

General Information

Lesson Parts & Duration

Total Duration: 1 hour

- Investigating Real Life Problems with Solids

Subject(s)

- Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. (5.MD.5)

Objective

- Students will use the formula $V = l \times w \times h$ to find the volume of right rectangular prisms in the context of real life and mathematical problems.
- Students will be able to identify right rectangular prisms in the classroom environment, measure their edges and turn them into mathematical problems.






Materials

- blank paper (1-2 per student)
- pencil & crayons/colored pencils
- right rectangular prism model or a rectangular tissue box
- document camera/projector or whiteboard
- Optional:** printable “Volume” practice sheet (page 5)
- Optional:** printable “Break Up Your Day” brain/movement break ideas (page 6)

Instructional Setting

- Students should be seated with or near another student for partner work.

Throughout this lesson, you will find:

-  **Scripted Text** indicates things that need to be said directly. Bullets starting with a “T” followed by *italicized type* indicate scripted text
-  **Clarifiers** within scripted text are in orange
-  **Teacher Directions** indicate things you should be doing
-  **Side notes** provide helpful hints, ELL strategies, differentiation and information
-  **Break Up Your Day** (Brain/Movement Breaks) are in green boxes (at the end)

Remember!

Quality over quantity. All components do not have to be accomplished; lessons may be ended at any time and resumed later.

Instructional Plan: 60 minutes

Subject

- Investigating Real Life Problems with Solids

Objective

- Students will use the formula $V = l \times w \times h$ to find the volume of right rectangular prisms in the context of real life and mathematical problems.
- Students will be able to identify right rectangular prisms in the classroom environment, measure their edges and turn them into mathematical problems.

Materials

- blank paper (1 per student)
- rulers (1 per two students)
- pencil & crayons/colored pencils
- Optional:** printable “Volume” assessment sheet (page 5)

Pass out 2 pieces of paper per student. One will be for “Notes” and the other for practice.

Introduction

- T** Today we will explore one of the geometric solids, the right rectangular prism.
- T** Does anyone know what a rectangular prism is and can share with the class? **Call on students.**
- T** A great example of this would be a tissue box.
- T** Although some are shaped more like a cube, most tend to be shaped like a rectangular prism.
- T** We will start by identifying its elements, some of which you might already know.
- T** Then, we will move on to finding the volume of a right rectangular prism using whole numbers.
- T** What are the elements of a right rectangular prism?
Call on students to share. Answer: edge, face, base, vertex.
- T** Since we already know what rectangular prisms look like, I am sure that we can find examples of them all around us. **Hand out one piece of blank paper per student.**

Vocabulary:

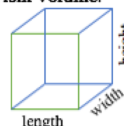
Edge: End of a side of a prism

Face: Flat surface that makes one whole side of a prism

Base: Bottom face of a prism

Vertex: Corner where two or more edges meet

Prism Volume:



Volume = length x width x height

Directions for the Activity

- T** Write your name and date in the top right hand corner of your paper. **See example & model so students can follow.**
- T** Write the title: Right Rectangular Prisms in Real Life.
- T** We are going to work in pairs and explore the classroom environment to find examples of right rectangular prisms.
- T** Divide your paper into 6 boxes. Each box will represent one item from your investigation. **See example & model so students can follow.**
- T** You and your partner should find a total of 6 rectangular prisms, draw a sketch in the corresponding box, and label the item.
- T** Then, you and your partner will use a ruler to measure the edges of each rectangular prism and record it in the same box.
- T** For example, I see that tissue box and decide to use it as my first example of a rectangular prism in my classroom environment.
- T** I will draw a sketch and label the item in the first box on my paper. **See example & model so students can follow.**

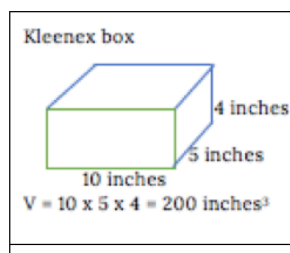
Name & Date

Right Rectangular Prisms in Real Life

- T** Then, I will use the ruler to measure the edges of the tissue box and record them in the same box.
- T** Since we are still using whole numbers for our edges, I will round to the nearest unit.
- T** First I will measure the length of the tissue box.
- T** It looks like the length is 10 inches.
- T** Next, I will measure the width.
- T** When rounding to the nearest inch it looks like the width is 5 inches.
- T** Last, we will measure the height of the tissue box.
- T** The height I measured is 4 inches. **See example & model so students can follow.**
- T** Even though you and your partner will have the same six items because you are working together, I will expect each person to create an individual report sheet with the items from your exploration with your partner.
- T** After you identify, sketch, label and record the measurements, you will find the volume of each right rectangular prism using the formula.
- T** So, let's recap, we need to follow four steps for recording our findings of right rectangular prisms in our classroom environment. **Use fingers to recap.**
1, 2, 3, 4.
- T** 1) Identify shape, 2) Sketch it on your piece of paper, 3) Label the elements of the prism, and 4) Record the measurements of the object.
- T** Now, let's go back to the formula we studied previously.
- T** Can someone remind me what the formula for finding the volume of a rectangular prism is?
Call on one or two students.
- T** My tissue box has dimensions of 5 inches by 10 inches by 4 inches.
- T** I will calculate the volume by multiplying the three numbers.
- T** My result will be 200 in³.
- T** Who can remind me why I write a little 3 as a superscript after inches, a superscript looks like an exponent? **Call on a student to answer. Answer: the superscript 3 stands for the unit for volume -- cubic inches.**
- T** You will work on finding the volume of the six items individually.
- T** Once you are done with all six items, make sure you check your work and then share it with your partner.
- T** After you are done comparing your answers, we will get back together and share your findings.
- T** Any questions before we put our detective hats on? **Give a few seconds wait time before giving out rulers.**

Name & Date

Right Rectangular Prisms in Real Life



Give time to complete this task. Monitor students and provide assistance as needed.

- T** Now that you had some time to look around the classroom and identify and record your findings, let us take some time to share your findings.
- T** Who would like to begin? If you have the same item on your list, show me a thumb instead of interrupting your friends. **Call on a student from each group to answer. Write their ideas on the board.**
- T** Ok, can you also tell me how you found the volume of these objects? **Record steps on the board. Repeat with more volunteers.**
- T** Thank you to those of you who volunteered to share. Now I would like to collect your papers.
- T** Make sure they have your name. **Collect papers and use them as exit slips for this segment. Give them to the teacher to review later on.**
- T** Great! Now that we have seen so many examples we can finish this lesson with a bit of movement!

T So, let's get up and stretch.



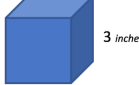
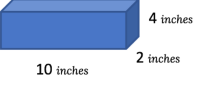


Make sure to "Break Up Your Day!"



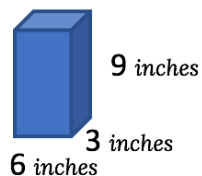
Now is a great time to take a break and get students re-energized.
See our list of engaging movement and brain break ideas to get your students moving and ready to refocus! (see page 6)

Pass out printable volume practice (page 5) –or– project it for students to copy. This is an optional assessment piece. Have students work either independently or with a partner to complete these problems.

Calculate the Volume of these prisms	
Prism 1: 	6 length 3 width 9 height Formula: $6 \times 3 \times 9 = 162$ Answer: Volume = 162 cubic inches
Prism 2: 	9 length 3 width 3 height Formula: $9 \times 3 \times 3 = 81$ Answer: Volume = 81 cubic inches
Prism 3:  Area of Base = 27 centimeters ²	3 or 9 length 3 or 9 width 3 height Formula: $9 \times 3 \times 3 = 81$ -or- $3 \times 9 \times 3 = 81$ Answer: Volume = 81 cubic inches
CHALLENGE	
Prism 4: 	Determine the length, width, & height of a prism that is $\frac{1}{2}$ the size of prism 4. 5 length 1 width 2 height Formula: $5 \times 1 \times 2 = 10$ Answer: Volume = 10 cubic inches
Create your own on the back!	

Calculate the Volume of these prisms

Prism 1:



_____ length
_____ width
_____ height

Formula: _____

Answer: Volume = _____

Prism 2:

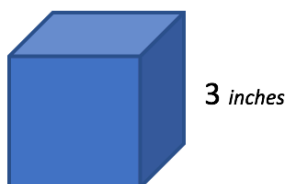


_____ length
_____ width
_____ height

Formula: _____

Answer: Volume = _____

Prism 3:



_____ length
_____ width
_____ height

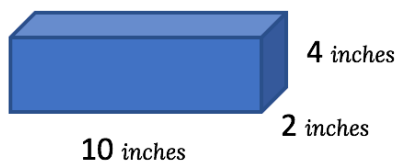
Formula: _____

Answer: Volume = _____

Area of Base= 27 centimeters²

CHALLENGE

Prism 4:



Determine the length, width, & height of a prism that is $\frac{1}{2}$ the size of prism 4.

_____ length
_____ width
_____ height

Formula: _____

Answer: Volume = _____

Create your own on the back!

Make sure to “Break Up Your Day!”

These can be used in the middle of a lesson or at the end of your lesson.

Here are a few engaging movement and brain break ideas to get your students moving and ready to refocus!



Break Up Your Day: Math Outside!



- Students take scratch paper/pencil and find multiplication problems outside.
- Students write multiplication problems they see on the playground. (examples: 3 basketball courts times 6 students equals 18 basketball players, four hopscotches times 5 students equals 20 students playing hopscotch.)



Break Up Your Day: Thumbs Up!



- Student is called on (use name cards or equity cards if available) to state a rounding observation from within the classroom using numbers from 1 to 500.
- Other students signify whether they understand and agree with the observation. (Example: “There are approximately 100 pencils in the classroom because each student has 3 pencils and there are 32 students. 3 times 32 is 96 and 96 rounds to 100.)
- Tally how many students agree with the rounding statements.
- The statement with the most votes or Thumbs Up is the “Round Up Captain”!



Break Up Your Day: Body Stretches!



10 minutes

FORMATION: Standing at desks

- Have students begin the day with a series of simple activities lasting 30 seconds or more: jumping jacks, knee lifts, flap arms like a bird, hopping, scissors (feet apart then cross in front, feet apart then cross in back)...
- Follow each activity with a basic stretching movement:
- Reach for the sky runner’s stretch
- Butterfly stretch (sit with bottom of feet together)
- Knee to chest, rotate ankles, scratch your back

Hold stretches for 10 - 30 seconds. Repeat a different simple activity followed by a new basic stretch as many times as desired.