

Amazing Area



Strands:

Number & Quantity

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Algebra

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Functions

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Geometry

X

Statistics & Probability

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What is area? Why do we care? How can we measure area? What tools work best? Engage in this activity for grades 3 through 5 to find out!

Set-Up:

- Learners work in pairs.
- Each pair of learners works with a small stack of same sized plates.

Object of the Activity:

- Measure surfaces using same-size square objects. Make sense of area. Find a way to measure area that is conveniently used by others.

Measure a Tabletop:

1. Use one *Amazing Area* plate as your unit of measure. Use a stack of the same size plates to measure in Steps 2 through 7.
2. Cover the surface of a table with the plates you chose in Step 1. Make sure you line up the plates so their edges touch but don't overlap and there are no gaps between them. (See the picture above.)
3. Count the number of same size plates you used to cover the table. Write the number in the appropriate column of the *Amazing Area* recording sheet.
4. How many plates did it take to cover the entire table? This is the area of the tabletop using the measuring tool you chose in Step 1.
5. Trade plates with a pair of learners who are using a different size.
 - a. What is your new unit of measure?
 - b. Use your new *Amazing Area* plates to cover the table.
 - c. Count the number of plates you used and write down the number in the appropriate column of the *Amazing Area* recording sheet.
 - d. What is the area of the table using this new measuring tool?
 - e. Compare the two area measurements you found for the table. Do the numbers make sense? Why or why not?
6.
 - a. Compare your two different area measurements with those of the pair of learners you traded plates with.
 - b. Are your areas the same or different? Why might they be different?

Measure Something Else:

7. Find another object that has a flat surface.
8. Do you think it will take more or fewer plates to cover the new object?
9. Repeat Steps 1 through 6 for your new object.

Thinking About Area:

Decide on objects for which it makes sense to measure the area. Some examples are: A desktop, the floor, a rectangular or square rug, a door, or the cover of a book. Answer the following questions:

10. Compare the different measuring tools. What relationships do you notice between the tools?
11. If you use different sized plates to measure the surface, will you use a larger number of large plates or of small plates to cover the surface? Why?
12. If you do not have enough plates to cover the surface of your object, how can you still determine how many plates you will need to cover the object?

Materials Needed:

- 3 sizes of square plastic or paper plates
- 50 square inch tiles
- Ruler, 1 per pair
- Metric and standard measuring tape, 1 per pair
- *Amazing Area* recording sheet

Where:

Outside

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Inside

X

On-line

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On-site

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Other Ways to Measure Area:

You might have noticed that square plates come in a variety of sizes. Because the size is not the same for everyone who owns square plates, it will be helpful to use units of measurement for area that are familiar to a broader audience. Complete the following to make recommendations on other, possibly more convenient, ways to measure area.

1. Think about these questions:
 - How much fabric do you need to make a tablecloth?
 - How much carpet you need to cover the floor?
 - How much paper do you need to cover a book?To describe how much material you need for each of these contexts, would it be sensible to tell a shop owner the numbers of plates you used to cover each? Why or why not?
2. What area measurement tool would make sense to other people? Explain.
3. a. What measuring tools have you used to find the length of something?
b. How might these tools help you find area?
4. Consider the container full of square inches.
 - a. How do square inch tiles compare with tools for measuring length?
 - b. How could you make a square foot from the square inch tiles?
 - c. Use the square inch tiles to cover a square plate. How many did you use?
 - d. Use a ruler to measure a side length of one plate. How could you use this length to find out how many square inch tiles would cover the plate?
5. a. Use a ruler or measuring tape to measure, in inches, the length and width of the table you measured.
b. How can you use these measurements to find the area of the table?
6. a. How could you use the area measurement of a plate to find the area of the table you measured?
b. Find the area of the table using both the area of a plate and length measurements from problem 5a. Compare these measurements.
c. Are these measurements the same? If not, what might be the cause of any differences?

Extensions:

Measure More: Choose different objects to measure. Compare the area you are finding with the areas you have already measured. Answer these questions:

- Are the numbers the same but the tools different? For example, does it take six small plates to cover a book and six large plates to cover a table?
- Why are the numbers the same? Does the measuring tool matter?

Which Tool?: Choose objects to measure and choose the best tool to use to measure the object. Answer the following:

- Are small plates a good tool to use to measure a table? Why or why not?
- If you use different area measuring tools to measure the same object, why are the numbers different? Which tool is more accurate?

Compare Perimeter and Area: Use 12 square inch tiles. Arrange them to make different sizes of rectangles. Find the perimeter of each rectangle. What is the area of each rectangle? Do all of the rectangles have the same perimeter? Try this again with a different number of square inch tiles.