

## **WAMC Lab Template**

Math Concept(s): Area of irregular regions

Source / Text: Financial Algebra 7-2

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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):**

#### **Lab Plan**

Lab Title: Reading a floor plan

Prerequisite skills: Students should be able to calculate the area of basic shapes including but not limited to: Squares and Rectangles, Triangles, Circles

Lab objective: The objective of this lab is to give students the opportunity to apply their ability to calculate the area of simple shapes to organize their living spaces.

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

Mathematics K–12 Learning Standards:

- G-C Find arc lengths and areas of sectors of circles.
- G-MG Apply geometric concepts in modeling

#### Standards for Mathematical Practice:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.

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

- CCSS.ELA-LITERACY.SL.11-12.1 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 11-12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

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#### K-12 Science Standards

- HS-PS2. Motion and Stability, HS-PS3. Energy

Technology

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Engineering

- 3.d. Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.

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

# Math Council

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

### Materials

- Graph Paper
- Cardstock
- Paper/Pencil
- Calculations Worksheet

### Set-Up Required:

- Cut out furniture on cardstock. Make sure furniture is composed of geometric shapes and their dimensions roughly fit graph paper

### **Lab Organization Strategies:**

Leadership (Connect to 21<sup>st</sup> Century Skills selected):

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### Cooperative Learning:

- Students will be in groups of 2. Each group is given a different set of “furniture” (2D Models of Furniture) to fit into their “living room” (piece of graph paper). Students will work together to place all of the furniture into whatever configuration they deem appropriate in their living room. Once they’ve chosen the proper alignment, one student holds the furniture while the other traces the outline onto the floor plan.

### Expectations:

- Students will calculate the following on their floor plan:
  - Area of their couch
  - Area of their coffee table
  - Area of their recliner
  - Area of their dog bed
  - Total area of furniture
  - Total empty space

### Timeline:

- This should be about an hour and a half long lab. 45 minutes for set up and tracing. 45 minutes for calculations.

### **Post Lab Follow-Up/Conclusions:**

Discuss real world application of learning from lab

- Students will learn how they’re organizing their own living spaces with a finite amount of space.

### Career Applications

- Interior design, construction, anything involving the need to calculate area

### Optional or Extension Activities

- Students can then price out the average cost of each piece of furniture in their living room. They can even look up the average size of a living room, compare that to the space that they’ve created and use that to see how realistic their model of a living room is.

Area of irregular regions lab instructions.

Materials:

Graph Paper

Paper Furniture/Cardstock

Sharpie

Step 1: Insure you have all your materials including 4 pieces of furniture, an area formula cheat sheet, your floor plan (graph paper) and Sharpie

Step 2: In groups of 2, arrange your furniture on your floor plan however you'd like!

Hint: you'll be using the lines on the graph paper to measure your area so make sure the furniture lines up with the lines on the graph paper

Step 3: Trace your furniture onto your floor plan using the sharpie

Hint: again, you should be tracing over lines already on the graph paper if you've placed your furniture correctly

Step 4: Calculate the area of each piece of furniture in inches and transfer to your area worksheet

Hint: the room is 20X30. The short side is 20 feet and there's 60 squares. Which makes each square 4 inches. (maybe include this in actual lab)

Step 5: Calculate the total area of all of your furniture in inches by adding up all of the areas

Step 6: Calculate the empty space in feet

Hint: Calculate area of furniture in feet. Find the area of the whole space in feet. Subtract the area of the furniture from the area of the whole space

Area Worksheet:

Furniture	Area
Couch	
Coffee Table	
Recliner	
Dog Bed	
Total Area	
Empty Space	

Follow up questions:

1. Which piece of furniture was the most difficult to calculate?
2. Does changing the arrangement of the furniture change the leftover/empty space?

## Area of Irregular Shapes Lab Rubric

### Complete Placement of Furniture

- 4 PTS – Placed all of my furniture on my floor plan in a way that makes sense
- 3 PTS – Placed most of my furniture on my floor plan in a way that makes sense
- 2 PTS- Placed some of my furniture on my floor plan in a way that makes sense
- 1 PT- Placed a few pieces of furniture on my floor plan

### Calculation of furniture area

- 4 PTS- Completely accurately calculated the area of all of my furniture and empty space
- 3 PTS- Mostly accurately calculated the area of all of my furniture and empty space
- 2 PTS- Sometimes accurately calculated the area of all my furniture and empty space
- 1 PT- Calculated a few pieces of furniture

### Follow up questions

- 4PTS – Answered both follow up questions with complete thoughts and 2-3 sentences each.
- 3PTS - Answered both follow up questions with complete thoughts and 1-2 sentences each.
- 2 PTS- Answered both follow up questions with incomplete thoughts and 1-2 sentences each.
- 1 PTS- Answered one of the questions