IDEA Public Schools

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How to Use This Addenda

Make sure you're ready to teach by noting the **Necessary Materials and Pre-Lesson Prep** you will need to gather or complete prior to the lesson

Find high-leverage instructional moves in the **Lesson Look Fors**. This is what leaders should see when observing your instruction

Note how your lesson objective ties to your state **Standards**

Plan purposeful questioning and responses using **Opportunities to CFU**

Plan to stress **Important Vocabulary** in the lesson. New vocab for the unit is indicated in bold

Note exemplar pacing in the **Lesson Agenda**

Use the **Mathematical Goal of the Lesson** to keep you focused on the appropriate student outcome

Plan instruction around what students need to Know & Do to be successful on the Exit Ticket using the identified **Student Criteria for Success**

Find recommended lesson modifications, content knowledge boosters, and/or high-leverage instructional moves that may not be in your Teacher Edition located in **Other Notes to Inform Your Planning**

Lesson 9: Find related multiplication facts by adding and subtracting equal groups in array models   Date: _____

Standard(s)

3.4K solve one-step and two-step problems involving multiplication and division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recall of facts

Important Vocabulary
- array
- **bracket**
- columns
- rows
- unit(s)

In this lesson, students are NOT responsible for the vocabulary distributive property. Please withhold as it will come up in later lessons.

Notes for Intellectual Preparation & Lesson Planning

Necessary Materials and Pre-Lesson Prep
- (S) Multiply by 2 (1–5) Pattern Sheet
- (S) Threes array no fill template
- (S) Personal white board
- (S) Blank paper

Lesson Agenda	Time
I. Do Now (source: fluency #1)	5 min
II. Fluency*	8 min
III. Concept Development	25 min
IV. Student Practice	15 min
V. Student Debrief	7 min
VI. Exit Ticket*	5 min

Mathematical Goal of this Lesson
Students learn they can use decomposition to break one larger number into two smaller numbers as a strategy for multiplication. The goal of this lesson is simply for student to understand how to interpret and create an array that demonstrates such decomposition. Students will build on this understanding in subsequent lessons. This lesson also supports the goal of student thinking in terms of counting units, an overarching goal for academy math.

Opportunities to CFU
- ✓ Concept Development, by way of eliciting student responses
- ✓ Problems Set problems: #2, #3

7 threes = 5 threes + 2 threes
$7 \times 3 = 5 \times 3 + 2 \times 3$
$21 = 15 + 6$

Other Notes to Inform Your Planning
For **Do Now**: Use the Multiply by 2 (1–5) Pattern Sheet for your Do Now. 3 minutes for completion, 2 minutes whole group classwork check.
For **Fluency**: Complete the Group Counting activity (notice the inclusion of 4s in preparation for upcoming lessons) and Forms of Multiplication activity.
For **Concept Development**: Consider prepping personal whiteboard in advance. Spend no more than 12 minutes for CD Problem 1 and 13 minutes for CD Prob 2.
For **Student Practice**: consider creating an extra set of Qs like 1-3 in case students struggle with entry-level understanding. If they don't, move on to Qs 4 and above.
For **Student Debrief**: consider using the Eureka assigned Exit Ticket for whole group debrief exercise; Suggested strategy – guided discourse.
For **Exit Ticket**: Use **Homework** problems 2 & 3 for this lesson's Exit Ticket.

🔑 Though not formally discussed yet, this is a foundation to understanding of distributive property. Students visually see multiplying the sum of two or more addends by a number will give the same result as multiplying each addend individually by the number and then adding the products together.

Lesson Look Fors

Look for teachers to…
- ☐ Have established a signaling routine for choral response or work show during the respective fluency activities
- ☐ Use a think aloud to describe why they shade what portions of the array, or use a different symbol in the array
- ☐ Make the focus of the lesson understanding the visual representations

Look for students to…
- ☐ Explain what they see in the array and how it relates to a given number sentence.

Student Criteria for Success
- Shading, brackets, and/or dotted lines on an array will have mathematical significance -brackets can identify parts or wholes -dotted lines and shading represent decompositions
- We count units; In an array, counting rows is the same as counting units. Addition/subtraction and multiplication math facts (up to 4)
- Interpret an array -identify decompositions within an array -Relate an annotated or labeled array to one or more number sentences
- Addition/subtraction (+/- up to 4) Multiplication (2, 3, and 4)

UNIT SYNOPSIS

In this sequence, students build on the geometry and measurement work from elementary and 6th grade to extend their understanding to three-dimensional applications. They begin by classifying prisms and pyramids, reinforcing the idea that solids are named for the shape of their bases. Real-world examples, geometric manipulatives, and nets are central models for helping students visualize and describe three-dimensional figures.

Students then develop strategies for calculating surface area. By unfolding figures into nets, they connect prior knowledge of area of polygons to the total and lateral surface area of prisms and pyramids. Hands-on manipulatives and visual representations are critical in this stage, since many students struggle to picture three-dimensional solids from flat drawings. Nets allow them to see and calculate the individual faces clearly, which builds a foundation for solving more complex problems.

The work then moves into volume. First, students calculate the volume of prisms by finding the area of the base and multiplying by the height. This connects directly to their earlier understanding of rectangular prisms and operations with rational numbers. From there, they extend to pyramids, discovering the relationship between prisms and pyramids through activities with water, solids, or videos that show that it takes three congruent pyramids to fill one prism with the same base and height. This leads students to derive the formula for the volume of a pyramid as one-third the product of the base area and height.

As the sequence progresses, students apply their understanding of both surface area and volume, deciding when to use each measure depending on the context (e.g., covering versus filling). They also gain experience measuring with rulers to the nearest unit or half unit, labeling dimensions, and working with decimals when calculating area, surface area, and volume. This strengthens their measurement fluency while reinforcing connections between numerical skills and geometric reasoning.

Key strategies and models throughout this work include:
- Using real-world examples and physical models of prisms and pyramids to classify solids.
- Visualizing and calculating with nets to understand surface area.
- Applying area formulas for polygons as a foundation for calculating surface area and volume.
- Using manipulatives, water-filling demonstrations, and simulations to show the prism–pyramid volume relationship.
- Practicing with measurement tools (rulers, grids) to build accuracy and confidence with dimensions.
- Comparative reasoning tasks that require students to distinguish between surface area and volume in real-world contexts.

By the end of this sequence, students have a strong conceptual and procedural understanding of how to calculate surface area and volume for prisms and pyramids. This foundation prepares them for more advanced work in geometry, such as composite solids, cylinders, cones, spheres, and cross-sections, and eventually for calculus applications of volume and surface area

This unit features 1 topic.

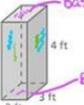## Topic A Overview – *Volume and Surface Area of 3-D Figures*

In Topic A, it is critical to build students' understanding of surface area and volume of prisms and pyramids. In Lesson 1, students use attributes of three-dimensional figures and their nets to classify them as rectangular prism, triangular prism, and square-based, rectangular, and triangular pyramids. This lesson prepares students for upcoming lessons in the unit such as finding total/lateral surface area and volume. In Lesson 2, students find the surface area of right prisms and pyramids (total and lateral). Students will connect what they have learned about area in previous lessons to finding total and lateral surface area of 3-D Figures. In Lesson 3, students calculate the volume of a prism. They will explore volume as the number of cubic units required to fill a 2-D figure. They ultimately build an understanding that the volume of a right prism is calculated by finding the area of the base and multiplying it by the height of the prism. In Lesson 4, students derive the formula for the volume of a pyramid using its relationship to a prism. Students will apply what they learned in the previous lesson about volume of a prism to calculate volume of a pyramid. In Lesson 5, students calculate the volume and surface area of all prisms and pyramids. This lesson ties together the concepts of surface area and volume. Students will eventually determine when it is necessary to find volume and when it necessary to find surface area given a problem situation. In Lesson 6, students will use a ruler to measure the dimensions of a figure to calculate area, volume, and surface area. They use what they learned in previous lessons to calculate the volume, and surface area of a figure.

LESSON 1

LESSON 2

LESSON 3

LESSON 4

LESSON 5

LESSON 6

CONTENT STANDARDS

Below are the standards addressed in this unit.

Readiness Standards	Supporting Standards
7.9(A) solve problems involving the volume of rectangular prisms, triangular prisms, rectangular pyramids, and triangular pyramids **7.5(C)** solve mathematical and real-world problems involving similar shape and scale drawings	**7.9(D)** solve problems involving the lateral and total surface area of a rectangular prism, rectangular pyramid, triangular prism, and triangular pyramid by determining the area of the shape's net

Focus on Disciplinary Literacy	Mathematical Process Standard **(F)** – analyze mathematical relationships to connect and communicate mathematical ideas
	Mathematical Process Standard **(G)** – display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication

ROADMAP

AT A GLANCE: Unit 8 – 3-D Geometry				
Topic	Day	Date	Lesson	Lesson Title
Topic A Volume and Surface Area of 3-D Figures	1		1	Intro to 3-D Figures
	2		2	Surface Area of Prisms and Pyramids (Total and Lateral)
	3		3	Volume of Prisms
	4		4	Volume of Pyramids
	5		5	Volume and Surface Area of Prisms and Pyramids
	6		6	Measuring to Find the Area, Volume, and Surface Area
	7			Review
	8			Exam

Lesson 1: Intro to 3D Figures		Date: _____
Standard(s)	**Notes for Intellectual Preparation & Lesson Planning**	**Lesson Look Fors**

Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors
This lesson is a pre-requisite for standards: ◆ **7.9(D)** solve problems involving the lateral and total surface area of a rectangular prism, rectangular pyramid, triangular prism, and triangular pyramid by determining the area of the shape's net ◆ **7.9(A)** solve problems involving the volume of rectangular prisms, triangular prisms, rectangular pyramids, and triangular pyramids	**Necessary Materials and Pre-Lesson Prep** ▪ Document Camera ▪ Unit 8 Student Workbook ▪ Projector ▪ Geo-Shapes **Lesson Agenda** **Time** <table><tr><td>I.</td><td>Do Now</td><td>5 min</td></tr><tr><td>II.</td><td>INM/Concept Development</td><td>35 min</td></tr><tr><td>III.</td><td>Student Practice</td><td>20 min</td></tr><tr><td>IV.</td><td>Student Debrief</td><td>5 min</td></tr><tr><td>V.</td><td>Exit Ticket</td><td>5 min</td></tr></table> **Mathematical Goal of this Lesson** The primary goal of the lesson is for students to use attributes of three-dimensional figures to classify them as rectangular prism, triangular prism, and square-based, rectangular, and triangular pyramids. This lesson prepares students for upcoming lessons in the unit such as finding total/lateral surface area and volume. **Opportunities to CFU** ✓ **INM: Part A** #3-5 and the Key Point **Part B** #3-5 ✓ **Student Practice: Part A** #1, 2, 4 **Part B** #1,4	Look for teachers to… ❑ Use Geo-Shapes and Real-World Examples of 3-D Figures that students will recognize to engage them in the lesson. ❑ Highlight the differences between a prism and pyramid, specifically triangular prism, and pyramid. Look for students to… ❑ Use the attributes of 3D Figures to name them as types of prisms or pyramids ❑ Explain the differences and similarities between prisms and pyramids ❑ Match 3D Figures to their nets.

Important Vocabulary		Student Know/Do Chart
▪ Bases ▪ Congruent Bases ▪ Net ▪ Parallel Bases ▪ Prisms ▪ Pyramids	**Other Notes to Inform Your Planning** **INM/Student Practice:** To support student understanding of naming prisms and pyramids by their attributes it will be important to model using geo-shapes and/or allow them to use a class set to reference. Also, it may be necessary to review the meaning of parallel and congruent so that students truly understand what it means for bases to be parallel and congruent in prisms. Use the questioning in the notes of the INM to scaffold in the case students become confused with figures such as triangular prism vs. triangular pyramid. **Focus on Disciplinary Literacy** **Do Now:** #1-2, Part C #1-3 **SP**: #1c **Student Debrief**	**Know** A pyramid has one base and prism has two bases **Know** Prisms and pyramids are named by the shape of their base **Know** A prism has rectangular faces, and a pyramid has triangular faces **Do** Determine whether a 3D Figure is a Prism or Pyramid **Do** Name a prism or pyramid by the shape of the base

Lesson 2: Surface Area of Right Prisms and Pyramids (Total and Lateral)		Date: _____
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors
◆ **7.9(D)** Solve problems involving the lateral and total surface area of a rectangular prism, rectangular pyramid, triangular prism, and triangular pyramid by determining the area of the shape's net	**Necessary Materials and Pre-Lesson Prep** ▪ Document Camera ▪ STAAR Math Reference Material ▪ Projector ▪ Geometric Solids/Manipulatives ▪ Unit 8 Student Workbook **Lesson Agenda** Time <table><tr><td>I.</td><td>Do Now</td><td>5 min</td></tr><tr><td>II.</td><td>INM/Concept Development</td><td>30 min</td></tr><tr><td>III.</td><td>Student Practice</td><td>25 min</td></tr><tr><td>IV.</td><td>Student Debrief</td><td>5 min</td></tr><tr><td>V.</td><td>Exit Ticket</td><td>5 min</td></tr></table> **Mathematical Goal of this Lesson** The primary goal of this lesson is for students to find the surface area of right prisms and pyramids (total and lateral). Students will connect what they have learned about area in previous lessons to finding total and lateral surface area of 3-D Figures. **Opportunities to CFU** ✓ **INM: Example:** 1-4, **Part B:** #2 ✓ **Student Practice:** #1, 3, 4, 5	Look for teachers to… ❑ Use real-world objects/situations to build students' understanding of surface area and the difference between lateral and total surface area. Look for students to… ❑ Clearly label each face of a 3-D figure as they calculate each area so they can be sure to include all necessary faces in the surface area. Ask: What is the difference between lateral surface area and total surface area? (Lateral does not include the base(s) while total does)
Important Vocabulary ▪ Lateral Surface Area ▪ Pyramid ▪ Right Prism ▪ Rectangular Prism ▪ Rectangular Pyramid ▪ Total Surface Area ▪ Triangular Prism ▪ Triangular Pyramid	**Other Notes to Inform Your Planning** For **INM**: It will be important to connect what students learned about calculating area of 2-dimensional figures to calculating the surface area. Students will need to experience seeing/holding 3-D Figures to support their understanding of surface area. Students had the opportunity to classify 3-D Figures by their nets in Lesson 1. Use the same vocabulary (faces, bases, prism, pyramid, net etc.) from Lesson 1 to build their understanding. It will be important to use real-world examples of calculating lateral and/or total surface area (i.e., wrapping a gift vs. frosting for a cake) since some student may confuse the two. Students should use their annotated STAAR Reference Material to access formulas. For **Student Practice:** Consider having students to draw and label the net and/or shade bases and/or faces to support their understanding. **Focus on Disciplinary Literacy** **INM:** #5, Reflect **SP:** #5 **Student Debrief**	**Student Know/Do Chart** Know — The surface area of a 3-Dimensional figure measures the area of its faces in square units Know — Total surface area measures the area of all faces including the bases while Do — Calculate total and lateral surface area of rectangular and triangular prism or pyramid with positive rational numbers as its dimensions. Do — Answer real-world application problems involving the surface area of geometric figures.

Lesson 3: Volume of Prisms		Date: _____
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors

Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors
◆ 7.9(A) Solve problems involving the volume of rectangular prisms, triangular prisms, ~~rectangular pyramids, and triangular pyramids.~~	**Necessary Materials and Pre-Lesson Prep** ▪ Unit 8 Student Workbook ▪ STAAR Math Reference Material ▪ Document Camera ▪ Projector ▪ Geometric Solids/Manipulatives **Lesson Agenda** — **Time** <table><tr><td>I.</td><td>Do Now</td><td>7 min</td></tr><tr><td>II.</td><td>INM/Concept Development</td><td>26 min</td></tr><tr><td>III.</td><td>Student Practice</td><td>25 min</td></tr><tr><td>IV.</td><td>Student Debrief</td><td>5 min</td></tr><tr><td>V.</td><td>Exit Ticket</td><td>7 min</td></tr></table> **Mathematical Goal of this Lesson** The primary goal of the lesson is for students to calculate the volume of a prism. They will explore volume as the number of cubic units required to fill a 2-D figure. They ultimately build an understanding that the volume of a right prism is calculated by finding the area of the base and multiplying it by the height of the prism. **Opportunities to CFU** ✓ **INM**: a-c, #4, 6 ✓ **Student Practice**: #2, 3, 5	Look for teachers to... ❑ Use actual objects to build students' understanding of the dimensions of a 3-D figure. ❑ Stamp that the height of a prism is the distance between two bases and "Big B" represents the area of the base. Look for students to... ❑ Calculate the area of any prism by finding the area of the base and multiplying it by the height of the prism ❑ Reference the formula for volume using STAAR Math Reference Material to assist with finding h and B when given volume.

Important Vocabulary	Other Notes to Inform Your Planning	Student Know/Do Chart
▪ Triangular Prism ▪ Rectangular Prism ▪ Right Prism	**Other Notes to Inform Your Planning** For **INM**: It is important that students build the understanding that the capital "B" represents the area of the base. It is also important that students understand that the height of a prism is the distance between the two bases. This will become important when students work with non-rectangular prisms that area rotated on their side. It will be important to use manipulatives to help students visualize the 3-D solids. In cases where students have to find the h or "B" remind them of the steps to solve one-step equations. They also should have access to the formulas on the annotated STAAR Math Reference Material. **Focus on Disciplinary Literacy** INM: #5, 6 SP: #5 Student Debrief	Know — Volume measures the 3-dimensional space inside of a 3-d figure in cubic units. Know — It is necessary to find the area of the base then multiply by the height when calculating volume Know — The height of a prism is always perpendicular to the base and measures the distance between the two bases. Do — Calculate volume of rectangular and triangular prisms with positive rational numbers as its dimensions Do — Answer real-world application problems involving the volume of geometric figures

Lesson 4: Volume of Pyramids		Date: _____
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors
◆ 7.9(A) Solve problems involving the volume of ~~rectangular prisms,~~ ~~triangular prisms,~~ rectangular pyramids, and triangular pyramids.	**Necessary Materials and Pre-Lesson Prep** ▪ Unit 8 Student Workbook ▪ Projector ▪ Document Camera ▪ STAAR Math Reference Material ▪ Geometric Solids/Manipulatives **Lesson Agenda** / **Time** <table><tr><td>I.</td><td>Do Now</td><td>8 min</td></tr><tr><td>II.</td><td>INM/Concept Development</td><td>30 min</td></tr><tr><td>III.</td><td>Student Practice</td><td>22 min</td></tr><tr><td>IV.</td><td>Student Debrief</td><td>5 min</td></tr><tr><td>V.</td><td>Exit Ticket</td><td>5 min</td></tr></table> **Mathematical Goal of this Lesson** The primary goal of this lesson is for student to derive the formula for the volume of a pyramid using the relationship to a prism. Students will apply what they learned in the previous lesson about volume of a prism to calculate volume of a pyramid. **Opportunities to CFU** ✓ INM: **Part B:** #2, 3 **Part C:** #1, 2 ✓ Student Practice: #3, 4 **Other Notes to Inform Your Planning** For **INM**: It will be important to allow students to derive the formula to find the volume of a pyramid then introduce them to the formula on the STAAR Math Reference Material. Throughout the INM, students are building an understanding of the relationship between the volume of a prism and pyramid and the relationship between the area of the base, height of the pyramid and the volume of a pyramid. It is common for students to forget that a pyramid is 1/3 of a prism and not divide by 3. This is something that is important to continuously stamp for them throughout the INM. For **Student Practice:** To assist them in recognizing the base and its dimensions have them shade the base of the figure. They should also use the annotated STAAR Math Reference Material to reference the formula for volume of a pyramid.	Look for teachers to… ❑ Show students a simulation of pouring liquid from a prism to a pyramid and allow students to derive the formula for volume of a pyramid ❑ Stamp that the volume of a pyramid is one-third of the volume of a prism and the volume of a prism is three times more than the volume of a pyramid. Look for students to… ❑ Justify their steps to finding the volume of a pyramid using the simulation modeled by the teacher. ❑ Use the conceptual understanding of the formula and the STAAR Reference Material to solve problems involving volume.
Important Vocabulary ▪ Rectangular Prism ▪ Right Prism ▪ Triangular Prism		**Student Know/Do Chart**
	Focus on Disciplinary Literacy **INM:** Reflect, Part B #3, Stop and Jot **Student Debrief**	**Know** Volume of a pyramid is calculated by multiplying the area of the base of the figure by the height of the figure and then dividing by 3 or multiplying by 1/3. **Know** The volume of a prism is 3 times bigger than the volume of a pyramid w/ the same base and height. **Do** Calculate volume of rectangular and triangular pyramids with positive rational numbers as its dimensions. **Do** Answer real-world application problems involving the volume geometric figures.

Lesson 5: Volume and Surface Area of Prisms and Pyramids		Date: _____
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors
◆ **7.9(A)** Solve problems involving the volume of rectangular prisms, triangular prisms, rectangular pyramids, and triangular pyramids. ◆ **7.9(D)** Solve problems involving the lateral and total surface area of a rectangular prism, rectangular pyramid, triangular prism, and triangular pyramid by determining the area of the shape's net	**Necessary Materials and Pre-Lesson Prep** ▪ Unit 8 Student Workbook ▪ Document Camera ▪ Document Camera ▪ Projector ▪ Geometric Manipulatives ▪ STAAR Math Reference Material **Lesson Agenda** ... **Time** I. Do Now — 7 min II. INM/Concept Development — 25 min III. Student Practice — 20 min IV. Student Debrief — 5 min V. Exit Ticket — 7 min **Mathematical Goal of this Lesson** The primary goal of this lesson is for students to calculate the volume and surface area of all prisms and pyramids. This lesson ties together the concepts of surface area and volume. Students will eventually determine when it is necessary to find volume and when it necessary to find surface area given a problem situation. **Opportunities to CFU** ✓ INM: #2-4 ✓ Student Practice: #1,3	**Look for teachers to...** ❑ Connect what students learned in the previous three lessons to solidify their understanding of 3-d measures of prisms and pyramids **Look for students to...** ❑ Explain whether they need to find the volume or the surface area of a 3-d figure when answering questions about real-world objects.
Important Vocabulary ▪ Lateral Surface Area ▪ Prism ▪ Pyramid ▪ Total Surface Area ▪ Volume	**Other Notes to Inform Your Planning** For **Do Now**: The Do Now is key in this lesson and should not be skipped. It prepares students for determining when it is necessary to find volume and surface area in a given problem situation. This would be a great opportunity to address misconceptions prior to the lesson. For **INM**: Students may struggle with #5 where they will need to find the volume. Ensure that they find the volume using the annotated STAAR Reference Material Formulas to solve this and other problems within this unit. Here is an example of how students could organize their work. For **Student Debrief:** Students will compare #1a-b from Student Practice. This would be a great time to clear up any misconceptions around determining if a problem is asking for volume or surface error before the exit ticket. **Focus on Disciplinary Literacy** SP: #1,3 Student Debrief	**Student Know/Do Chart** Know — Surface area is measured in square unit while volume is measured in cubic units. Know — Volume represents the amount of space inside a 3-D figure while surface area represents the space around the outside of a 3-D figure. Do — Calculate volume and surface area of rectangular and triangular prisms and pyramids with positive rational numbers as the dimensions. Do — Solve real-world application problems involving the volume and surface area of geometric figures. Do — Differentiate between questions that are asking for volume and those that area asking for surface area of a 3-D Figure

Lesson 6: Measuring to find the Area, Volume, and Surface Area		Date: _____
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors
◆ **7.9(C)** determine the area of composite figures containing combinations of rectangles, squares, parallelograms, trapezoids, triangles, semicircles, and quarter circles ◆ **7.9(A)** Solve problems involving the volume of rectangular prisms, triangular prisms, rectangular pyramids, and triangular pyramids	**Necessary Materials and Pre-Lesson Prep** ▪ Document Camera ▪ Unit 8 Student Workbook ▪ Projector STAAR Math Reference Chart ▪ Ruler (Class Set) <table><tr><td colspan="2">Lesson Agenda</td><td>Time</td></tr><tr><td>I.</td><td>Do Now</td><td>5 min</td></tr><tr><td>II.</td><td>INM/Concept Development</td><td>35 min</td></tr><tr><td>III.</td><td>Student Practice</td><td>20 min</td></tr><tr><td>IV.</td><td>Student Debrief</td><td>5 min</td></tr><tr><td>V.</td><td>Exit Ticket</td><td>5 min</td></tr></table> **Mathematical Goal of this Lesson** The primary goal of this lesson is for students to use a ruler to measure the dimensions of a figure to calculate area, volume, and surface area. Students will use what they learned in the previous lessons to calculate the volume, and surface area of a figure. **Opportunities to CFU** ✓ **INM:** #3, 4, 6, 7, 8 ✓ **Student Practice:** #3, 4, 5	Look for teachers to… ❑ Use a ruler under the document camera to model measuring to the nearest half inch for students ❑ Stamp that measuring should start at the first tick mark on the ruler and not the edge. Look for students to… ❑ Use a ruler to measure and find the missing dimensions of a figure then use the formulas to find the area or volume ❑ Use estimation to find dimensions to the nearest half inch when measuring
Important Vocabulary ▪ Area ▪ Dimensions ▪ Surface Area ▪ Volume	**Other Notes to Inform Your Planning** For **INM**: Throughout this lesson students will need to understand that when measuring with a ruler, they will need to start at the first tick mark on the ruler and ***not*** at the ruler's edge. The measurements in this lesson were taken using the 7th Math STAAR Reference Material. It will be important to borrow a student workbook and use a ruler to ensure that the measurement is accurate. Also, this lesson was created before TEA released the new STAAR Reference Material which ***does not*** include a ruler. It will be necessary to use a class set of rulers and allow students to use the STAAR Reference Material for formulas. Students may struggle to determine a measurement closest to the nearest half inch. It will be important to relate measuring to the nearest half inch to estimation. 'Is three-eighth closest to half which is four-eighth or is it closest to zero?'	**Student Know/Do Chart** Know It is necessary to start at the first tick mark on a ruler to measure Do Use a ruler to measure and find the dimensions of a figure to nearest half inch Do Use the dimensions measured to the nearest half inch to find the area and volume

Focus on Disciplinary Literacy

INM: #4, 6
SP: #6
Student Debrief

Recommended Success Day Materials and Resources

3-D Geometry
Volume of Prisms Activity 1
Volume of Prisms Activity 2
Volume of Prisms and Pyramids Activity 1
Volume of Prisms and Pyramids Activity 2
Volume of Prisms and Pyramids Activity 3
Surface Area of Prisms
Surface Area of Pyramids
Extra Practice SE
Extra Practice TE

Notes to Inform Your Planning
These resources can be used for either small-group or whole-group reteach.

If student data indicates a pause point is not necessary, you can opt to move forward and reserve a Success Day to use at a later date.
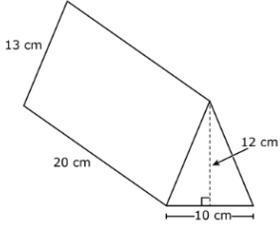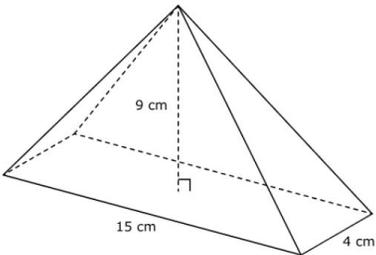
Using exit ticket data can help you prioritize what to review. For example, if you remember that students did poorly on Lesson 9, pull problems from lesson 6, especially if they are problems students did not do before (for example, SP or INM problems you skipped during class). You can also take questions from the resources linked above.

All unit exams should be given online to prepare students for STAAR online.

UNPACKED STANDARDS

Focus standards for this unit.

Standard Breakdown		
Standard	**Specificity**	**STAAR Alignment**
7.9(A) solve problems involving the volume of rectangular prisms, triangular prisms, rectangular pyramids, and triangular pyramids	**Concepts:** - Volume - Rectangular Prisms - Triangular Prisms - Rectangular Pyramids - Triangular Pyramids **Skills:** - Solve **Limitations:** • Measurements limited to positive rational numbers • 3-D figures limited to rectangular and triangular prisms and pyramids	**2025 Q5:** 2025 – Q5 A chocolate bar in the shape of a triangular prism is shown with its dimensions in centimeters. 13 cm 20 cm 12 cm 10 cm What is the volume of the chocolate bar in cubic centimeters? Ⓐ 1,300 cm³ Ⓑ 2,600 cm³ Ⓒ 2,400 cm³ Ⓓ 1,200 cm³ 2025 – Q26 A rectangular pyramid is shown with its dimensions in centimeters. 9 cm 15 cm 4 cm What is the volume of the rectangular pyramid in cubic centimeters? Ⓐ 114 cm³ Ⓑ 342 cm³ Ⓒ 180 cm³ Ⓓ 540 cm³

2024 Q24:

> **2024 – Q4**
>
> The area of the base of a triangular pyramid is 60 square inches. The height of the pyramid is 13 inches.
> What is the volume of the triangular pyramid in cubic inches?
>
> Ⓐ 390 in.^{3}
>
> Ⓑ 260 in.^{3}
>
> Ⓒ 780 in.^{3}
>
> Ⓓ 130 in.^{3}

2023 Q17:

> **2023 – Q17**
>
> A tent is in the shape of a square pyramid. The side length of the tent's base is 7 feet, and the height of the tent is 6.6 feet.
>
> What is the volume of the tent in cubic feet?
>
> Ⓐ 107.8 ft^3
>
> Ⓑ 101.64 ft^3
>
> Ⓒ 161.7 ft^3
>
> Ⓓ 184.8 ft^3

> **❗ 2023 – Q34**
>
> A gift box in the shape of a rectangular prism has a volume of 384 cubic inches. The base of the box is a square with an area of 64 square inches.
>
> What is the height of the gift box in inches?
>
> Ⓐ 6 in.
>
> Ⓑ 3 in.
>
> Ⓒ 12 in.
>
> Ⓓ 8 in.

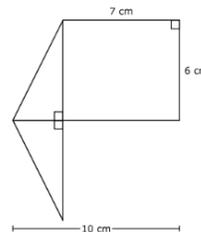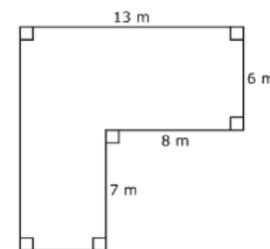| Standard	Specificity	STAAR Alignment
7.9(C) determine the area of composite figures containing combinations of rectangles, squares, parallelograms, trapezoids, triangles, semicircles, and quarter circles	**Concepts:** - Area - Composite Figures - Rectangles - Squares - Parallelograms - Trapezoids - Triangles - Semicircles - Quarter Circles **Skills:** - Determine **Limitations:** • Composite figures will be composed of circles, rectangles, trapezoids, parallelograms and triangles only. • Measurements limited to positive rational numbers	2025 Q12 2025 – Q12 A composite figure consists of 2 congruent right triangles and a rectangle. The figure and its dimensions in centimeters are shown. 7 cm 6 cm 10 cm What is the area of the figure in square centimeters? Enter your answer in the box provided. cm^2 | 1	2	3
4	5	6
7	8	9
	0	| 2025 – Q22 A composite figure is made up of two rectangles. The figure and its dimensions in meters are shown in the diagram. 13 m 6 m 8 m 7 m What is the area of the composite figure in square meters? Ⓐ 52 m² Ⓑ 113 m² Ⓒ 134 m² Ⓓ 143 m²

2024 Q12:

The top of a table is made up of triangles and rectangles. The table and its dimensions in inches are shown in the diagram.
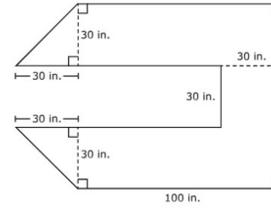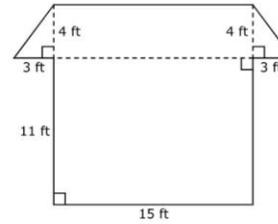

What is the area of the top of the table in square inches?
Enter your answer in the box provided.

The side wall of a barn is shown with its dimensions in feet.
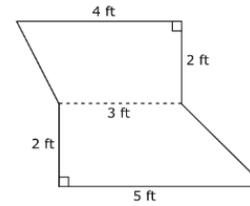

What is the area of the barn wall in square feet?

- Ⓐ 231 ft^2
- Ⓑ 225 ft^2
- Ⓒ 237 ft^2
- Ⓓ 249 ft^2

2024 Q12:

2023 Q13:

The figure is composed of two trapezoids. Measurements are given in feet.

4 ft

2 ft

3 ft

2 ft

5 ft

What is the area of the figure in square feet?

Enter your answer in the box.

1	2	3
4	5	6
7	8	9
	0	
.	-	

⚠ 2023 – Q26

A cutting board is created with congruent light pieces and congruent dark pieces of wood, as shown in the figure. All angles are right angles.

$3\frac{3}{4}$ in.

39 in.

29 in.
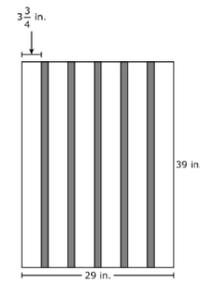
What is the combined area of the dark pieces of wood in square inches?

Ⓐ 399.75 in.²

Ⓑ 877.5 in.²

Ⓒ 478.5 in.²

Ⓓ 253.5 in.²

Standard	Specificity	STAAR Alignment
7.5(C) solve mathematical and real-world problems involving similar shapes and scale drawings.	Concepts: - Mathematical Problems - Real World Problems - Similar Shapes - Scale Drawings Skills: - Solve Limitations: • Scale Factors should be used to solve proportions rather than cross-products	2025 Q10:

Leila lives in Austin and visited another city in Texas that is 146 miles away. The map shown uses a scale where 0.5 inch represents 25 miles.

Use the map to select the name of the city that Leila visited.

Select **ONE** correct answer.

Fort Worth
Odessa
3.46 in. Waco
5.90 in. 1.90 in.
2.92 in.
1.46 in. Austin Houston
San Antonio

Not drawn to scale
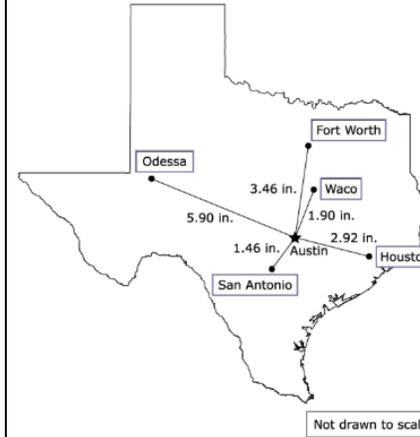
2025 – Q20

Quadrilateral *KLMN* is similar to quadrilateral *PQRT*. Some of the side lengths for the quadrilaterals are shown in centimeters.

90 cm   L
K
36 cm   x
N   126 cm   M

P 10 cm Q
4 cm   7 cm
T   14 cm   R

Not drawn to scale
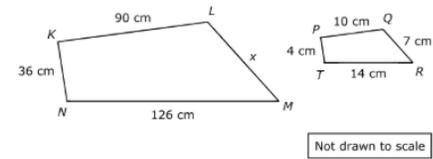
What is the value of *x* in centimeters?

Ⓐ $x = \frac{7}{9}$

Ⓑ $x = \frac{4}{9}$

Ⓒ $x = 36$

Ⓓ $x = 63$

2024 Q1:

The distance across Texas from north to south is approximately 800 miles. A map uses a scale in which 1 inch represents 25 miles.
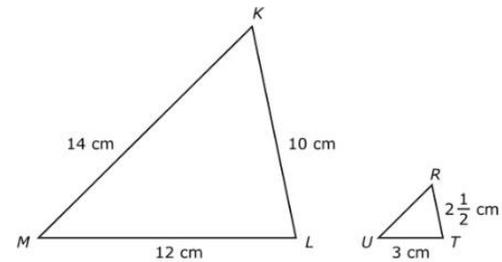
Which measurement is closest to the scaled distance in inches across Texas from north to south on the map?

Ⓐ 768 in.

Ⓑ 775 in.

Ⓒ 32 in.

Ⓓ 25 in.

2024 – Q19

Triangle *KLM* is similar to triangle *RTU*. The triangles are shown with side lengths in centimeters.

What is the length of side *RU* in centimeters?

Ⓐ $2\frac{11}{12}$ cm

Ⓑ $11\frac{2}{3}$ cm

Ⓒ $6\frac{1}{2}$ cm

Ⓓ $3\frac{1}{2}$ cm
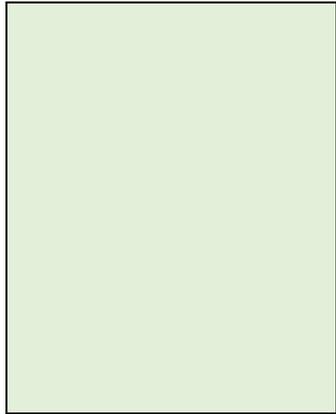
2023 Q4:

2023 – Q4

A student made a model of the Washington Monument using a scale in which 1 inch represents 15 feet. The actual height of the Washington Monument is approximately 555 feet.
Which measurement is closest to the height of the model in inches?

Ⓐ 37 in.

Ⓑ 75 in.

Ⓒ 46 in.

Ⓓ 180 in.

STANDARDS

This section details the **progression** of key student expectations/standards** in the courses **before** and **after** this course. This will help you understand what **prior knowledge skills to build upon** and guide you in knowing what **skills you are preparing your students** for in the subsequent course.

5th Grade	6th Grade	8th Grade	Geometry
5.4(H) represent and solve problems related to perimeter and/or area and related to volume 5.5(A) classify two-dimensional figures in a hierarchy of sets and subsets using graphic organizers based	6.8(D) determine solutions for problems involving the area of rectangles, parallelograms, trapezoids, and triangles and volume of right rectangular prisms where dimensions are positive rational numbers	8.3(C) use an algebraic representation to explain the effect of a given positive rational scale factor applied to two-dimensional figures on a coordinate plane with the origin as the center of dilation	G.11(B) determine the area of composite two-dimensional figures comprised of a combination of triangles, parallelograms, trapezoids, kites, regular polygons, or sectors of circles to solve problems using appropriate units of measure
on their attributes and properties 5.6(A) recognize a cube with side length of one unit as a unit cube having one cubic unit of volume and the volume of a three-dimensional figure as the number of unit cubes (n cubic units) needed to fill it with no gaps or overlaps if possible 5.6(B) determine the volume of a rectangular prism with whole number side lengths in problems related to the number of layers times the number of unit cubes in the area of the base	6.8(A) extend previous knowledge of triangles and their properties to include the sum of angles of a triangle, the relationship between the lengths of sides and measures of angles in a triangle, and determining when three lengths form a triangle 6.8(B) model area formulas for parallelograms, trapezoids, and triangles by decomposing and rearranging parts of these shapes 6.8(C) write equations that represent problems related to the area of rectangles, parallelograms, trapezoids, and triangles and volume of right rectangular prisms where dimensions are positive rational numbers	8.10(C) explain the effect of translations, reflections over the x- or y-axis, and rotations limited to 90°, 180°, 270°, and 360° as applied to two-dimensional shapes on a coordinate plane using an algebraic representation 8.3(A) generalize that the ratio of corresponding sides of similar shapes are proportional, including a shape and its dilation 8.8(D) use informal arguments to establish facts about the angle sum and exterior angle of triangles, the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles	G.11(C) apply the formulas for the total and lateral surface area of three-dimensional figures, including prisms, pyramids, cones, cylinders, spheres, and composite figures, to solve problems using appropriate units of measure G.11(D) apply the formulas for the volume of three-dimensional figures, including prisms, pyramids, cones, cylinders, spheres, and composite figures, to solve problems using appropriate units of measure G.11(A) apply the formula for the area of regular polygons to solve problems using appropriate units of measure G.12(B) apply the proportional relationship between the measure of an arc length of a circle and the circumference of the circle to solve problems G.12(C) apply the proportional relationship between the measure of the area of a sector of a circle and the area of the circle to solve problems