

STAAR™ Edition



# Closing the Distance

A Flexible Tutorial  
Mathematics, Grade 5



Teacher Edition

 region 4<sup>®</sup>  
Educated Solutions

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## What is *Closing the Distance: A Flexible Tutorial*?

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1

A resource that serves as an intervention for students who are close to success on the State of Texas Assessments of Academic Readiness (STAAR™)

2

A resource that provides opportunities for rigorous mathematical conversations while providing a review of mathematics concepts and skills by integrating related TEKS

3

A resource that keeps students engaged without feeling the pressure of a high-stakes assessment through strategies including modeling, card sorts, paper folding, matching, chart paper recording, cooperative learning, and analysis of student work

4

A resource that provides an opportunity for students to track their progress with analysis of strengths and areas to improve within each lesson and an opportunity for follow-up with parents through an activity for each lesson that is accessible through a QR code

5

A resource of classroom-ready 5E lessons. The Engage phase of each lesson consists of a student-centered activity that either bridges from students' prior knowledge or encourages interest in deeper exploration of the concepts in the lesson. The Explore phase of each lesson provides students with an opportunity to "do mathematics" and begin to formulate ideas and conjectures. In the Explain phase of each lesson, students formalize the mathematical ideas from the Explore phase with a focus on academic vocabulary as well as procedures related to the concepts. The Elaborate phase of each lesson allows students to apply or extend their understanding of the concepts in the lesson. The Evaluate phase consists of four selected-response or griddable items that can be used to assess student understanding.

# What is in a lesson found in *Closing the Distance: A Flexible Tutorial*?

## Volume of Rectangular Prisms

### TEKS

- 5.3 The student adds, subtracts, multiplies, and divides to solve meaningful problems.  
(B) The student is expected to use multiplication to solve problems involving whole numbers (no more than three digits times two digits without technology).  
**Readiness Standard**
- 5.10 The student applies measurement concepts involving length (including perimeter), area, capacity/volume, and weight/mass to solve problems.  
(B) The student is expected to connect models for perimeter, area, and volume with their respective formulas. **Supporting Standard**  
(C) The student is expected to select and use appropriate units and formulas to measure length, perimeter, area, and volume. **Readiness Standard**
- 5.14 The student applies Grade 5 mathematics to solve problems connected to everyday and activities in and outside of school.  
The student is expected to identify the mathematics in everyday situations.  
The student is expected to select or develop an appropriate problem-solving plan or strategy, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem.  
The student is expected to use tools such as real objects, manipulatives, and technology to solve problems.  
The student is expected to communicate about Grade 5 mathematics using informal language.  
The student is expected to explain and record observations using objects, words, pictures, numbers, and technology.  
(B) The student is expected to relate informal language to mathematical language and symbols.
- 5.16 The student uses logical reasoning.  
(A) The student is expected to make generalizations from patterns or sets of examples and nonexamples.  
(B) The student is expected to justify why an answer is reasonable and explain the solution process.

### STAAR™ Reporting Category

- 1 **Numbers, Operations, and Quantitative Reasoning**  
The student will demonstrate an understanding of numbers, operations, and quantitative reasoning.
- 4 **Measurement**  
The student will demonstrate an understanding of measurement.

A QR code may be used to see the Assessed Curriculum as listed on the Texas Education Agency website.

STAAR™ Assessed Curriculum:  
Eligible Texas Essential  
Knowledge and Skills



Each lesson supports multiple student expectations. These are listed at the beginning of each lesson and are labeled as readiness or supporting.

Each lesson identifies the reporting categories addressed within the lesson.

# What is in a lesson found in *Closing the Distance: A Flexible Tutorial*?

## Volume of Rectangular Prisms

### Core Questions

By the end of this lesson, students should be able to answer these core questions:

- What is volume?
- How do you describe the dimensions of a rectangular prism?
- How could you use a formula to find the volume of a rectangular prism?
- How could you determine the height of a rectangular prism given the volume and area of the base?

Key vocabulary terms are identified.

Core questions are provided for each lesson. The activities within each lesson are designed to support student learning.

### Vocabulary Focus

- base
- cubic units
- dimensions
- height
- length
- rectangular prism
- volume
- width

### Lesson Preparation

| Phase   | Materials<br><i>one per student unless otherwise noted</i>  | Instructional Grouping          |
|---------|---|---------------------------------|
| Engage  | <ul style="list-style-type: none"> <li>♦ Centimeter cubes (approximately 60 per group)</li> <li>♦ <b>Volume Riddles</b></li> <li>♦ <b>Building Mat</b></li> </ul>   | Groups of 2 students            |
| Explore | <ul style="list-style-type: none"> <li>♦ <b>Scavenger Hunt Posters</b> for display</li> <li>♦ <b>Scavenger Hunt</b> recording sheet</li> <li>♦ Reference Materials*</li> </ul>                                      | Individual or pairs of students |
| Explain | <ul style="list-style-type: none"> <li>♦ <b>Which Is Greater?</b> Reference Materials*</li> <li>♦ <b>Volume of Rectangular Prisms</b></li> <li>♦ <b>Reflections: Error Analysis</b> Reference Materials*</li> </ul> | Whole-group discussion          |
|         |   | Independent                     |
|         |   | Individual                      |

Materials for each phase are summarized on one page for ease in preparation.

Grouping sizes for each phase are summarized to assist in the arrangement of the classroom.

\* Students may use the STAAR™ Grade 5 Reference Materials as needed throughout the lesson. Reference Materials can be found at <http://www.tea.state.tx.us/student.assessment/staar/math/>.

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Closing the Distance: A Flexible Tutorial, Grade 5



**Volume of Rectangular Prisms**

- **How many layers of cubes would Figure 1 have?**  
8
- **How could you use the number of cubes in the first layer and the number of layers to determine the volume of Figure 1?**  
*Possible answer: I could multiply them together.*
- **If you were to sketch the cubes that form Figure 2, how many cubes would be on the first layer?**  
15
- **How many layers of cubes would Figure 2 have?**  
8
- **How could you use the number of cubes in the first layer and the number of layers to determine the volume of Figure 2?**  
*Possible answer: I could multiply them together.*
- **How could you use the STAAR™ Reference Materials\* to help you determine the volume of each figure?**  
*Possible answer: I could use the Reference Materials to find the formula for volume of a rectangular prism. I could then use the formula to determine the volume of each of the figures and determine which has the greater volume.*

Teacher Notes:

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**EVALUATE**



1. Distribute **Volume of Rectangular Prisms** to each student.
2. Prompt students to complete **Volume of Rectangular Prisms**.
3. Upon completion of **Volume of Rectangular Prisms**, prompt students to complete **My Reflections: Error Analysis** for this lesson. Prompt students to note errors made during the lesson to determine if a pattern exists that needs to be addressed.

Each selected-response item is labeled with the STAAR™ reporting category, a content student expectation, and an underlying processes and tools student expectation as appropriate. Incorrect answer choices are classified according to type.

**Answer Key and Error Analysis for Independent Practice**

| Question Number | Correct Answer | Reporting Category | TEKS  |       | Conceptual Error |   |   | Procedural Error |  | Guess |
|-----------------|----------------|--------------------|-------|-------|------------------|---|---|------------------|--|-------|
|                 |                |                    | 5.10C | 5.14C | A                | B | D |                  |  |       |
| 1               | C              | 4                  | 5.10C | 5.14C | A                | B | D |                  |  |       |
| 2               | D              | 4                  | 5.10C | 5.15B | A                | B | C |                  |  |       |
| 3               | 5              | 4                  | 5.10C | 5.14C |                  |   |   |                  |  |       |
| 4               | A              | 4                  | 5.10C | 5.16A | B                | C | D |                  |  |       |

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Closing the Distance: A Flexible Tutorial, Grade 5

# What is in a lesson found in *Closing the Distance: A Flexible Tutorial*?

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

### My Reflections: Error Analysis

Place a tally mark for each error you may have made while completing the following lesson activities.

|                                     | use the operation of addition | use the operation of subtraction | use the operation of multiplication | use the operation of division | describe and/or determine the dimensions of a rectangular prism |
|-------------------------------------|-------------------------------|----------------------------------|-------------------------------------|-------------------------------|---|
| <i>Volume Riddles</i>               |                               |                                  |                                     |                               |   |
| <i>Scavenger Hunt</i>               |                               |                                  |                                     |                               |   |
| <i>Which Is Greater?</i>            |                               |                                  |                                     |                               |   |
| <i>Volume of Rectangular Prisms</i> |                               |                                  |                                     |                               |   |

My goals to improve my understanding are . . .

I am most proud of . . .

Check your understanding of the concepts in this lesson.



Parent's Signature: \_\_\_\_\_

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Each lesson ends with an opportunity for student reflection as the student self-assesses errors that may or may not have been made in each phase of the lesson. Following this self-assessment, students are prompted to set a goal for improvement and to note strengths with the lesson's topic.

This QR code leads to an additional activity for follow-up efforts related to this lesson.

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# Volume of Rectangular Prisms

## TEKS

5.3 The student adds, subtracts, multiplies, and divides to solve meaningful problems.

- (B) The student is expected to use multiplication to solve problems involving whole numbers (no more than three digits times two digits without technology).

**Readiness Standard**

5.10 The student applies measurement concepts involving length (including perimeter), area, capacity/volume, and weight/mass to solve problems.

- (B) The student is expected to connect models for perimeter, area, and volume with their respective formulas. **Supporting Standard**  
(C) The student is expected to select and use appropriate units and formulas to measure length, perimeter, area, and volume. **Readiness Standard**

5.14 The student applies Grade 5 mathematics to solve problems connected to everyday experiences and activities in and outside of school.

- (A) The student is expected to identify the mathematics in everyday situations.  
(C) The student is expected to select or develop an appropriate problem-solving plan or strategy, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem.  
(D) The student is expected to use tools such as real objects, manipulatives, and technology to solve problems.

5.15 The student communicates about Grade 5 mathematics using informal language.

- (A) The student is expected to explain and record observations using objects, words, pictures, numbers, and technology.  
(B) The student is expected to relate informal language to mathematical language and symbols.

5.16 The student uses logical reasoning.

- (A) The student is expected to make generalizations from patterns or sets of examples and nonexamples.  
(B) The student is expected to justify why an answer is reasonable and explain the solution process.

STAAR™ Assessed Curriculum:  
Eligible Texas Essential  
Knowledge and Skills



## STAAR™ Reporting Category

1 **Numbers, Operations, and Quantitative Reasoning**

The student will demonstrate an understanding of numbers, operations, and quantitative reasoning.

4 **Measurement**

The student will demonstrate an understanding of measurement.

# Volume of Rectangular Prisms

## Core Questions

By the end of this lesson, students should be able to answer these core questions:

- What is volume?
- How do you describe the dimensions of a rectangular prism?
- How could you use a formula to find the volume of a rectangular prism?
- How could you determine the height of a rectangular prism given the volume and the area of the base?

## Vocabulary Focus

- base
- cubic units
- dimensions
- height
- length
- rectangular prism
- volume
- width

## Lesson Preparation

| Phase     | Materials<br><i>one per student unless otherwise noted</i>   | Instructional Grouping          |
|-----------|--|---------------------------------|
| Engage    | <ul style="list-style-type: none"><li>◆ Centimeter cubes (approximately 60 per group)</li><li>◆ <b>Volume Riddles</b></li><li>◆ <b>Building Mat</b></li></ul>              | Groups of 2 students            |
| Explore   | <ul style="list-style-type: none"><li>◆ <b>Scavenger Hunt Posters</b> for display</li><li>◆ <b>Scavenger Hunt</b> recording sheet</li><li>◆ Reference Materials*</li></ul> | Individual or pairs of students |
| Explain   |  | Whole-group discussion          |
| Elaborate | <ul style="list-style-type: none"><li>◆ <b>Which Is Greater?</b></li><li>◆ Reference Materials*</li><li>◆ Ruler</li></ul>  | Independent                     |
| Evaluate  | <ul style="list-style-type: none"><li>◆ <b>Volume of Rectangular Prisms</b></li><li>◆ <b>My Reflections: Error Analysis</b></li><li>◆ Reference Materials*</li></ul>       | Individual                      |

\* Students may use the STAAR™ Grade 5 Reference Materials as needed throughout the lesson. Reference Materials can be found at <http://www.tea.state.tx.us/student.assessment/staar/math/>.







# Volume of Rectangular Prisms

- **How many layers of cubes would Figure 1 have?**  
8
- **How could you use the number of cubes in the first layer and the number of layers to determine the volume of Figure 1?**  
*Possible answer: I could multiply them together.*
- **If you were to sketch the cubes that form Figure 2, how many cubes would be on the first layer?**  
15
- **How many layers of cubes would Figure 2 have?**  
8
- **How could you use the number of cubes in the first layer and the number of layers to determine the volume of Figure 2?**  
*Possible answer: I could multiply them together.*
- **How could you use the STAAR™ Reference Materials\* to help you determine the volume of each figure?**  
*Possible answer: I could use the Reference Materials to find the formula for volume of a rectangular prism. I could then use the formula to determine the volume of each of the figures and determine which has the greater volume.*

Teacher Notes:

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## EVALUATE



1. Distribute **Volume of Rectangular Prisms** to each student.
2. Prompt students to complete **Volume of Rectangular Prisms**.
3. Upon completion of **Volume of Rectangular Prisms**, prompt students to complete **My Reflections: Error Analysis** for this lesson. Prompt students to note errors made during the lesson to determine if a pattern exists that needs to be addressed.

## Answer Key and Error Analysis for Independent Practice

| Question Number | Correct Answer | Reporting Category | TEKS  |       | Conceptual Error |   |   | Procedural Error |  |  | Guess |
|-----------------|----------------|--------------------|-------|-------|------------------|---|---|------------------|--|--|-------|
|                 |                |                    |       |       |                  |   |   |                  |  |  |       |
| 1               | C              | 4                  | 5.10C | 5.14C | A                | B | D |                  |  |  |       |
| 2               | D              | 4                  | 5.10C | 5.15B | A                | B | C |                  |  |  |       |
| 3               | 5              | 4                  | 5.10C | 5.14C |                  |   |   |                  |  |  |       |
| 4               | A              | 4                  | 5.10C | 5.16A | B                | C | D |                  |  |  |       |

## Volume Riddles

### Answer Key

Use your centimeter cubes and your **Building Mat** to build on the shaded rectangles to solve the following riddles. Note: Not all shaded rectangles will be used.

- 1** I am a rectangular prism. I have a length of 2 centimeters, a width of 3 centimeters, and a height of 3 centimeters. What is my volume?

**18 cubic centimeters**

- 2** I am a cube. My volume is 8 cubic centimeters. What is my length, my width, and my height?

**2 centimeters, 2 centimeters, and 2 centimeters**

- 3** I am a rectangular prism. I have volume of 16 cubic units. I have a length of 4 centimeters and a width of 2 centimeters. What is my height?

**2 centimeters**

- 4** I am a rectangular prism. I have a volume of 30 cubic centimeters. I have a length of 2 centimeters and a width of 5 centimeters. What is my height?

**3 centimeters**

### Which Is Greater?

The bases of two different rectangular prisms are pictured below. Measure the dimensions of each base to the nearest centimeter. The height of each rectangular prism is 8 centimeters. Determine which rectangular prism has the greater volume. Explain your thinking.

Figure 1

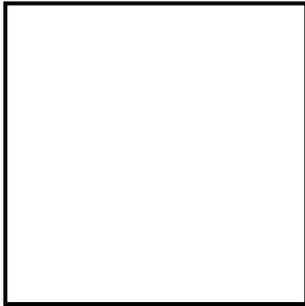


Figure 2

