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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**

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**

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

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

Note exemplar pacing in the **Lesson Agenda**

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

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

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**

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

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	Notes for Intellectual Preparation & Lesson Planning Necessary Materials and Pre-Lesson Prep <ul style="list-style-type: none"> • (S) Multiply by 2 (1–5) Pattern Sheet • (S) Personal white board • (S) Threes array no fill template • (S) Blank paper 	Lesson Look Fors Look for teachers to... <ul style="list-style-type: none"> <input type="checkbox"/> Have established a signaling routine for choral response or work show during the respective fluency activities <input type="checkbox"/> Use a think aloud to describe why they shade what portions of the array, or use a different symbol in the array <input type="checkbox"/> Make the focus of the lesson understanding the visual representations 														
Important Vocabulary <ul style="list-style-type: none"> ▪ array ▪ bracket ▪ columns ▪ rows ▪ unit(s) <p><i>In this lesson, students are NOT responsible for the vocabulary distributive property. Please withhold as it will come up in later lessons.</i></p>	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="text-align: left;">Lesson Agenda</th> <th style="text-align: left;">Time</th> </tr> </thead> <tbody> <tr> <td>I. Do Now (source: fluency #1)</td> <td>5 min</td> </tr> <tr> <td>II. Fluency*</td> <td>8 min</td> </tr> <tr> <td>III. Concept Development</td> <td>25 min</td> </tr> <tr> <td>IV. Student Practice</td> <td>15 min</td> </tr> <tr> <td>V. Student Debrief</td> <td>7 min</td> </tr> <tr> <td>VI. Exit Ticket*</td> <td>5 min</td> </tr> </tbody> </table> <p>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.</p> <p>Opportunities to CFU</p> <ul style="list-style-type: none"> ✓ Concept Development, by way of eliciting student responses ✓ Problems Set problems: #2, #3 <p style="text-align: right;"> $7 \text{ threes} = 5 \text{ threes} + 2 \text{ threes}$ $7 \times 3 = 5 \times 3 + 2 \times 3$ $21 = 15 + 6$ </p> <p>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.</p> <p><small>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.</small></p>	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	Look for students to... <ul style="list-style-type: none"> <input type="checkbox"/> Explain what they see in the array and how it relates to a given number sentence. Student Criteria for Success <ul style="list-style-type: none"> 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)
Lesson Agenda	Time															
I. Do Now (source: fluency #1)	5 min															
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UNIT SYNOPSIS

In this unit, students revisit surface area and volume, something they have not worked with since 7th grade. Luckily, students learned about area of polygons and circles in previous units and are now applying their prior knowledge to surface area and volume. Unlike in other curricula, we will not deal with each shape separately and practice applying the volume or surface area formula multiple times. Instead, we want students to be able to solve problems with volume and surface area and come up with the formulas on their own by visualizing the solid and relating it to other solids. This unit provides many opportunities for students to “unwrap” solids (like an orange!) to better understand surface area and to fill 3d solids with dry goods (like rice or macaroni). While it is always important to internalize lessons ahead of time, it is particularly important for this unit, since it requires some pantry items.

CONTENT STANDARDS

Below are the standards addressed in this unit.

Readiness Standards	Supporting Standards
<p>G.10B determine and describe how changes in the linear dimensions of a shape affect its perimeter, area, surface area, or volume, including proportional and nonproportional dimensional change</p> <p>G.11C 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</p> <p>G.11D 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</p>	<p><i>There are no supporting standards in this unit.</i></p>

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

LEARNING SUPPORTS BY LESSON

There is a checkmark for the math support if the lesson	Lessons →	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10
	Math Supports										
makes a connection to prior content or from a previous unit or academic year	Access Prior Knowledge	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
uses familiar contexts or experiences to make the learning relevant to students	Real-World Connections	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
makes use of graphic organizers	Graphic Organizers	✓	✓	✓	✓	✓					
includes tools like rulers, protractors, patty paper, algebra tiles, etc.	Tools or Manipulatives	✓	✓	✓	✓						
incorporates tables, reference charts, displays, pictures, models, or color-coding	Visual Aids	✓	✓	✓	✓		✓		✓		
includes definitions, examples vs. nonexamples, cognates, etc.	Vocabulary Supports	✓	✓	✓	✓		✓	✓		✓	
includes strategies that support language development											
asks students to discuss with their partner to prepare for whole class discussion	- Turn and Talk	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
teacher facilitates a whole class discussion to debrief key learnings	- Guided Discussion	✓	✓	✓	✓		✓	✓	✓	✓	
asks students to think independently, test their idea with a partner, and share whole group	- Think, Pair, Share										
includes sentence stems to support students with explanations	- Sentence Stems										
provides opportunities for students to work with a partner or a group	Peer Collaboration	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
uses mnemonics such as SohCahToa	Mnemonics										
includes websites or equipment that enhances the lesson	Technological Support										
content can be presented in different forms											
uses hands-on tools or manipulatives to represent the math	- Concrete	✓	✓	✓	✓			✓			
uses drawings to represent the math	- Pictorial	✓	✓	✓	✓		✓	✓			
uses numbers and number sentences to represent the math	- Abstract	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

The EFFL Model

Experience First, Formalize Later (EFFL) Model

Opening

For every new lesson, the teacher begins by making the goals of the lesson crystal clear. The teacher does more than simply read the objective to the class. They make connections to previous learning, share how this learning fits into a bigger picture, or explain why this learning is important for future learning.

Activity / Interaction With New Material (INM)

For this part of the lesson, students work in pairs or groups of four to experience new content through an activity. Students might be discussing a proposed scenario, working with other groups, or doing a simulation. The student activity is designed for students to be able to do without the help of the teacher. Of course, the teacher is watching and listening in to conversations in order to formatively assess student understanding. The teacher provides questions, cues, and prompts (not answers!) to help push groups forward when they are stuck or have made a mistake. As students begin to finish the activity, the teacher identifies students to write their work on the board. Most often, the teacher selects student work that will easily allow them to connect the experience to formal learning. Students write their work on the whiteboard in a single-color marker.

Debrief Activity

Once students have recorded their responses in their workbook (see blue writing to the right), the teacher calls the whole group back together for a debrief. It is in this discussion that the teacher will help students formalize the learning. The teacher connects the student activity experience to new vocabulary, definitions, formulas, and algorithms. The formal learning is attached specifically to the experiences of the activity so that students can enhance their constructed understanding of the new content. The teacher writes all of the formal learning in a different color in the margins of the activity (see red writing to the right). The students add these ideas in the margins on their activity page and often think of this as the formal “notes” of the lesson. In all of the answer keys we provide on Math Medic, the teacher formal learning points are provided in the margins in a different color.

2. a. Graph $\triangle ABC$ after moving it left four and up two.
 $(x,y) \rightarrow (x-4, y+2)$
b. Give the ordered pairs of the new triangle.
 $A = (-5, 5)$ $B = (-1, 8)$
 $C' = (-4, 2)$
c. Describe what happened to the measures of the three angles and three side lengths of the triangle after moving it.
Translations are rigid transformations they stayed the same.

QuickNotes

In this part of the lesson, the teacher uses the whole experience of the activity and the formalization in the debrief to summarize the learning from the lesson. Notice that we use the box to constrain the amount of formal “notes” that the teacher can provide.

Lesson 3.2 – Translations

QuickNotes
LT#1
Translations preserve lengths + angles (rigid movement)

LT#2
Translation rule
 $(x,y) \rightarrow (x \pm \quad, y \pm \quad)$
original point becomes horizontal movement vertical movement
Every pt. moves same distance!

Student Practice

Now that students have arrived at some new learning, they need to be able to apply it in new contexts. Most often we have students complete these questions in pairs and occasionally we select one question to use as an exit ticket. If we have time, we have students write solutions on the whiteboard.

Extra Practice

We typically give students around 3-5 “Extra Practice” problems for each lesson. We choose problems that are closely aligned with the Learning Objectives of the lesson. It is our belief that “less is more” here. We would rather students spend their Extra Practice time thinking deeply about just a few problems, rather than surface level thinking on many problems. When possible, we provide the answers at the bottom of the page, so they can immediately assess their understanding.

Slightly modified version of: <https://www.calc-medic.com/post/experience-first-formalize-later#:~:text=%E2%80%9CExperience%20First%2C%20Formalize%20Later%E2%80%9D,at%20formal%20definitions%20and%20formulas.>

Before You EFFL!

Here are helpful resources that you guide you in the right direction before your first EFFL lesson!

Why Should We EFFL?

The article advocates for the Experience First, Formalize Later (EFFL) teaching model, emphasizing its effectiveness in fostering deep understanding and flexible thinking in students. The author compares traditional teaching to a game of "Simon Says," where students merely mimic instructions without grasping underlying concepts. In contrast, EFFL encourages students to engage actively with problems, enhancing their ability to understand and apply calculus concepts creatively.

Tips for Lesson Planning

The article offers practical advice for effective lesson planning beyond the exhaustive and overly detailed approaches often emphasized during teacher training. It underscores the importance of thoughtful preparation but rejects the notion that teachers need to script every minute or detail of a class session.

Making the Most of Your EFFL Lesson Debrief

The article discusses the significance of the debriefing phase in the Experience First, Formalize Later (EFFL) lesson model, emphasizing its role in reinforcing learning and highlighting student contributions. The debrief session is seen as crucial for integrating academic vocabulary, emphasizing key lesson understandings, and valuing students' mathematical insights.

While You EFFL!

While each lesson may be unique in context and skills, all lessons benefit from the following practices:

Teacher Look Fors:

- Utilizing the Do Now to spark students' interest in the Activity.
- Use questioning to promote small group discussion and exploration, guided by monitoring questions.
- Connects Experience First to formal concepts using a **colored pencil/pen** to take notes along the margin during the Debrief.
- Facilitates whole-class discussions for students to reflect, share insights, and provides feedback that reinforces key concepts.
- Tracks time to adapt lesson pacing and support based on student response and engagement.

Students Look Fors:

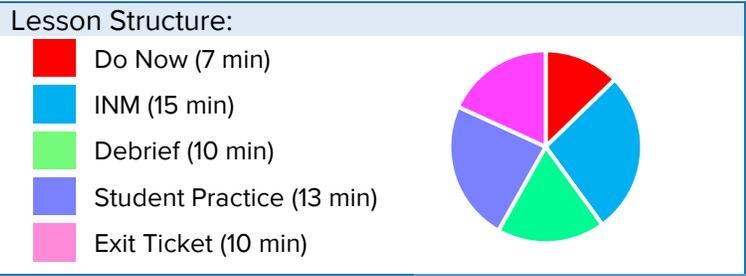
- In the Activity, students engage in group work and discourse.
- Exploring the activity, testing hypotheses and approaches (trial & error).
- Take notes on key ideas and concepts using different **colored pencil/pen** to take notes along the margin.
- Share thoughts and ideas that demonstrate their approach to their work.

Other considerations

- During the **Experience First** phase, if most of your students seem stuck or disengaged, take a moment to pause, reset, and provide clear instructions. Some problems of the Activity are more suitable to do a whole-class discussion as a means to save some instructional time for Student Practice or the Exit Ticket. You are encouraged to adapt the EFFL (Experience First, Formalize Later) process to meet your students' needs while maintaining a focus on student-centered instruction.

ROADMAP

AT A GLANCE: Unit 9 – Surface Area and Volume			
Day	Date	Lesson	Lesson Title
<p>There are 4 flexible Success Days that you can use anywhere in the unit.</p> <ul style="list-style-type: none"> • Consider using 1 day to facilitate Lesson 5, a Mid-Unit review that addresses content from Lessons 1 - 4. • Consider using 1 day to administer Topic Quiz A between Lessons 5 and 6, and another day to administer Topic Quiz B after Lesson 9. • Consider using 1 day to review the day before UE9. For this review, consider using the provided review lesson, Lesson 9.10. • If you don't need to use all 9 Success Days, you can/should save them for later. 			
1		1	Introducing Volume With Prisms and Cylinders
2		2	Surface Area and Volume of Prisms and Cylinders
3		3	Volume of Pyramids and Cones
4		4	Surface Area of Pyramids and Cones
5		5	Mid-Unit Review A (Lessons 1 – 6)
6			Unit 9 Topic Quiz A Success Day
7		6	Volume of Spheres
8		7	Surface Area of Spheres
9		8	Problem Solving With Surface Area and Volume
10		9	Similar Solids
11			Unit 9 Topic Quiz B Success Day
12		CR	Cumulative Review Lesson 9.10 Success Day
13			Unit 9 Exam

Lesson 2: Surface Area and Volume of Prisms and Cylinders		Date: _____
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors
<ul style="list-style-type: none"> ◆ 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(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.10(B) determine and describe how changes in the linear dimensions of a shape affect its perimeter, area, surface area, or volume, including proportional and nonproportional dimensional change 	<p>Necessary Materials and Pre-Lesson Prep</p> <ul style="list-style-type: none"> ▪ Lesson 9.2 Student Workbook pages ▪ 1 white and 1 not-white 8.5" x 11" sheet of paper per student ▪ Class set of red pens ▪ Class set of rulers ▪ Paper plates, plastic or paper cups, and popcorn <p>Lesson Structure:</p>  <p>Mathematical Goal of this Lesson By the end of this lesson, students should be able to find the surface area and volume of prisms and cylinders, and explain how changing dimensions of cylinders and prisms affects their volumes. It is not important for students to memorize surface area formulas. Rather, students should internalize that the lateral surface of both a cylinder and a prism is just a rectangle, and that they can add the area of this rectangle to the area of the bases to find total surface area when needed.</p> <p>Opportunities to CFU</p> <ul style="list-style-type: none"> ✓ INM: 7, 8, 12 ✓ Student Practice: 1, 2, 3, 4 <p>Other Notes to Inform Your Planning For the Do Now: The Do Now sets up the INM and CANNOT be skipped or replaced. It requires only that students can fold paper into a prism and measure its dimensions. If you anticipate some students will struggle with folding or measurement skills, set them up with a partner who can quietly support them.</p> <p>For INM #8: This question is really interesting and sets students up to start thinking about scale factor of similar solids, particularly when you teach Lesson 9: Similar Solids</p> <div data-bbox="1102 1266 1417 1469" style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">Focus on Disciplinary Literacy</p>  <p style="text-align: center;">INM #8</p> </div>	<p>Look for teachers to...</p> <ul style="list-style-type: none"> ❑ use the monitoring questions provided on TE p15 and 16 to prompt student thinking ❑ maintain a sense of urgency while circulating to ensure that students get enough time to work through prisms and cylinders. Consider using the extra flexible Success Day right after this lesson if you feel students would benefit so that they can engage with this activity for one day and then practice the next. <p>Look for students to...</p> <ul style="list-style-type: none"> ❑ understand that both prisms have the same lateral surface area (since they're both made of exactly the same-sized sheet of paper (INM #3)) ❑ make a prediction about which prism can hold more popcorn, and do their best to justify it (even if justification is wrong) <p>Student Know/Do Chart</p> <ul style="list-style-type: none">  Students can find the surface area of a cylinder given its height and the circumference of its base.  To find the area of a circle, you must know its radius. If given circumference, you can work backward using $C = 2\pi r$ to find its radius.  You can find the surface area of a cylinder by "opening" it to see its net and finding the surface of each area (two congruent circles and one rectangle).
<p>Important Vocabulary</p> <ul style="list-style-type: none"> ▪ cylinder ▪ prism ▪ lateral surface area ▪ surface area 		

Lesson 3: Volume of Pyramids and Cones		Date: _____										
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors										
<p>◆ G.11D 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</p>	<p>Necessary Materials and Pre-Lesson Prep</p> <ul style="list-style-type: none"> ▪ Lesson 9.3 Student Workbook pages ▪ 1-2 sets of relational geo solids ▪ Class set of red pens ▪ Rice or other filling material <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Lesson Structure:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px; background-color: red; border: 1px solid black;"></td> <td>Do Now (7 min)</td> </tr> <tr> <td style="width: 20px; background-color: cyan; border: 1px solid black;"></td> <td>INM (15 min)</td> </tr> <tr> <td style="width: 20px; background-color: limegreen; border: 1px solid black;"></td> <td>Debrief (7 min)</td> </tr> <tr> <td style="width: 20px; background-color: blue; border: 1px solid black;"></td> <td>Student Practice (16 min)</td> </tr> <tr> <td style="width: 20px; background-color: magenta; border: 1px solid black;"></td> <td>Exit Ticket (10 min)</td> </tr> </table>  </div> <p>Mathematical Goal of this Lesson By the end of this lesson, students should be able to find the volume of pyramids and cones and explain the relationship between the volume of a cone and cylinder with the same dimensions (and the volume of a prism and pyramid with the same dimensions), and use this to solve problems. Just like in the previous two lessons, the goal is not to memorize formulas, but to understand why the volume formulas make sense so that students are less likely to confuse or misapply them.</p>		Do Now (7 min)		INM (15 min)		Debrief (7 min)		Student Practice (16 min)		Exit Ticket (10 min)	<p>Lesson Look Fors</p> <p><u>Look for teachers to...</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> set clear expectations for the activity <p><u>Look for students to...</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> notice that the answer to C is always very close to “3.” <input type="checkbox"/> realize that the volume of a cone/pyramid with the same dimensions as a cylinder/prism has $\frac{1}{3}$ the volume of that cylinder/prism, and be able to explain each element of the formula $V = \frac{1}{3}Bh$.
		Do Now (7 min)										
	INM (15 min)											
	Debrief (7 min)											
	Student Practice (16 min)											
	Exit Ticket (10 min)											
<p>Important Vocabulary</p> <ul style="list-style-type: none"> ▪ cone ▪ pyramid ▪ slant height 	<p>Opportunities to CFU</p> <ul style="list-style-type: none"> ✓ INM: 2, 3, 4 ✓ Student Practice: 1, 2, 3 <p>Other Notes to Inform Your Planning</p> <p>For the Do Now: The Do Now is not tied to the INM and can be skipped or replaced. It is included to activate prior knowledge relevant to the lesson.</p> <p>For INM: Please read pink TE box on p22 for a note on how to set up the activity (the information does not fit here). Know that students will spend part of the INM traveling around the room to investigate different pairs of solids with the same dimensions with the goal of identifying a pattern.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px; text-align: center;"> <p>Focus on Disciplinary Literacy</p>  <p>Debrief</p> </div>	<p>Student Know/Do Chart</p> <p> Students can find the volume of a cone.</p> <p> You can find the volume of a cone using $V = \frac{1}{3}Bh$ since the volume of a cone is $\frac{1}{3}$ the volume of a cylinder with the same Base and height.</p>										

Lesson 5: Mid-Unit Review A (Lessons 1-4) – AROUND THE WORLD!		Date: _____										
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors										
<p>◆ 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</p> <p>◆ 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</p>	<p>Necessary Materials and Pre-Lesson Prep</p> <ul style="list-style-type: none"> Unit 9.5 Student Workbook pages Whiteboard space for students Around the World Cards (see TE pp 65-66) <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>Lesson Structure:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px; background-color: red; border: 1px solid black;"></td> <td>Do Now (7 min)</td> </tr> <tr> <td style="width: 20px; background-color: blue; border: 1px solid black;"></td> <td>INM (0 min)</td> </tr> <tr> <td style="width: 20px; background-color: green; border: 1px solid black;"></td> <td>Around the World (40 min)</td> </tr> <tr> <td style="width: 20px; background-color: purple; border: 1px solid black;"></td> <td>Debrief (8 min)</td> </tr> <tr> <td style="width: 20px; background-color: pink; border: 1px solid black;"></td> <td>Exit Ticket (0 min)</td> </tr> </table>  </div> <p>Mathematical Goal of this Lesson This lesson provides a review of Lesson 1-5 and gives students the opportunity to work together.</p> <p>Opportunities to CFU</p> <ul style="list-style-type: none"> ✓ when giving Around the World directions (before you release students to participate in the activity) ✓ during the Debrief when you go over most-missed questions <p>Other Notes to Inform Your Planning</p> <p>For the Do Now: The provided Do Now is helpful for activating prior knowledge, but it is not married to the INM and can be replaced with a spiraled review question of your choice.</p> <p>For Around the World: Please carefully read the directions in the pink box on TE p63.</p> <p>For Debrief: Go over questions students struggled with the most.</p> <p>For the Exit Ticket: No SP is provided because this review lesson is essentially a LOT of student practice. No ET is provided because the next day should be a Topic Quiz day that will give you a great data point.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px; text-align: center;"> <p style="background-color: yellow; margin: 0;">Focus on Disciplinary Literacy</p>  <p style="margin: 0;">Around the World</p> </div>		Do Now (7 min)		INM (0 min)		Around the World (40 min)		Debrief (8 min)		Exit Ticket (0 min)	<p>Look for teachers to...</p> <ul style="list-style-type: none"> <input type="checkbox"/> give clear directions for “Around the World” so the activity can flow smoothly. <input type="checkbox"/> Have “Around the World” cards clearly accessible around the classroom <input type="checkbox"/> Set clear expectations for how students should move “around the world” <p>Look for students to...</p> <ul style="list-style-type: none"> <input type="checkbox"/> talk with their partners about the math problem they’re working on at the time. <input type="checkbox"/> persevere through challenge. If neither partner knows how to solve a problem, that is okay! They can try a different problem and come back to it later. If they’re totally stuck, they can ask for help.
	Do Now (7 min)											
	INM (0 min)											
	Around the World (40 min)											
	Debrief (8 min)											
	Exit Ticket (0 min)											
Important Vocabulary		Student Criteria for Success										
All vocabulary from Lessons 1 – 5.		<p> Students can apply all “Dos” from Lessons 1-5.</p> <p> Students know all “Knows” from Lessons 1-5.</p>										

Lesson 9: Similar Solids		Date: _____										
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors										
<p>G.10B determine and describe how changes in the linear dimensions of a shape affect its perimeter, area, surface area, or volume, including proportional and nonproportional dimensional change</p>	<p>Necessary Materials and Pre-Lesson Prep</p> <ul style="list-style-type: none"> Lesson 9.9 Student Workbook pages Class set of red pens <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>Lesson Structure:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20px; text-align: center;"></td> <td>Do Now (7 min)</td> </tr> <tr> <td style="text-align: center;"></td> <td>INM (15 min)</td> </tr> <tr> <td style="text-align: center;"></td> <td>Debrief (10 min)</td> </tr> <tr> <td style="text-align: center;"></td> <td>Student Practice (13 min)</td> </tr> <tr> <td style="text-align: center;"></td> <td>Exit Ticket (10 min)</td> </tr> </table>  </div> <p>Mathematical Goal of this Lesson In Lesson 6.6 (Area and Perimeter of Similar Figures), students learned that the scale factor of two similar figures is squared when determining area because growth occurs in two dimensions. By the end of this lesson, students should be able to determine dimensions and volumes of similar solids and apply the understanding that the scale factor of two similar solids is squared when determining surface area and cubed when determining volume.</p> <p>Opportunities to CFU</p> <ul style="list-style-type: none"> INM: 2b, 3 Student Practice: 1, 2, 3 		Do Now (7 min)		INM (15 min)		Debrief (10 min)		Student Practice (13 min)		Exit Ticket (10 min)	<p>Look for teachers to...</p> <ul style="list-style-type: none"> define “fair price” in this case as paying a consistent amount per unit of product (e.g. if three doughnuts cost \$5, then six doughnuts cost \$10). use the monitoring questions in the green boxes on TE pp 68-69 to help students when they’re stuck or spur discussion. <p>Look for students to...</p> <ul style="list-style-type: none"> initially disagree with each other on question #2 because some are already thinking about how the scale factor must be squared while others are not. Ideally, through discourse, all teammates will help to get each other on the same page. perform relevant calculations to justify their thinking. For example, with #2a, students could perform calculations to demonstrate that one 10” tortilla is not equivalent to two 5” tortillas by finding the area of each size tortilla.
		Do Now (7 min)										
	INM (15 min)											
	Debrief (10 min)											
	Student Practice (13 min)											
	Exit Ticket (10 min)											
<p>Important Vocabulary</p> <ul style="list-style-type: none"> scale factor similar solids 	<p>Other Notes to Inform Your Planning</p> <p>For the Do Now: The Do Now sets up the INM. It cannot be skipped or replaced.</p> <p>For the INM: Question 1 deals with 1-d growth, Q2 deals with 2-d growth, and Q3 deals with 3-d growth. Ensure that</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0; text-align: center;"> <p>Focus on Disciplinary Literacy</p>  <p>Debrief</p> </div>	<p>Student Know/Do Chart</p> <p>Do Students can apply their understanding that the scale factor of two similar solids is cubed when working with volume because growth occurs in three dimensions.</p> <p>Do Students can set up a ratio to compare the volume of two similar solids.</p> <p>Know When two solids of the same type are similar, the ratio of the scale factor of one corresponding dimension is cubed to find the ratio of their volumes (e.g. for two spheres, the ratio of one sphere’s radius to the other sphere’s radius is cubed to find the ratio of the volumes of one each sphere.</p> <p>Know All spheres are similar to each other.</p>										

Cumulative Review Success Day		Date: _____	
Standard(s)	Notes for Intellectual Preparation & Lesson Planning	Lesson Look Fors	
<p>◆ G.10B determine and describe how changes in the linear dimensions of a shape affect its perimeter, area, surface area, or volume, including proportional and nonproportional dimensional change</p> <p>◆ G.11C 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</p> <p>◆ G.11D 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</p>	<p>Necessary Materials and Pre-Lesson Prep</p> <ul style="list-style-type: none"> ▪ Review students' Unit 9 exit ticket data to determine what to prioritize during review ▪ Multiple copies of problem set (see notes below) ▪ Pack of sticky notes <p>Lesson Structure:</p> <div style="display: flex; align-items: center;"> <ul style="list-style-type: none"> ■ Do Now (7 min) ■ INM (0 min) ■ Sticky Feet (40 min) ■ Debrief (8 min) ■ Exit Ticket (0 min)  </div> <p>Preparation: Print multiple copies of the problem set. There should be enough copies for each group to have one of each problem. Cut up the problems and arrange them in your classroom somewhere for easy access. You'll also need to prepare your sticky notes with the point amounts written on the back. To make the sticky notes, write a point value on the back of 30 or so Post-It notes (use pencil so they can't see through it). Stick them to a poster or whiteboard. Write positive values between 0 and 10 on most of them and a few higher ones (15 and 20) and some negative ones, including one negative 20. Don't tell the students the distribution of positive and negative numbers.</p> <p>How to play: Arrange students in groups of 3 or 4. Each group should come up with a team name and write it on the board. Groups send one group member up to the teacher to grab a problem. They work on this at their desks as a group and bring it up to you to check. If it is incorrect, you will simply say "No" and send them back to try again. If the answer is correct, they take a Post-it note from the board which tells them how many points they earn for the question (see more details below.) They then send a different group member to get the next problem. We require that groups take turns sending up group members and writing out the answer so that every student is included and participating. I tell students I should see everyone's handwriting at some point!</p> <p>Scoring: Every time a group gets a correct problem, they have the opportunity to earn some points by randomly selecting a sticky note from the whiteboard or poster. BEFORE the group sees the number of points they have to choose whether to keep the points or give them to another group. But here's the catch: some of the Post-Its are Stinky Feet, meaning they have NEGATIVE points on them. If they have chosen to give the points to another team, they can look at the value and THEN decide which team to assign it to. They should then adjust the scores on the board and start working on the next problem.</p> <p>End of the game: The game ends when there are no more sticky notes left, or after an allotted time.</p>	<p><u>Look for teachers to...</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> facilitate a review session that prioritizes what students need based on previous exit ticket and/or quiz data. <p><u>Look for students to...</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> review Unit 9 topics in preparation for the Unit 9 exam. 	
	Student Criteria for Success		
			<p> Students can prepare for the Unit 9 Exam by reviewing Unit 9 content.</p>

Recommended Unit 9 Success Day Material and Resources

Date: _____

For more practice with SA and volume of prisms and cylinders (Lessons 1-2), try...

- 22-23 MCR Lesson 10.2 Surface Area of Prisms and Cylinders: TE | SW
- 22-23 MCR Lesson 10.4: Volume of Prisms and Cylinders: TE | SW
- Mathopolis Quiz: Surface Area
- Mathopolis Quiz: Volume

For more practice with SA and volume of pyramids and cones (Lessons 3-4), try...

- 22-23 MCR Lesson 10.3: Surface Area of Prisms and Cones: TE | SW
- 22-23 MCR Lesson 10.5: Volume of Pyramids and Cones: TE | SW
- Kuta Software: Pyramids and Cones

For more practice with SA and volume of spheres (Lessons 6-7), try...

- 22-23 MCR Lesson 10.6: Surface Area and Volume of a Sphere: TE | SW
- Kuta Software: Spheres
- Math Drills: SA and Volume of Spheres

For more practice with similar solids (Lesson 9), try...

- 22-23 MCR Lesson 10.9: Effects of Changing Dimensions: TE | SW
- Kuta Software: Similar Solids
- Big Ideas in Math: SA and Volume of Similar Solids

For a combination of problem sets on various SA and volume concepts, try...

- 22-23 MCR Lesson 10.7: Review of SA and Volume: TE | SW
- 22-23 MCR Lesson 10.10: Cumulative Review: TE | SW
- New Jersey Center for Teaching and Learning 37-page packet
- Released textbook chapter: Surface Area and Volume

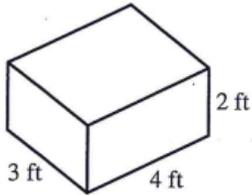
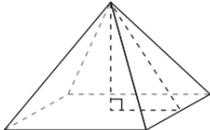
Standard(s)	Notes for Intellectual Preparation & Lesson Planning
<p>◆ G.10B determine and describe how changes in the linear dimensions of a shape affect its perimeter, area, surface area, or volume, including proportional and nonproportional dimensional change</p> <p>◆ G.11C apply the formulas for the 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</p> <p>◆ G.11D 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</p>	<p>Necessary Materials and Pre-Lesson Prep</p> <ul style="list-style-type: none"> ▪ Print enough copies of UE9 Bluebook on Curriculum Corner (for the FRQ) and ensure you have access to the exam on Edcite. (If you do not have access to the exam, notify your TC and submit a Zendesk ticket ASAP.) <p>Notes to Inform Your Planning</p> <p>Review the Unit 9 Exam on Curriculum Corner. Internalize and create an exemplar for the assessment prior to teaching the unit as part of unpacking the unit. Use your exemplar to spar with the solutions provided in the Assessment Companion on Curriculum Corner.</p> <p>The scanning deadline for the Unit 9 Exam is April 2nd, 2026. Consider administering the exam 1-3 school days BEFORE April 2nd to allow sufficient time for grading the FRQ.</p> <p>Refer to the scoring guide to score the FRQ.</p>

UNPACKED STANDARDS

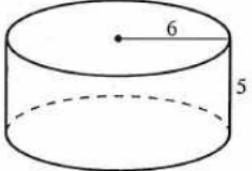
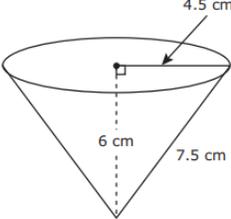
Focus standards for this unit.

Standards Clarification		
Standards	Specificity	Notes/Explanations/Examples
<p>G.10B determine and describe how changes in the linear dimensions of a shape affect its perimeter, area, surface area, or volume, including proportional and nonproportional dimensional change</p>	<p><u>Content:</u></p> <ul style="list-style-type: none"> • Dimensions • Perimeter • Area • Surface area • Volume • Proportional and nonproportional dimensional change <p><u>Including but not limited to:</u></p> <ul style="list-style-type: none"> • Finding area of similar figures given a scale factor • Determining whether or not figures can be proven to be congruent • Finding volume of similar figures given scale factor. • Determining whether a change in a dimension affects a shape's volume or area 	<p>From released Geometry STAAR</p> <p>20 The volume of a rectangular prism is 960 cubic inches. If the dimensions of the base are doubled and the height remains the same to create a new prism, what will be the volume of the new rectangular prism in cubic inches?</p> <p>Record your answer and fill in the bubbles on your answer document.</p>

Standards Clarification

Standards	Specificity	Notes/Explanations/Examples												
<p>G.11C 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</p>	<p>Content:</p> <ul style="list-style-type: none"> Total surface area Lateral surface area Prisms Pyramids Cones Cylinders Spheres Composite figures <p><u>Including but not limited to:</u></p> <ul style="list-style-type: none"> finding the total surface area of a prism, pyramid, cone, cylinder, sphere, or composite figure finding the lateral surface area of a prism, pyramid, cone, cylinder, or composite figure finding a missing dimension when given a figure's total or lateral surface area 	<p style="text-align: center;">December 2018 Released ACT</p> <p>A local recycling center pays customers for cans, bottles, and cardboard. After processing these items, the center then resells them to XYZ Inc. The recycling center's payments to customers and the resale prices paid by XYZ Inc. are given in the table below.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Item</th> <th>Payment</th> <th>Resale price</th> </tr> </thead> <tbody> <tr> <td>Can</td> <td>\$0.05 each</td> <td>\$0.15 each</td> </tr> <tr> <td>Bottle</td> <td>\$0.10 each</td> <td>\$0.18 each</td> </tr> <tr> <td>Cardboard</td> <td>\$0.01 per pound</td> <td>\$0.02 per pound</td> </tr> </tbody> </table> <p>43. The closed box with no overlapping pieces whose dimensions are given below is made with cardboard that weighs 1 pound per square foot of the surface area of the box. Which of the following values is closest to the amount the recycling center will pay a customer for this box?</p> <div style="text-align: center;">  </div> <p>A. \$0.24 B. \$0.36 C. \$0.48 D. \$0.52 E. \$1.04</p> <p style="text-align: center;">Geometry 2013 STAAR Release</p> <p>6 Five spheres are being painted for a display at a store. If the diameter of each sphere is 7 centimeters, which value is closest to the total surface area that will be painted?</p> <p>F 770 cm² G 154 cm² H 192 cm² J 440 cm²</p>	Item	Payment	Resale price	Can	\$0.05 each	\$0.15 each	Bottle	\$0.10 each	\$0.18 each	Cardboard	\$0.01 per pound	\$0.02 per pound
Item	Payment	Resale price												
Can	\$0.05 each	\$0.15 each												
Bottle	\$0.10 each	\$0.18 each												
Cardboard	\$0.01 per pound	\$0.02 per pound												
	<p>37 The main entrance to the Louvre art museum is shaped like a pyramid. The pyramid is 71 feet tall and has a slant height of approximately 91 feet. Each side of the square base measures 115 feet.</p> <div style="text-align: center;">  </div> <p>Which of the following is closest to the lateral surface area of the pyramid?</p> <p>A 20,930 ft² B 16,330 ft² C 10,465 ft² D 34,155 ft²</p>													

Standards Clarification

Standards	Specificity	Notes/Explanations/Examples
<p>G.11D 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</p>	<p><u>Content:</u></p> <ul style="list-style-type: none"> • volume • prisms • pyramids • cylinders • spheres • composite figures <p><u>Including but not limited to:</u></p> <ul style="list-style-type: none"> • finding the volume of a prism, pyramid, cylinder, sphere or composite figure. • Finding a missing dimension when given the volume of a prism, pyramid, cylinder, sphere or composite figure. 	<p style="text-align: center;">ACT: June 2020 release</p> <p>30. A formula for the volume, V, of a right circular cylinder is $V = \pi r^2 h$, where r is the radius and h is the height. The cylindrical tank shown below has radius 6 meters and height 5 meters and is filled with water.</p>  <p>Given that the weight of 1 cubic meter of water is approximately 2,205 pounds, the weight, in pounds, of the water in the tank is:</p> <p>F. less than 400,000. G. between 400,000 and 900,000. H. between 900,000 and 1,200,000. J. between 1,200,000 and 1,700,000. K. more than 1,700,000.</p> <p style="text-align: center;">STAAR Geometry Release</p> <p>28 A conical paper cup is shown in the diagram below.</p>  <p>Which value is closest to the maximum volume of water this cup can hold?</p> <p>F 159 cm³ G 32 cm³ H 127 cm³ J 40 cm³</p>

VERTICAL 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.

7 th Grade	Geometry	Algebra II
<p>7.8A model the relationship between the volume of a rectangular prism and a rectangular pyramid having both congruent bases and heights and connect that relationship to the formulas.</p> <p>7.8B explain verbally and symbolically the relationship between the volume of a triangular prism and a triangular pyramid having both congruent bases and heights and connect that relationship to the formulas.</p> <p>7.8C use models to determine the approximate formulas for the circumference and area of a circle and connect the models to the actual formulas.</p> <p>7.9A solve problems involving the volume of rectangular prisms, triangular prisms, rectangular pyramids, and triangular pyramids.</p> <p>7.9B determine the circumference and area of circles.</p> <p>7.9C determine the area of composite figures containing combinations of rectangles, squares, parallelograms, trapezoids, triangles, semicircles, and quarter circles.</p> <p>7.9D 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.</p>	<p>G.10B determine and describe how changes in the linear dimensions of a shape affect its perimeter, area, surface area, or volume, including proportional and non-proportional dimensional change.</p> <p>G.11C 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.</p> <p>G.11D 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.</p>	<p>No direct connections.</p>
Algebra I		Pre-Calculus
<p>No direct connections.</p>		<p>P.3F the student is expected to determine the conic section formed when a plane intersects a double-napped cone.</p>