

WAMC Lab Template

Math Concept(s): Area

Source / Text:

Developed by: Katie vanderVis

E-Mail: katie_vandervis@ksd403.org

Date: Summer Conference 2022

Attach the following documents:

- Lab Instructions- see page 3
- Student Handout(s)- Motel Remodel (see page 4)
- Rubric and/or Assessment Tool- formative assessment: Motel Flooring worksheet (see page 4)

Short Description (Be sure to include where in your instruction this lab takes place):

Lab Plan

Lab Title: Motel Remodel

Prerequisite skills:

Area of quadrilaterals and triangles

$$a=lw \quad \text{area of a triangle} = bh/2$$

Pythagorean Theorem

Finding missing dimensions

Decomposing a composite shape

Price per square foot.

Lab objective:

The objective of the lab is for the student to gain understanding in how to decompose a composite shape, calculate the area. The student will be able to calculate the amount of flooring needed and the total price of flooring.

Standards: (Note SPECIFIC relationship to Science, Technology, and/or Engineering)

Mathematics K–12 Learning Standards:

- [CCSS.MATH.CONTENT.7.G.B.6](#)
- [CCSS.MATH.CONTENT.6.G.A.1](#)
- [CCSS.MATH.CONTENT.8.G.B.7](#)

Standards for Mathematical Practice:

- 4 Model with mathematics
- 2 Reason abstractly and quantitatively
- 6 Attend to precision

K-12 Learning Standards-ELA (Reading, Writing, Speaking & Listening):

- [CCSS.ELA-LITERACY.SL.8.1](#)

K-12 Science Standards

Technology

- 1.d. Students are able to navigate a variety of technologies and transfer their knowledge and skills to learn how to use new technologies
- 3.a. Students demonstrate and practice the ability to effectively utilize research strategies to locate appropriate digital resources in support of their learning
- 3.d. Students explore real-world issues and problems and actively pursue an understanding of them and solutions for them.

Engineering

- MS-ETS1-4

Leadership/21st Century Skills:

<u>21st Century Interdisciplinary themes</u> (Check those that apply to the above activity.)			
<input type="checkbox"/> Global Awareness	<input checked="" type="checkbox"/> Financial/Economic/Business/Entrepreneurial Literacy	<input type="checkbox"/> Civic Literacy	
<input type="checkbox"/> Health/Safety Literacy	<input type="checkbox"/> Environmental Literacy		
<u>21st Century Skills</u> (Check those that students will demonstrate in the above activity.)			
LEARNING AND INNOVATION	INFORMATION, MEDIA & TECHNOLOGY SKILLS	LIFE & CAREER SKILLS	Productivity and Accountability
<u>Creativity and Innovation</u>	<u>Information Literacy</u>	<u>Flexibility and Adaptability</u>	<input type="checkbox"/> Manage Projects
<input checked="" type="checkbox"/> Think Creatively	<input checked="" type="checkbox"/> Access and Evaluate Information	<input type="checkbox"/> Adapt to Change	<input type="checkbox"/> Produce Results
<input checked="" type="checkbox"/> Work Creatively with Others	<input checked="" type="checkbox"/> Use and manage Information	<input type="checkbox"/> Be Flexible	<u>Leadership and Responsibility</u>
<input type="checkbox"/> Implement Innovations	<u>Media Literacy</u>	<u>Initiative and Self-Direction</u>	<input type="checkbox"/> Guide and Lead Others
<u>Critical Thinking and Problem Solving</u>	<input type="checkbox"/> Analyze Media	<input type="checkbox"/> Manage Goals and Time	<input type="checkbox"/> Be Responsible to Others
<input type="checkbox"/> Reason Effectively	<input type="checkbox"/> Create Media Products	<input type="checkbox"/> Work Independently	
<input type="checkbox"/> Use Systems Thinking	<u>Information, Communications and Technology (ICT Literacy)</u>	<input type="checkbox"/> Be Self-Directed Learners	
<input type="checkbox"/> Make Judgments and Decisions	<input type="checkbox"/> Apply Technology Effectively	<u>Social and Cross-Cultural</u>	
<input checked="" type="checkbox"/> Solve Problems		<input checked="" type="checkbox"/> Interact Effectively with Others	
<u>Communication and Collaboration</u>		<input type="checkbox"/> Work Effectively in Diverse Teams	
<input type="checkbox"/> Communicate Clearly			
<input type="checkbox"/> Collaborate with Others			

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Teacher Preparation: (What materials and set-up are required for this lab?)

Materials

- Graph paper, measuring tape, ruler, calculator, computer for research, Motel Remodel worksheet.

Set-Up Required:

- Set-up will be in the gym. Two separate layouts of the motel room will be taped on the gym floor.

Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

- Financial/Economic/Business/Entrepreneurial Literacy
- Think Creatively
- Solve Problems
- Access and Evaluate Information
- Use and Manage Information

Cooperative Learning:

- The students will work in pairs to measure and calculate.

Expectations:

- Students will be able to come to a conclusion of how much flooring will be needed to cover all 15 motel rooms. They will explain which flooring they chose, why.
- Students will be able to calculate how much the total cost will be.
- Students will be able to work cooperatively in their pairs, and come to mutual decisions.

Timeline:

- This lab should take 50 minutes to complete research, measure and record. 50 minutes to complete calculations.

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab

- Finding area and pricing out materials is applicable for home improvement.

Career Applications

- Construction and trade work

Optional or Extension Activities

- This lab can be adapted to cover other math concepts, such as scales, ratios and proportions. It can even be adapted to cover financial planning concepts.

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Lab Instructions:

Students will pair up and gather materials. As a class, we will go to the gym where I have pre-taped two motel room layouts on the floor. The pairs can choose one to measure, keeping in mind we will be calculating the area. The students will sketch the layout on their worksheet, and measure and label the sides of the polygon.

In the classroom, students will calculate the area of their motel room. This number will give them the amount of flooring needed to refloor one motel room. Then calculate how much flooring needed for all 15 (identical) rooms.

Students will research different flooring options (carpet, vinyl, etc.) from a website like Home Depot or Lowes. Knowing the area of the room and price per square foot of the chosen flooring, students will figure out how much flooring they would need to order, and how money it would cost to refloor all 15 rooms.

All answers will be recorded on their Motel Remodel worksheet.

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Motel Remodel

You are remodeling a motel. You are going to need to figure out how much flooring you will need to refloor the 15 identical rooms, and how much it will cost.

Your job is to:

Figure out the area of one room.

Calculate how much total flooring you will need for all 15 rooms.

Find a type of flooring (at Home Depot or Lowes) that your guests will like but that is also cost effective.

Record how much it costs per square foot.

Calculate how much flooring you need to order, and how much it will cost total.

Sketch of the motel room:

Calculate the area:

Research flooring options:

Flooring Name and Type:	Cost per square foot:	Store/Website

Calculate the total amount of flooring (15 identical rooms)

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Calculate the total cost to re-floor:

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WAMC Lesson Plan

Name(s): Katie vanderVis

Email Address: katie_vandervis@ksd403.org

Lesson Title: Composite Shape Area

Date:

Text:

STEM Correlation:

Lesson Length: 50 min

Big Idea (Cluster): Perimeter and Area	
Mathematics K–12 Learning Standards: <ul style="list-style-type: none"> • CCSS.MATH.CONTENT.7.G.B.6 • CCSS.MATH.CONTENT.8.G.B.7 • CCSS.MATH.CONTENT.HSG.GPE.B.7 	
Mathematical Practice(s):	
Content Objectives: <ul style="list-style-type: none"> • Students will recall the formula for the area of 2D shapes. • Students will recall the formula for finding perimeter of 2D shapes. • Students will use the formula for the perimeter and area for a composite shape. 	Language Objectives (ELL): <ul style="list-style-type: none"> • Access prior knowledge, we will be able to target new vocabulary, as well as reinforce previous vocabulary words
Vocabulary: <ul style="list-style-type: none"> • face • perimeter • area • composite shape 	Connections to Prior Learning <ul style="list-style-type: none"> • calculating areas of basic 2D shapes • finding perimeter of basic 2D shapes • understanding how to deconstruct composite shapes
Questions to Develop Mathematical Thinking: <ul style="list-style-type: none"> • If I were to rearrange the room, would the perimeter change? • How could you apply this in real life? • How are perimeter and area different? 	Common Misconceptions: <ul style="list-style-type: none"> • 2D and 3D shapes • Formulas for 2D and 3D shapes • Finding the measurements of composite shapes

Assessment (Formative and Summative):

<ul style="list-style-type: none"> • Formative assessment— “Finding Perimeter and Area” worksheet • Summative assessment—end of unit test

Materials:

<ul style="list-style-type: none"> • Worksheet • Calculator

Instruction Plan:

<p>Introduction:</p> <ul style="list-style-type: none"> • We will begin with review as a class: <ul style="list-style-type: none"> -shapes, perimeter and area. -Why do we need to be able to find perimeter and area: real world applications (i.e.
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WAMC Lesson Plan

remodeling houses). -Discuss what a composite shape is, and how to break it down into manageable shapes. <ul style="list-style-type: none"> • We will do a 3-5 practice problems on the board, as a formula review.
Explore: <ul style="list-style-type: none"> • After reviewing perimeter, area, and the formula as a class, students will be given the worksheet. We will complete one problem as a class, then the rest will be completed independently.
When I observe students: <ul style="list-style-type: none"> • Check to make sure they are correctly doing the formula.
Questions to Develop Mathematical Thinking as you observe: <ul style="list-style-type: none"> • How did you get this answer? • What would happen if you'd rearrange the composite shape? Would the perimeter/area change? Why/why not? • How would you need to use this in your personal life?
Answers: <ul style="list-style-type: none"> • "I split this polygon into two rectangles, then used the $l \cdot w$ formula for each." • "It would be a different shape, but the perimeter and area would be the same." • "I could use this if I were to remodel a house or apartment. I could also use this in design, for example figuring out how to rearrange my room."
Summarize: This lesson acts as a basic review of 2D shapes, and how to find the perimeter and area of basic shapes. After the class discussion and practice, students will learn how to decompose a shape, to be able to find the area and perimeter. With this knowledge, they will complete the worksheet on their own. Which will be turned in at the end of class, and act as the formative assessment. There are many components used when finding the area and perimeter of a composite shape. For example, students must remember how to decompose the shape. They must know how to use the formulas for multiple shapes (triangles and rectangles for example).

Career Application(s):

<ul style="list-style-type: none"> • Construction careers • Remodeling homes • Engineering careers

Leadership/21st Century Skills:

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<u>Critical Thinking and Problem Solving</u> <input checked="" type="checkbox"/> Reason Effectively <input type="checkbox"/> Use Systems Thinking <input type="checkbox"/> Make Judgments and Decisions	<u>Media Literacy</u> <input type="checkbox"/> Analyze Media <input type="checkbox"/> Create Media Products	<u>Social and Cross-Cultural</u>	

WAMC Lesson Plan

- Solve Problems
Communication and Collaboration
 Communicate Clearly
 Collaborate with Others

- Information, Communications
and Technology (ICT Literacy)
 Apply Technology Effectively

- Interact Effectively with
Others
 Work Effectively in Diverse
Teams

- Be Responsible
to Others

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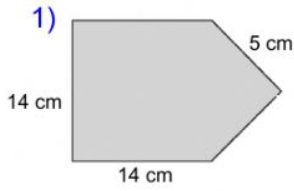
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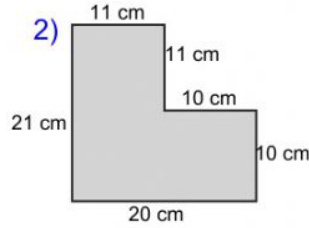
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Area and Perimeter:

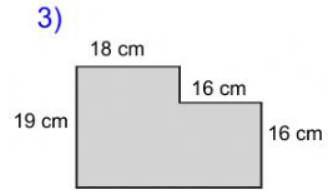
Find the perimeter:



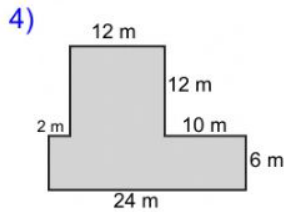
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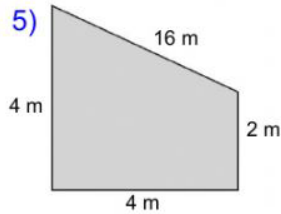
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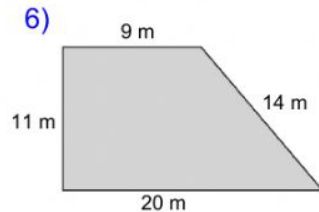
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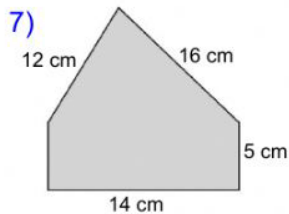
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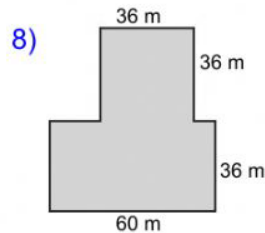
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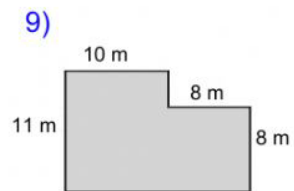
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Perimeter: _____



Perimeter: _____

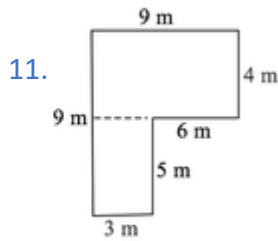
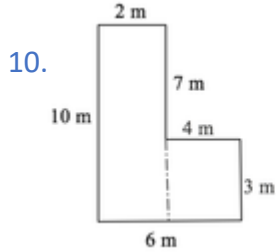


Perimeter: _____

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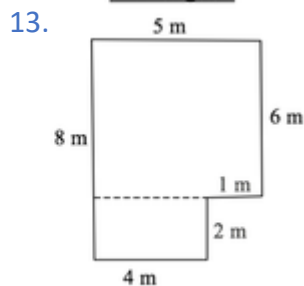
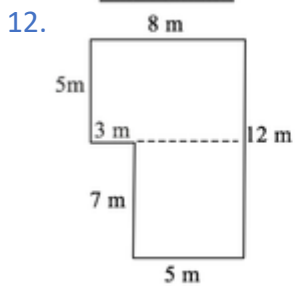
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Find the area:



10. Area: _____

11. Area: _____



12. Area: _____

13. Area: _____