Name:_____ Date:_____ Class:_____

WAMC Lab Template

Math Concept(s): Reading a Floor Plan

Source / Text: Financial Algebra Edition 2

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Attach the following documents:

- Lab Instructions
- Student Handout(s)
- Rubric and/or Assessment Tool

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

This lab will take place in the shop classroom. It will involve the students calculating the square footage and the perimeter of the shop classroom. In addition it will involve students making decisions about materials to use and the cost of the materials for flooring and molding.

Lab Plan

Lab Title: Calculating Sq. footage, perimeter, and cost in a floor plan

Prerequisite skills: Students will need to have a concept of area, perimeter, and know how to draw to scale. They will also understand the concept of reading a floor plan.

Lab objective: Students will be able to calculate areas in a room, perimeter of a room, and calculate cost for home repairs or improvements.

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

Mathematics K–12 Learning Standards:

- G-C5, G-MG3

Standards for Mathematical Practice:

- Standard for Mathematical Practice 1: Make sense of problems and persevere in solving them
- Standard for Mathematical Practice 3: Construct viable arguments and critique the reasoning of others.
- Standard for Mathematical Practice 4: Model with mathematics.
- Standard for Mathematical Practice 5: Use appropriate tools strategically
- Standard for Mathematical Practice 6: Attend to precision.

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

- RST11-12.3
- RST 11-12.6

Technology

- W.9.6 & W.10.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
- W.11.6 & W.12.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

Engineering

- HS-ETS1-2 Engineering Design - Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
- HS-ETS1-3 Engineering Design - Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.
- HS-ETS1-4 Engineering Design - Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem

Leadership/21st Century Skills:

21st Century Interdisciplinary themes (Check those that apply to the above activity.)

☐ Global Awareness ☒ Financial/Economic/Business/Entrepreneurial Literacy ☐ Civic Literacy
☐ Health/Safety Literacy ☐ Environmental Literacy

21st Century Skills (Check those that students will demonstrate in the above activity.)

LEARNING AND INNOVATION
Creativity and Innovation
☐ Think Creatively
☒ Work Creatively with Others
☐ Implement Innovations
Critical Thinking and Problem Solving
☒ Reason Effectively
☐ Use Systems Thinking
☒ Make Judgments and Decisions
☒ Solve Problems
Communication and Collaboration
☒ Communicate Clearly
☒ Collaborate with Others

INFORMATION, MEDIA & TECHNOLOGY SKILLS
Information Literacy
☒ Access and Evaluate Information
☐ Use and manage Information
Media Literacy
☐ Analyze Media
☐ Create Media Products
Information, Communications and Technology (ICT Literacy)
☐ Apply Technology Effectively

LIFE & CAREER SKILLS
Flexibility and Adaptability
☐ Adapt to Change
☐ Be Flexible
Initiative and Self-Direction
☒ Manage Goals and Time
☐ Work Independently
☐ Be Self-Directed Learners
Social and Cross-Cultural
☐ Interact Effectively with Others
☐ Work Effectively in Diverse Teams

Productivity and Accountability
☐ Manage Projects
☐ Produce Results
Leadership and Responsibility
☐ Guide and Lead Others
☐ Be Responsible to Others

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

Materials

- Tape measure, Lab Instructions, Student Handout, calculators, computers with internet access students handout, ruler for extended activity.

Set-Up Required:

- Split students into groups, explain the procedure.

Lab Organization Strategies:

Leadership (Connect to 21st Century Skills selected):

- Student will work collaboratively in groups to figure out the answers to the selected problem. They will use technologies such as calculators and computers to figure out the answer to the problem. They will need to reason effectively, make judgements and decisions, access and evaluate information to solve the problem at hand. They will need to communicate their results clearly through written communication. They will have to manage goals and time to complete the problem on time.

Cooperative Learning:

- Students will work in groups to complete this lab.

Expectations:

- Students are expected to work collaboratively, not one person doing all the work. They need to complete the lab within the allotted time

Timeline:

- Measure the classroom in the shop building – 10 minutes.
- Draw out Scale Drawing – 10 minutes
- Calculate Area and Perimeter – 10 minutes
- Research different materials on home depot – 20 minutes
- Find prices and make calculations for materials needed – 20 minutes
- Conclusion of report – 20 Minutes

Post Lab Follow-Up/Conclusions:

Discuss real world application of learning from lab

- Students will be able to calculate sq. footage to consider when buying a home in addition, they will be able to calculate costs of materials when considering on redoing an area.

Career Applications

- This would apply to any students planning on buying a home or renting a home or apartment to figure out square footage. It would also apply to students who would be

completing their own home renovations in the future. This lesson would apply to architects, carpenters, engineers etc.

Optional or Extension Activities

- See attached handout.

Name:_____ Date:_____ Class:_____

Instructions for Lab

1. You will be placed into groups by the teacher.
2. You will need to measure lengths of walls in the room and record. Please draw out a floor plan to a 1/8" scale. ¼" = 2 ft.
3. After you have your floor plan please figure out the area and perimeter of the room.
4. When you have completed this please use the internet to find a flooring product. It must be either indoor/outdoor carpet, vinyl flooring, or a laminate flooring. The product must be durable as it will be put in the shop classroom and have chairs sliding on it. Please calculate how much it will cost to cover the floor in the shop.
5. Finally find a molding that you would use to cover the perimeter of the classroom at the base. Please calculate the cost and record.

Name:_____ Date:_____ Class:_____

Shop Classroom Remodel

Please answer the following questions below, please show your work when possible. Please make sure to label with the correct units

1. Please draw out the floor plan of the shop to a 1/8“scale. Please make sure to double check you measurements. If you need to you may attach a separate sheet of paper to this lab.

2. What is the square footage of the shop classroom? _____

3. What is the perimeter of the shop classroom? _____

4. What type of product did you choose for flooring in the shop and why? How many boxes or how much will you have to buy?

5. What was the price for the flooring product? Make sure you use the right units in this answer.

6. What type of molding did you use for the base molding in the shop and why? How many sticks will you have to buy?

7. What was the price for the molding? Make sure you use the right units in this answer?

8. What did you learn from this project and how do you know you learned it?

Name:_____ Date:_____ Class:_____

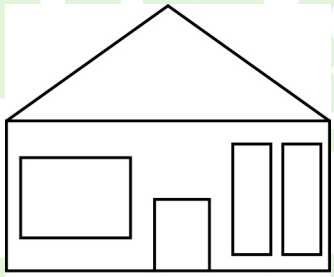
Shop Classroom Remodel Rubric

Category	Total Points	Your Points
Classroom Drawn out correctly	10 pts	
1/8” Scale Used	10 pts	
Work for Area shown	5pts	
Correct Answer for area and units	5pts	
Work Shown for Perimeter	5pts	
Correct Answer for Perimeter and units	5pts	
Explanation for flooring	5pts	
Work Shown for amount/boxes	5pts	
Correct answer for amount/boxes	5pts	
Work for what it will cost for floor	5pts	
Explanation for type of molding	5pts	
Correct answer for what it will cost floor	5pts	
Work shown for sticks of molding	5pts	
Correct answer for sticks of molding	5pts	
Explanation for learning	10 pts	
Total Points	90pts	

Name:_____ Date:_____ Class:_____

Interpretation of Scale - Worksheet 3

1. The front elevation of a house has been drawn to scale 1 : 200 as shown below.



Scale 1:200

By taking measurements with a ruler, determine the:

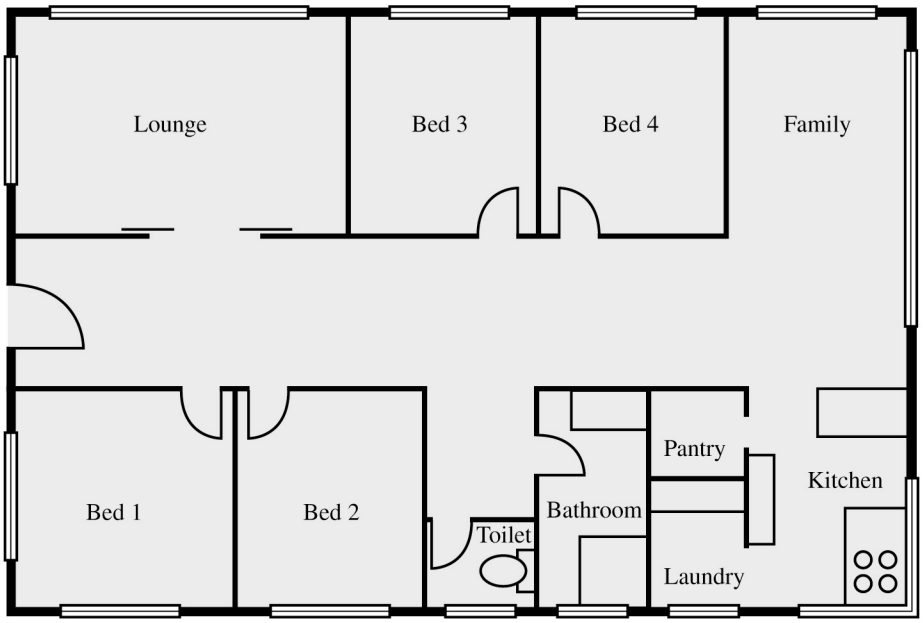
a. actual height of the house from the ground to the top of the roof in mm.

_____

b. actual width of the front of the house in mm.

_____

2. Use a ruler to help answer the questions on the next page for this floor plan. Scale is 1:150.



Scale 1:150

Name:_____ Date:_____ Class:_____

Find the:

(a) length of the house in mm and in m (a) _____

(b) width of the house in mm and in m (b) _____

(c) total floor area of the house in square metres (c) _____

(d) area of the lounge in square metres (d) _____

(e) length of the longest window on the house, in mm (e) _____

(f) dimensions of bedroom 1 in mm (f) _____

(g) total bedroom area of the house in square metres (g) _____

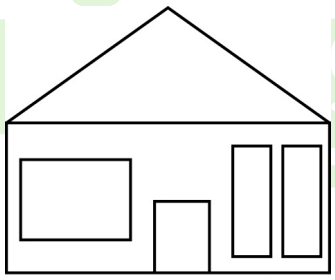
3. Using a ruler, find what length of railing is needed on the front of this house? Scale is 1:100.

_____

Name:_____ Date:_____ Class:_____

Interpretation of Scale - Worksheet 3 - ANSWERS

1. The front elevation of a house has been drawn to scale 1:200 as shown below.



Scale 1:200

By taking measurements with a ruler, determine the:

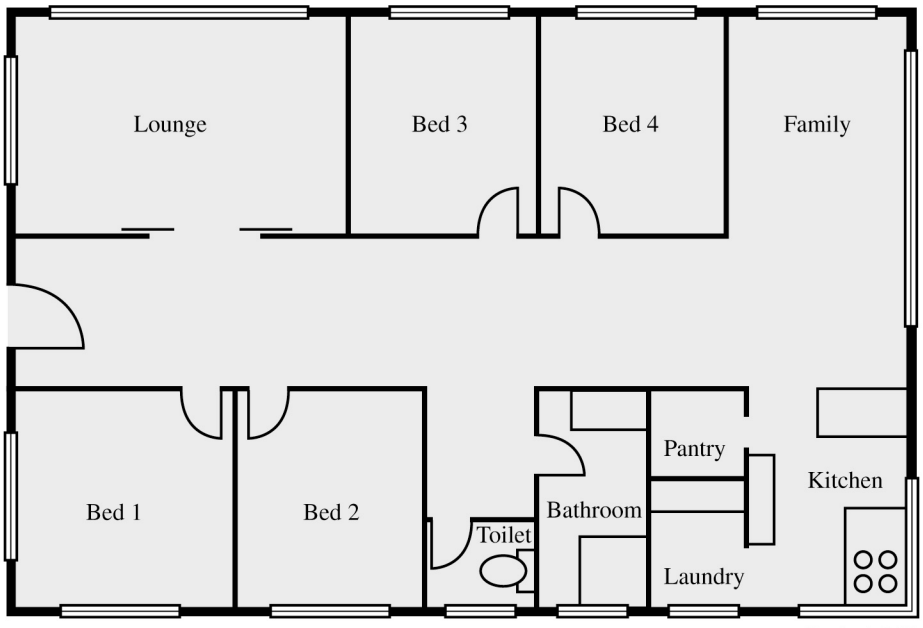
(a) actual height of the house from the ground to the top of the roof in mm.

35 x 200 = 7000 mm

(b) actual width of the front of the house in mm.

43 x 200 = 8600 mm

2. Use a ruler to help answer the questions on the next page for this floor plan. Scale is 1:150.



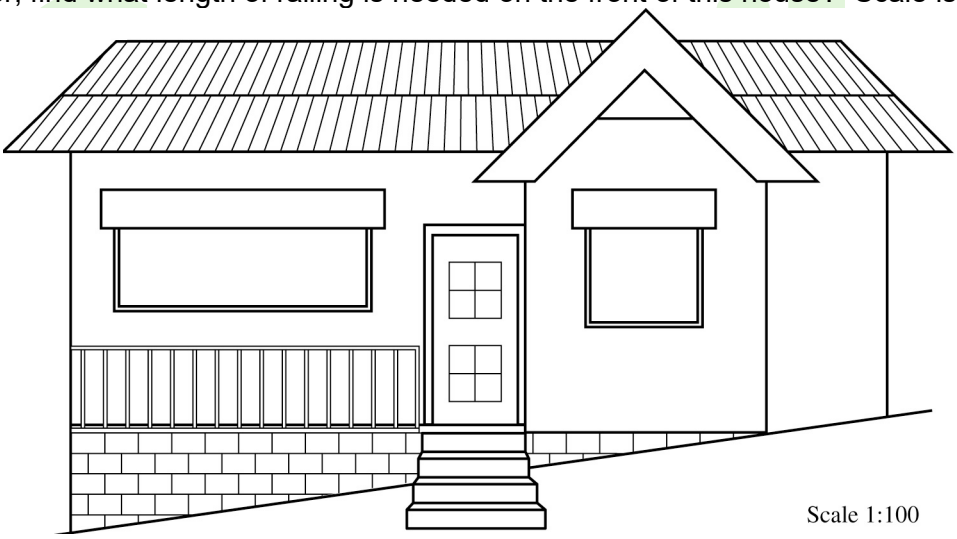
Scale 1:150

Name:_____ Date:_____ Class:_____

Find the:

(a) length of the house in mm and in m	(a) **18000 mm, 18 m**
(b) width of the house in mm and in m	(b) **12000 mm, 12 m**
(c) total floor area of the house in square metres	(c) **18 x 12 = 216 sqm**
(d) area of the lounge in square metres	(d) **30.69 sq m**
(e) length of the longest window on the house, in mm	(e) **5400 mm**
(f) dimensions of bedroom 1 in mm	(f) **4350 mmx 4350 mm**
(g) total bedroom area of the house in square metres	(g) **67.2 sq m**

3. Using a ruler, find what length of railing is needed on the front of this house? Scale is 1:100.



46 x 100 = 4600 mm