead of the height of the cylinder.	having the student draw a cylinder and label its radius, diameter, and height.

ONE-DAY ACTIVITY | Name:

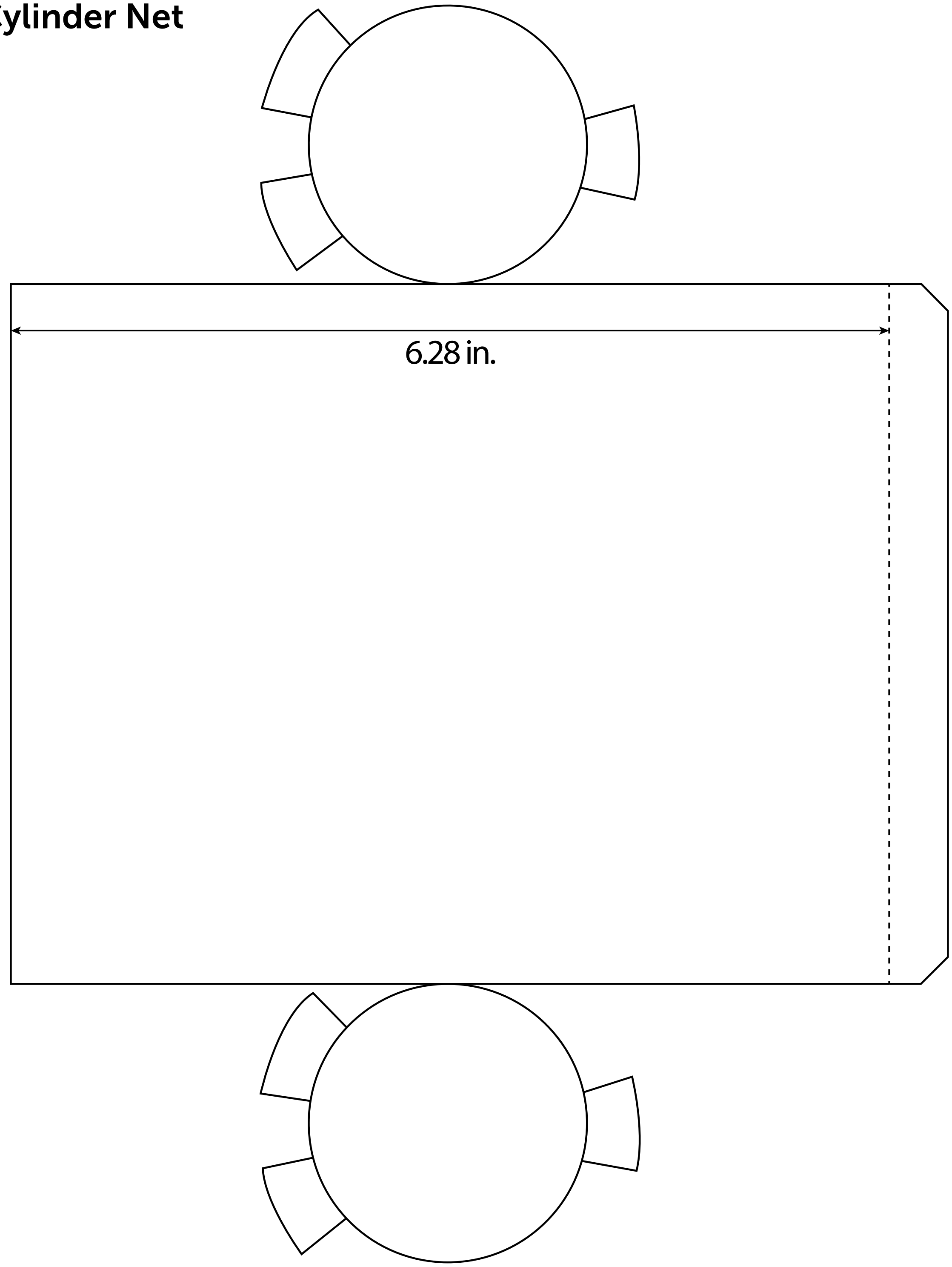
Recording Sheet 2

Formulas: $A = \pi r^2$, $A = \ell \times w$, $SA = 2\pi r^2 + 2\pi rh$, $V = \pi r^2 h$

Station 1: Solution: ______________________	**Station 2:** Solution: ______________________
Station 3: Solution: ______________________	**Station 4:** Solution: ______________________

ONE-DAY ACTIVITY | Name:

Cylinder Net

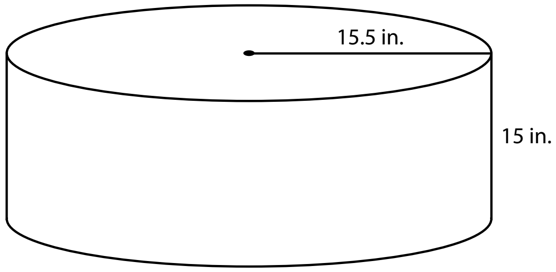


ONE-DAY ACTIVITY Name:

Cylinder Stations

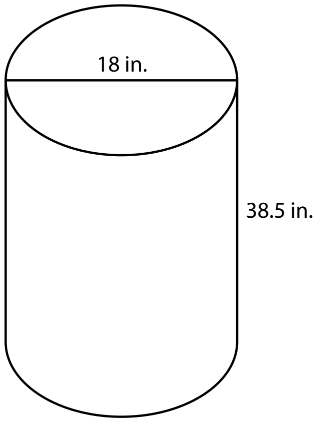
Station 1:

An ottoman is shaped like a cylinder. The dimensions of the ottoman are shown. Using 3.14 for π, approximate how much fabric will be needed to cover the entire ottoman, including the bottom.



Station 2:

A rain barrel is shaped like a cylinder. The dimensions of the rain barrel are shown. Using 3.14 for π, about how much rain can the rain barrel hold?

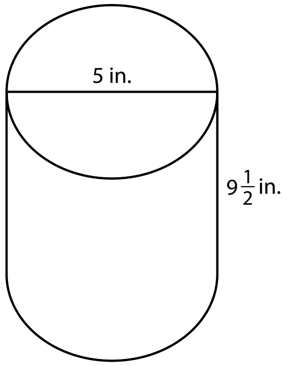


ONE-DAY ACTIVITY | Name:

Cylinder Stations *continued*

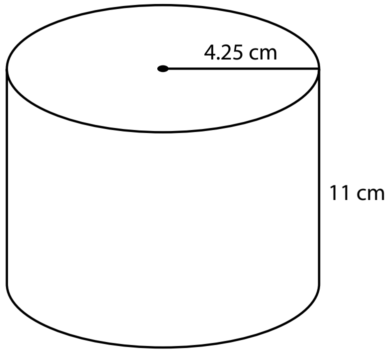
Station 3:

The dimensions of a cardboard tube of oats is shown. Using 3.14 for π, about how much cardboard is needed to make one tube?



Station 4:

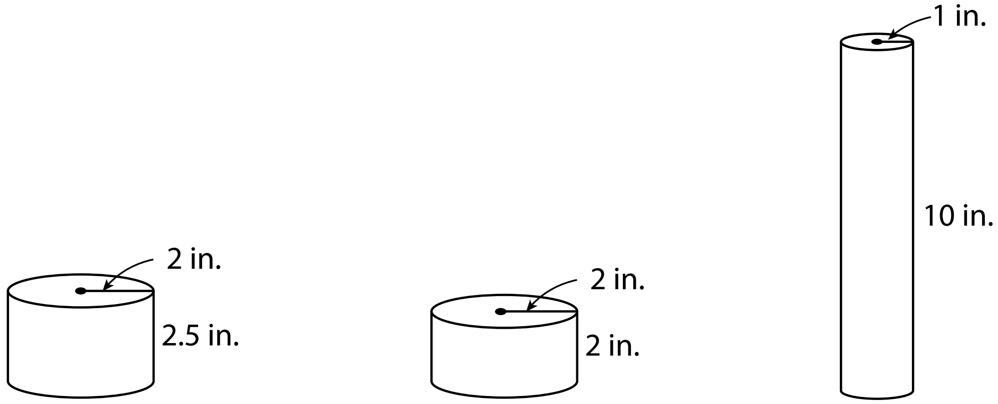
The dimensions of a mug are shown. If a cubic centimeter equals 1 milliliter, approximate how many milliliters of liquid it takes to fill the mug, using 3.14 for π.



ONE-DAY ACTIVITY | Name:

Cylinders

A pet company must select a new can for packaging dog food. The company wants a can that contains approximately 2 to $2\frac{2}{3}$ cups of food, or 28.875 to 38.40 cubic inches of food. It also wants a can that does not use too much material so that the cost to make the can is low. Which can should the pet food company select? Why?

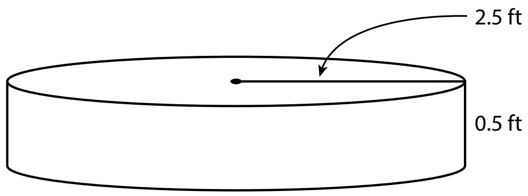


Can A **Can B** **Can C**

ONE-DAY ACTIVITY | Name:

Check for Understanding

David is making a dog bed in the shape of a cylinder. The dimensions of the dog bed are shown.



1. He needs to cover the entire dog bed in fabric. Using 3.14 for π, about how much fabric will it take to cover the dog bed?

2. He needs to fill the dog bed with foam. Using 3.14 for π, approximate how much foam he will need to fill the dog bed.

“I love the rigor of the program, and I love having access to all grade levels of the [Teacher] Toolbox. It allows me to differentiate instruction within each of my math groups.”

—Mathematics Educator

Lesson-Level Resources

Lesson 18: Write and Solve Multi-Step Equations

Additional Practice

Differentiation

Assessment

FLUENCY AND SKILLS PRACTICE | Name: ____________

LESSON 18

Writing and Solving Equations with Two or More Addends

➤ **Solve each equation. The answers are mixed up at the bottom of the page. Cross out the answers as you complete the problems.**

1 $8x + 15 = 63$

2 $9x - 13 = 23$

3 $135 = 2x + 25$

4 $33 = 32x - 31$

5 $12x - 16 = 68$

6 $7x + 115 = 136$

7 $82 = 4x + 14$

8 $2x - 56 = 34$

9 $3x - 4\frac{1}{2} = -19\frac{1}{2}$

10 $10 = -\frac{1}{4}x + 12$

11 $6x + 4.59 = 11.19$

12 $25.68 = 2x - 6.32$

Answers

$x = 1.1$	$x = 45$	$x = -5$	$x = 6$
$x = 7$	$x = 16$	$x = 4$	$x = 55$
$x = 17$	$x = 8$	$x = 2$	$x = 3$

Tools for Instruction

Write Equations to Solve Problems

Objective Write and solve equations to solve word problems.

This activity gets at the heart of algebra: writing an equation to model a situation and solving the equation to answer a question about the situation. To do this successfully, students must integrate many previously-learned skills. They must write expressions to model real-world situations, apply properties of operations and order of operations to write equivalent expressions, compute fluently with integers, convert between forms of rational numbers (fractions, decimals, percents), and use estimation strategies to assess reasonableness of solutions. In addition, students must be comfortable solving one-step word problems in the forms $x + p = q$ and $px = q$.

Take time to enable students to become comfortable making sense of multi-step word problems and persevering to find a solution. Encourage students to think critically about the problem situation and construct viable arguments. Help them choose appropriate tools and use effective modeling strategies.

Step by Step 20–30 minutes

1 Present the problem.

- Present the student with a word problem that can be translated into an equation. The goal is to give the student a rich real-world context that translates to an equation that has two operations and one variable. Provide numerical data using words (for example, "of" for multiplication) and numbers.
- Say: *Mark buys a shirt and two pairs of identical jeans. The shirt costs $28.98. If the total cost is $72.50, what is the price of each pair of jeans?*

2 Analyze the problem.

- Help the student identify the known information. Mark buys one shirt for $28.98. Mark also buys 2 pairs of jeans, and the total cost is $72.50.
- Help the student identify the question they need to answer: What is the cost of one pair of jeans?
- Have the student assign a variable, such as j, to represent the unknown quantity. Encourage the student to write this down, for example, as: *Let j equal the cost of one pair of jeans.*

3 Develop a model of the situation.

- Use bar models, words, or diagrams to model the problem.
- Describe the situation in words:
  cost of shirt + cost of two pairs of jeans = total cost

$28.98	jeans	jeans
$72.50		

4 Write and solve an equation.

- Based on the description, use a variable and write an equation that represents the situation:

$28.98 + j + j = 72.5$

$28.98 + 2j = 72.5$

Tools for Instruction

- Remind the student that the fundamental rule of solving equations is "If I do something on one side of the equal sign, I must do the same action on the other side too, to keep the equation balanced." Here is one approach to solving the equation:

$$28.98 + 2j = 72.5$$

$$28.98 - 28.98 + 2j = 72.5 - 28.98$$ Subtract 28.98 from both sides of the equation.

$$2j = 43.5$$

$$\frac{2j}{2} = \frac{43.5}{2}$$ Divide both sides of the equation by 2.

$$j = 21.75$$

- Help the student relate the solution to the problem context: One pair of jeans costs $21.75.

5 Determine if the solution is reasonable.

- Work can be considered incomplete until the student has asked and answered the question "Does this solution make sense?" The solution can be checked by substituting the calculated value of *j* into the original equation and seeing if the answer makes the equation true.
- Say: *Use estimation to explain why the answer is reasonable.* (The 3 items cost about $70. The shirt costs about $30. That leaves about $40 for the two pairs of jeans. Half of $40 is $20. $21.75 is close to $20. The solution makes sense.) Optional: Have the student make an estimate after Step 3. After finding an exact solution, compare it to the estimate.

6 Repeat with additional problems.

Check for Understanding

Present the following problem. Ask the student to write an equation and find the solution.

All of the students in the Spanish Club and 6 students from the French Club are going on a field trip. Of all the students on the trip, $\frac{3}{4}$ are taking a bus from the school. If 24 students take the bus, how many students are in the Spanish Club? ($24 = \frac{3}{4}(s + 6)$, 26 students)

For the student who struggles, use the chart below to help pinpoint where extra help may be needed.

If you observe…	the student may…	Then try…
the student answers 12 students	have solved $s + 6 = \frac{3}{4}(24)$.	using a bar model to help the student write an equation.
the student answers 40 students	have solved $\frac{3}{4}s = 24 + 6$.	having the student describe the problem situation in words.
the student answers 12 students	have written the correct equation but multiplied 24 by $\frac{3}{4}$ instead of $\frac{4}{3}$.	reviewing division by fractions.

CENTER ACTIVITY ●● | Names:

LESSON 18

Write and Solve Algebraic Equations

On Level is shown here.

What You Need

- Recording Sheet, 1 per team
- Question Cards

What You Do

1. Shuffle the **Question Cards** and put them facedown in a pile.
2. Work in two teams. Each team draws a **Question Card**. On your team's **Recording Sheet**, write the number of the card and then write an equation to model the problem.
3. Trade **Recording Sheets** and **Question Cards** with the other team. The other team determines if the equation modeling the problem is correct. That team then solves the equation, showing their work.
4. Trade **Recording Sheets** back. Check to see if the other team's solution is correct.
5. Each team draws another card. Repeat the process until all of the **Question Cards** have solutions.

Check Understanding

Christina has a backpack that weighs $\frac{3}{4}$ pound. She puts three books in the backpack. Each book has the same weight. The total weight of the backpack with the books is $7\frac{7}{8}$ pounds. Write and solve an equation to find the weight, *b*, of each book.

Go Further

Choose one card that the opposite team solved. Show a different solution method for the same equation.

CENTER ACTIVITY ●●

Names:

LESSON 18

Write and Solve Algebraic Equations

Record your equation and solution to each **Question Card** in the table below.

RECORDING SHEET

Question Card Number	Equation	Solution

CENTER ACTIVITY ●●

LESSON 18

Names:

QUESTION CARDS

1 Trace is buying notebooks. Each notebook is \$2 off the original price. He buys 8 notebooks for \$28. What is the original price of a notebook?	2 Quentin is collecting rocks. He has a case that will hold 65 rocks. He starts with 21 rocks now and collects 4 new rocks each week. How many weeks will it take Quentin to fill his case?
3 A rectangle has a width that is 6 inches less than its length. The perimeter of the rectangle is 72 inches. What is the length?	4 Carson decides to buy a new phone. He pays \$255 up front, and then will pay a set amount each month for 15 months. The total cost of the phone is \$600. How much will Carson pay each month?
5 Kate deposits some money into a new bank account. Her parents add \$45. Her grandparents give her 2.5 times the amount she and her parents added. Her grandparents give Kate \$250. How much did Kate deposit to start her account?	6 Toni buys 6 shirt-and-short outfits. The shirts each have the same price. The shorts each have the same price. A shirt costs \$2.99 more than a pair of shorts. Her total cost without tax is \$125.58. What is the price for each pair of shorts?
7 Four times the sum of two consecutive even integers is 40. What is the greater of the two even integers?	8 There are 68 students from three classes going on a field trip. Together, Ms. Cho's class and Mrs. Wye's classes have 6 more students going than Mr. Ott's class. How many students from Mr. Ott's class are going on the field trip?

CENTER ACTIVITY ●●● | Names:

LESSON 18

Write and Solve Algebraic Equations

Above Level is shown here.

What You Need

- Recording Sheet, 1 per team
- Question Cards

What You Do

1. Shuffle the **Question Cards** and put them in a pile facedown.
2. Work in two teams. Each team draws a **Question Card**. On your team's **Recording Sheet**, write the number of the card and then write an equation to model the problem.
3. Trade **Recording Sheets** and **Question Cards** with the other team. The other team determines if the equation modeling the problem is correct. That team solves the equation, showing their work.
4. Trade **Recording Sheets** back. Check to see if the other team's solution is correct.
5. Each team draws another card. Repeat the process until all of the **Question Cards** have solutions.

Check Understanding

Gavin has a shipping box that weighs $1\frac{3}{4}$ pounds. He packs five ukuleles in the box. Each ukulele has the same weight. The total weight of the box with the ukuleles is $8\frac{5}{16}$ pounds. Write and solve an equation to find the weight, *u*, of each ukulele.

Go Further

Choose one card that the opposite team solved. Show a different solution method for the same equation. Explain your solution steps.

CENTER ACTIVITY ●●● | Names:

LESSON 18

Write and Solve Algebraic Equations

Record your equation and solution to each **Question Card** in the table below.

RECORDING SHEET

Question Card Number	Equation	Solution

CENTER ACTIVITY ●●● | Names:

LESSON 18

QUESTION CARDS

1

Magdalena is packing a shipping box. The empty box weighs $\frac{3}{8}$ pound. She adds books that weigh $2\frac{1}{4}$ pounds each. Magdalena's box now weighs $16\frac{1}{8}$ pounds. How many books does Magdalena pack?

2

Oren joins a gym. He pays a monthly fee plus a one-time joining fee of $45. Oren pays $124.50 for the first 3 months. What is the monthly fee?

3

Two sides of an isosceles triangle are each represented by $2x + 2$. The length of the third side is represented by $4x - 2$. The perimeter is 42 inches. What is the length of the third side?

4

Robert pays $7.99 per month for a movie subscription service. One month he also rents 3 movies from the service. His bill for the month is $19.96. How much does Robert pay to rent each movie?

5

Jia has some money in a bank account. She deposits $35 more. Her parents deposit $45. Then her grandparents give her 1.5 times the total amount in her account. Her grandparents give Jia $322.50. How much did Jia already have in her account?

6

Jabari buys 4 shirt-and-pants outfits. The shirts each have the same price. The pants each have the same price. A pair of pants costs $5.99 more than a shirt. His total cost without tax is $95.72. What is the price for each pair of pants?

7

The sum of three consecutive even integers is 42. What is the greatest of the three even integers?

8

There are 74 students from three classes going on a field trip. Ms. Shaw's class has 6 more students going on the trip than Mr. Brown's class. Mrs. Lee's class has 7 fewer students going on the trip than Mr. Brown's class. How many students from Mr. Brown's class are going on the field trip?

CENTER ACTIVITY ● Names:

LESSON 18

Write and Solve Algebraic Equations

Below Level is shown here.

What You Need

- Recording Sheet, 1 per team
- Question Cards

What You Do

1. Shuffle the **Question Cards** and put them in a pile facedown.
2. Work in two teams. Each team draws a **Question Card**. On your team's **Recording Sheet**, write the number of the card and then write an equation to model the problem.
3. Trade **Recording Sheets** and **Question Cards** with the other team. The other team determines if the equation modeling the problem is correct. That team then solves the equation, showing their work.
4. Trade **Recording Sheets** back. Check to see if the other team's solution is correct.
5. Each team draws another card. Repeat the process until all of the **Question Cards** have solutions.

Check Understanding

Karim has a backpack that weighs 2 pounds. He puts three books in the backpack. Each book has the same weight. The total weight of the backpack with the books is 8 pounds. Write and solve an equation to find the weight, b, of each book.

Go Further

Choose one card that the opposite team solved. Show a different solution method for the same equation.

CENTER ACTIVITY ● Names:

LESSON 18

Write and Solve Algebraic Equations

Record your equation and solution to each **Question Card** in the table below.

RECORDING SHEET

Question Card Number	Equation	Solution

CENTER ACTIVITY ●
LESSON 18

Names:

QUESTION CARDS

1 Oliver buys 4 pineapples. Each pineapple is \$2 off the original price. He pays \$4. What is the original price of a pineapple?	2 Karrie is collecting baseball cards. She has a case that will hold 100 cards. She starts with 25 cards now and collects 5 new cards each week. How many weeks will it take Karrie to fill her case?
3 Lola buys 5 movie tickets. She has a coupon for \$3 off each ticket. She pays \$45 for the tickets. What is the regular price of a movie ticket?	4 The perimeter of a rectangular horse pasture is 38 meters. The length is 5 meters more than its width. What is the width of the pasture?
5 Notah decides to buy a new phone. He pays \$200 up front, and then will pay the same amount each month for 8 months. The total cost of the phone is \$600. How much will Notah pay each month?	6 Akiko sells 5 small paintings and 5 large paintings. Each large painting costs \$20 more than a small painting. She earns \$300. What is the price of a small painting?
7 Two times the sum of two consecutive integers is 50. What is the greater of the two integers?	8 Paula deposits some money into a new bank account. Her parents add \$40. Her grandparents give her 2 times the amount she and her parents added. Her grandparents give Paula \$200. How much did Paula deposit to start her account?

ENRICHMENT ACTIVITY
LESSON 18

Name:

What's the Temp?

Your Challenge

➤ **Temperatures are commonly measured in degrees Celsius (°C) or degrees Fahrenheit (°F). You can convert from degrees Celsius to degrees Fahrenheit by using the formula $C = \frac{5}{9}(F - 32)$, where C is the temperature in degrees Celsius, and F is the temperature in degrees Fahrenheit.**

Is there a temperature that has the same value in degrees Fahrenheit as it does in degrees Celsius? If so, what is that temperature? Explain.

LESSON 18 • QUIZ

Name:

➤ **Solve the problems.**

Digital Comprehension Checks are also available.

1. What is the value of x in the equation $-5.4 = 4x - 1.8$?

   A -14.4

   B -1.8

   C -0.9

   D 0.9

2. Kenya starts to solve the equation $5\frac{3}{4} - \frac{1}{6}x = 4\frac{1}{2}$. She writes $1\frac{1}{4} = \frac{1}{6}x$. Is this a valid way to solve the equation?

   A Yes, because there are still fractions.

   B No, because you cannot change the side of the equation that x is on.

   C Yes, because she subtracts $4\frac{1}{2}$ from both sides and adds $\frac{1}{6}x$ to both sides.

   D No, because the coefficient of x has changed from negative to positive.

3. Kaylin buys a greeting card for \$3.79. She then buys 4 postcards that all cost the same amount. The total cost of the greeting card and postcards is \$5.11. How much is each postcard? Show your work.

SOLUTION ______________________________

LESSON 18 • QUIZ Name:

4 Jordyn weighs ingredients on a kitchen scale to make bread. The bowl weighs $1\frac{1}{2}$ pounds. He adds several scoops of flour. The total weight of the bowl and the flour is $2\frac{3}{4}$ pounds. If each cup of flour weighs $\frac{5}{16}$ pound, how many cups of flour does he add? Show your work.

SOLUTION ______________________________

5 Riku says that a and b have the same value in the equations $0.75(a - 2) = 5.25$ and $\frac{3}{4}b - \frac{3}{2} = \frac{21}{4}$. Is Riku correct? Why or why not? Show your work.

SOLUTION ______________________________

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—Mathematics Educator

Unit-Level Resources

Unit 4: Algebraic Thinking: Expressions, Equations, and Inequalities

GAME
UNIT 4

Name:

The Inequality Solution

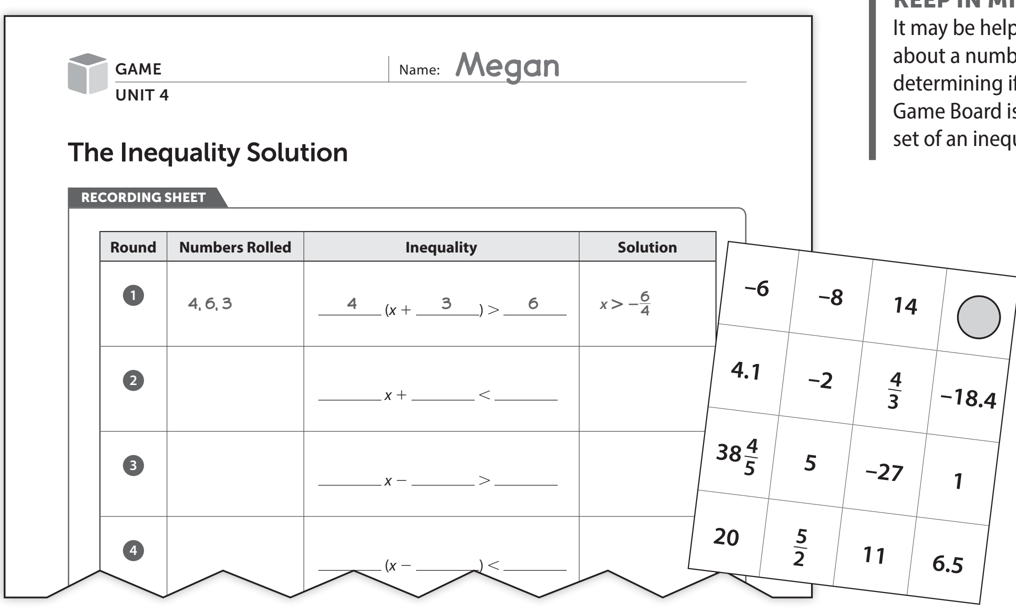
What You Need

- Recording Sheet (1 for each player)
- Game Board
- 3 number cubes labeled as follows: 1 labeled 0–4 and "free choice"; 1 labeled 5–9 and "free choice"; 1 labeled 1–6
- counters (16 of one color per player)

Directions

- Your goal is to solve inequalities in order to cover as many Game Board squares as possible.
- For Round 1, choose one player to roll the number cubes and record the numbers. If "free choice" is rolled, the player may choose any number 0–9.
- The player uses the numbers rolled to fill in the blanks in the inequality for the round. The numbers may be written in any order, except the number 0 cannot be written in the first blank.
- The player solves the inequality and places a counter on a number on the Game Board that is within the solution set. (For example, if the solution is $x < -10$, you could place a counter on –18.4 or –27, because both numbers are less than –10.)
- If no uncovered number on the Game Board is a solution of the inequality, the player's turn ends and no counter is placed.
- After eight rounds, the player with the most spaces covered wins.

Sample Recording Sheet


GAME
UNIT 4
Name: Megan

The Inequality Solution

RECORDING SHEET

Round	Numbers Rolled	Inequality	Solution
1	4, 6, 3	$4(x + 3) > 6$	$x > -\frac{6}{4}$
2		___ x + ___ < ___	
3		___ x − ___ > ___	
4		___ (x − ___) < ___	

−6	−8	14	
4.1	−2	$\frac{4}{3}$	−18.4
$38\frac{4}{5}$	5	−27	1
20	$\frac{5}{2}$	11	6.5

KEEP IN MIND . . .
It may be helpful to think about a number line when determining if a value on the Game Board is in the solution set of an inequality.

GAME
UNIT 4

Name: ____________________

The Inequality Solution

RECORDING SHEET

Round	Numbers Rolled	Inequality	Solution
1		______ $(x +$ ______ $) >$ ______	
2		______ $x +$ ______ $<$ ______	
3		______ $x -$ ______ $>$ ______	
4		______ $(x -$ ______ $) <$ ______	
5		______ $(x +$ ______ $) >$ ______	
6		______ $x +$ ______ $>$ ______	
7		______ $x -$ ______ $>$ ______	
8		______ $x -$ ______ $<$ ______	

GAME | Name:
UNIT 4

The Inequality Solution

GAME BOARD

-6	-8	14	$\frac{1}{2}$
4.1	-2	$\frac{4}{3}$	-18.4
$38\frac{4}{5}$	5	-27	1
20	$\frac{5}{2}$	11	6.5

Welcome Home

by Joyce Mallery

1 As far back as I could recall, basketball has been my passion. My father had set up a basketball hoop in our backyard, and my older brother Andy had started showing me how to play basketball from the time I was small. As I grew older, playing basketball became the focus of my life.

2 In most situations, I tend to be a shy and timid person, but I become someone completely different when I'm on the basketball court. It's almost like a switch turns on inside of me, and I can shut out everything else. When I'm playing basketball, my brother calls me Fast and Furious Fi. *Fi* rhymes with *see*, and Fi is short for Fiona. When I'm playing basketball, the spectators love to chant rhymes during the game: "What do you see, Fi?" "Score one for me, Fi!" and even "Hey Fi, make it three!!"

3 My brother has always been my best friend. While we did all the things that kids generally do to annoy each other, we always seemed to know what was in each other's hearts. But the past year has been so hard for me because my brother enlisted in the Air Force, and shortly after, he was deployed to the Middle East. My heart still thumps when I think back to the night before he left—the night we sat together and silently stared at the stars. "I don't know what I'll do without you," I blurted out, despite my feeble attempt to put on a brave face.

4 Andy was quiet, which is totally unlike him. "I'm scared to leave," he admitted quietly. "But it will be easier for me to be away if I know you're okay, and we can always text and email. I just have to know that you're going to be all right while I'm gone, Fiona—that you're going to be the star of your basketball team and work to get good grades."

5 I hugged him and I couldn't stop crying. My passion is basketball, and I'll work hard to get good grades because I know those things are important to my brother. "Hang in there, Fast and Furious," he whispered, trying his best to reassure me. But instead of fast and furious, I felt lost and lonely.

6 My life just wasn't the same after Andy left. My friends didn't seem to comprehend how I felt now that my brother was not around and how I worried about him. "I'd love to have my brother leave for awhile," my best friend Chloe once said. It took all the strength I had not to start crying, and I could tell that Chloe immediately regretted her remark. "I guess that was a thoughtless thing to say," she mumbled apologetically. "I know how much you love Andy."

7 The following week, Chloe and I were at the library when she called me over to her computer and pointed to a website. "Fiona, look at this," she said excitedly. "My mom told me about this: Troop Greeters official website. People assemble at the airport and greet the troops that pass through." We read the mission statement together: The mission of Troop Greeters is to express the nation's gratitude and appreciation to the troops, for those going overseas and for those heroes coming home.

Source: *Ready Reading*, Grade 7, Lesson 13

8 The website said we could contact the group for additional information. "Let's go outside and call," Chloe suggested. I grabbed my cell phone and dialed the number. A woman answered, and she explained it all to us. "We'll let you know when flights are arriving," she said. "Have at least one parent accompany you. The welcome means so much to our returning and departing military personnel."

9 That night I discussed it with my parents. "This sounds like a wonderful idea," Mom said. "And we'll bring Chloe, too, since it was her idea."

10 Then, the night before we were scheduled for our first meet–and–greet, I started to get really nervous about talking to strangers. Finally, I called Chloe. "I can't do this. I'll have no idea what to say!" I moaned.

11 "Wait a minute—you can't back out now!" Chloe snapped. "What happened to 'Fast and Furious Fi' of the basketball court? You're acting more like a foolish and flighty fan in the bleachers!" Then, in a softer voice, she added, "I've got an idea. Why don't you bring your basketball with you. That way the troops will know something about you right from the start, and you'll have something to talk about."

12 The next morning we stood in line with the other troop greeters. Suddenly, there was a rush of footsteps and uniforms, and we could feel an electric buzz of excitement and energy. The first man in line looked at me, smiled, and shook my hand. "Thank you for coming," he said. "And you're a basketball player! Can I borrow this?" He grabbed the ball and started dribbling and laughing. Then he passed it to his friend.

13 I took a deep breath and forced myself to ask, "Did you play basketball in high school? I play for my varsity team." That remark brought a grin to several faces.

14 After that, it was easy for me to talk to the troops. Each one said hello and asked about my basketball. And every time I said, "Welcome home!" I knew in my heart that someday soon I would be uttering those words to my own hometown hero—my brother.

LITERACY CONNECTION
UNIT 4

Name: ______________________________

Welcome Home

Expressions, Equations, and Inequalities

➤ **Solve each problem. Show your work.**

1. In basketball, getting the ball in the net can be worth either 1, 2, or 3 points. Clayton plays in two basketball games. He makes a three-point shots in the first game and b three-point shots in the second game. Write an expression that represents the total points scored on three-point shots in the two games. Explain why the expression works.

2. Suki plays in a basketball game. She makes some three-point shots. She also makes 5 field goals (2 points each) and 4 free throws (1 point each). She scores a total of 26 points. How many three-point shots does Suki make?

SOLUTION ____

LITERACY CONNECTION | Name: ____________________
UNIT 4

3 A standard basketball court is a rectangle with a perimeter of 288 feet. The length of the court is 44 feet greater than its width. What is the width of the court?

SOLUTION ____________________

4 Elena orders tickets to a local basketball tournament. The tickets cost \$16 each. There is a one-time \$5 service fee to purchase tickets. Elena has \$135 to spend on the tickets. Write an inequality that represents the number of tickets Elena can buy. What is the greatest number of tickets Elena can buy?

SOLUTION ____________________

UNIT 4 • UNIT ASSESSMENT
FORM A

Name: ______________________

➤ **Solve the problems.**

Form A is shown here. Digital Comprehension Checks and Form B are also available.

1 Which expression is equivalent to $-4(2k - 6) - 4k$?

A $4k + 24$

B $-8k + 20$

C $-12k + 24$

D $-12k - 24$

2 Decide if the expressions are equivalent.
Choose *Yes* or *No* for each pair of expressions.

	Yes	No
a. $4(-2b + 5)$ and $2(-4b + 10)$	○	○
b. $-9h - 4.5$ and $-0.75(12h - 4.5)$	○	○
c. $-7(k - 2 + 3k - 4)$ and $28k - 42$	○	○
d. $\frac{1}{8}(48m + 24)$ and $6m + 3$	○	○

3 At a restaurant, small tables have a chairs, and large tables have b chairs.

PART A Donna notices that there are 12 small tables and 8 large tables. How can the expression $12a + 8b$ help her find the total number of chairs in the dining room? Explain your reasoning.

SOLUTION ____

____

____

PART B A server wants to rearrange the tables into 4 identical rows of small and large tables. How can you rewrite $12a + 8b$ so that the expression shows the number of small tables and the number of large tables in each row? Write your answer in the blanks.

________(________ + ________)

UNIT 4 • UNIT ASSESSMENT | Name:

FORM A continued

4 The length of a rectangle is represented by $8x - 3$. The width of the rectangle is represented by $2x$. The perimeter is 34 centimeters. Which equations represent the perimeter? Select all the correct answers.

A $4(2x + 8x - 3) = 34$

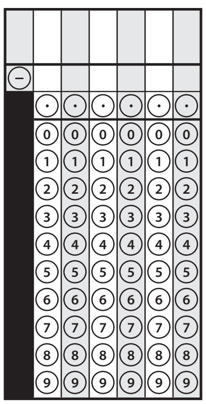
B $2(2x) + 2(8x - 3) = 34$

C $2x + 8x - 3 + 2x + 8x - 3 = 34$

D $20x - 6 = 34$

E $2x(8x - 3) = 34$

5 The sum of half a number, n, and 15 is 24. What is the value of the number n? Record your answer on the grid. Then fill in the bubbles.



6 Which solutions, if any, do the inequalities $-5(x + 4) > 10$ and $x + 3 < -7$ have in common? Show your work.

SOLUTION ______________________________

UNIT 4 • UNIT ASSESSMENT Name: ______________________

FORM A continued

7 Show that $-4(5m - 3)$ and $-20m + 12$ are equivalent. Write your answers in the blanks.

$-4(5m - 3)$

$(-4)(\_\_\_\_\_\_\_\_) + (\_\_\_\_\_\_\_\_)(-3)$

$\_\_\_\_\_\_\_\_ + 12$

8 Jameson Middle School gives bottles of water to teachers and students who are going on a field trip. The school orders 500 bottles of water. They plan to give 35 bottles of water to teachers. They ordered at least 2 bottles of water for each student. How many students could be going on the field trip? Show your work.

SOLUTION ____

____

9 Dayton's family pays \$12 for beach parking and rents 4 paddleboards. Each paddleboard rental costs the same amount. They spend \$80 total. How much does each paddleboard rental cost?

A \$8

B \$17

C \$48

D \$92

UNIT 4 • UNIT ASSESSMENT | Name:

FORM A continued

10 Daria earns h dollars per hour working at a grocery store. She works 9 hours per week. She writes the expression $9 \cdot h \cdot 4$ to represent how much money she earns in a four-week month. Daria's boss writes the expression $36h$ to represent the same value. Which person's expression tells you how many hours Daria works per four-week month? Explain your reasoning.

SOLUTION ______________________________

____

11 Solve $12 = \frac{x-6}{-3}$ for x. Write your answers in the blanks.

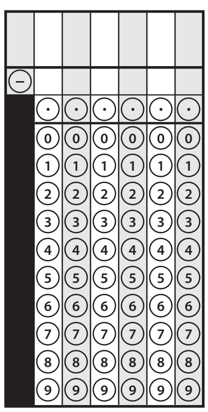
$$-3(12) = \left(\frac{x-6}{-3}\right)(\_\_\_\_\_\_\_\_)$$

$$-36 = x - 6$$

$$-36 + \_\_\_\_\_\_\_\_ = x - 6 + 6$$

$$\_\_\_\_\_\_\_\_ = x$$

12 Monica is one year younger than Dave. Dave is one year younger than Amber. The sum of their ages is 33. How old is Dave? Record your answer on the grid. Then fill in the bubbles.



UNIT 4 • UNIT ASSESSMENT

Name:

FORM A continued

13 Natasha wants to earn an average score of at least 90% in math class. Her test scores so far are 94%, 89%, 88%, 92%, and 85%. What score does she need to earn on her next test to reach her goal? Show your work.

SOLUTION ______________________________

____

14 Consider the following equations:

$a - 5 = 31$

$\frac{1}{2}b - 5 = 31$

$2c - 5 = 31$

Order *a*, *b*, and *c* from least to greatest. Explain your reasoning.

SOLUTION ______________________________

____

____

UNIT 4 • UNIT ASSESSMENT | Name:

FORM A continued

15 Dante is the head cook in the cafeteria. Each lunch includes one serving of pasta and one serving of salad. Pasta costs p dollars per serving, and salad costs s dollars per serving. He needs to order 100 lunches for seventh graders and 100 lunches for eighth graders. Which expressions represent the total cost of the pasta and salad Dante orders? Select all the correct answers.

A $7(p + s) + 8(p + s)$

B $200(p + s)$

C $100(p + s) + 100(p + s)$

D $200p + s$

E $p + s + 200$

F $200p + 200s$

16 Jamie works twice as many hours on the weekend as he does during the week. He earns $7.75 per hour. This week, he wants to earn at least $279.00. Will Jamie meet his goal if he works 10 hours during the week? Show your work.

SOLUTION ______________________________

____

17 In which equation is the value of $(x - 7)$ less: $2(x - 7) = 36$ or $3(x - 7) = 36$? Explain your reasoning.

SOLUTION ______________________________

____

____

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