

Finding Area

Summary

Find area for rectangles and circles using formulas.

Main Core Tie

Mathematics Grade 7

[Strand: GEOMETRY \(7.G\) Standard 7.G.4](#)

Materials

Geoboards and bands

5 Cylindrical objects including tennis ball canister

Worksheets: [Counting Area and Perimeter](#), [Geoboards: Polygon Area](#)

Class Reference sheet for each student

One copy of the [Who Has, We Have for Area Game](#) cut into the 10 slips

- [Tic Tac Toe Choice Board](#)

for each student

Background for Teachers

Enduring Understanding (Big Ideas):

Finding area

Essential Questions:

What units of measurement are appropriate for measuring area?

How can a formula be used to find area?

Skill Focus:

Find area for rectangles and circles

Vocabulary Focus:

length, width, base, height, perimeter, area, radius, diameter, Pi, formula

Ways to Gain/Maintain Attention (Primacy):

Manipulatives, sketching, movement, music, calculators, Game, student choice

Instructional Procedures

Starter:

Find the perimeter of this rectangle using the formula $P=2l + 2w$

Explain how perimeter is different from area.

Which would have a greater perimeter, a rectangle with length of 5 and width of 6, or a rectangle with length of 6 and width of 5?

How is circumference the same as perimeter?

How is circumference different from perimeter?

Lesson Segment 1: What units of measure are appropriate for measuring area? Use the attached centimeter paper worksheet # 1-4 to have students answer questions below. They should count the measures and write the answer for these two questions for each rectangle:

How many total units is the distance around the rectangle? What unit of measure is being used on the centimeter paper?

How many squares are needed to cover the rectangle? What unit of measure is being used?

Teach them the Perimeter, Area, and Volume Song (See end of lesson) having them do the actions of measuring around, covering up and filling up.

Have each think of an example of either perimeter or area in the room. Play "Read My Mind" where a

student comes to the front of the room and describes what they are thinking, then calls on another student to tell whether they are describing perimeter or area. For example, the student might say, "I'm thinking of the distance around the rim of the flag" (for perimeter), or, "I'm thinking of the number of tiles needed to cover the floor" (for area).

Have students try to estimate the circumference of the circles on the worksheet # 5, 6. Area and circumference for circles is very difficult to visualize. We need a formula.

Do the following Circumference Guess activity to help them with the meaning of Pi.

Geometry Helping Students Visualize Circumference

To help your students visualize the relationship between the diameter and the circumference, select four cylindrical objects such as a glass, a film canister, a toilet paper roll, etc. A tennis ball canister with the three balls inside should be one of these objects. Have students number their paper 1-4 and write the name of each item. Tell them you will be having them decide which is greater, the circumference of the object or the height of the object. As you show them each object, they should write their guess for which is greater, either "circumference" or "height", next to the name of object. When they have written their guess for each object, show the length of the circumference by wrapping a measuring tape around the object. Then hold that length along the height so the students can compare the two lengths. They will be surprised when the circumference proves to be longer than the height of the object, because circumference is difficult to visualize.

Tell them the way you guess is to estimate the distance across (the diameter) and try to visualize a little more than three of those distances as you visually estimate the height of the object. Tell them this relationship between the diameter and the circumference of a circle is called Pi. In any true circle the circumference will always be a little more than three diameters. Have them look at the formula on their Class Reference Sheet connecting this idea with the formula $C = d$. Using the tennis ball canister is especially effective since it contains three round balls. The height should be very close to the circumference for this object.

When finding measures for circles such as circumference or area, we always use this relationship called Pi. Have them use the Pi and the formula for finding the circumference and area of the circles on the worksheet.

Lesson Segment 2: How can a formula be used to find area?

Make sure each student has a Class Reference Sheet for their Math Journal. Use the Geoboards to form these ten polygons: 2 parallelograms, 2 rectangles, 2 squares, 2 triangles, 2 trapezoids. As each is formed, have students sketch them on the Geoboards: Polygon Area worksheet and label each significant variable for the formula for area. They should use the Class Reference Sheet to identify the formula for area for the shape and the variables needed for that formula. For example on a trapezoid, label b_1 , b_2 , and h . Have students use the formula to find the area for each. Have student sketch a polygon they choose for # 11-12 and challenge their team mates to find the area. To make this more fun, play Red Rover where students work as a team to form the polygons. At teacher's signal each team simultaneously calls a person from another team over to show what they have formed and explain how they found the area using the correct formula.

Play Who Has? We Have... with area (attached).

Who has? We Have. Cut the game slips apart. Teams are given one or more of the game slips so that all ten slips are used. They first find the answer for their Who Has part. They write their Who Has question on the overhead without the answer. The teacher selects a representative from a team to read their Who Has question putting it on the overhead. The class works the problem and each of the other teams look at their slip of paper to see if the answer is recorded on the We Have section of their own slip. If it is, they holler, "We have _____", giving the correct answer using appropriate units of measure. If they have the correct answer on their slip of paper, they earn a point for recognizing that answer. If no one recognizes that they have the answer on their slip, the challenging team representative works the problem and gives the answer. When a team has the answer, they become

the next team to ask their Who Has... question.

Go over the Tic Tac Toe Choice Board with the students. They will need to do any three in a row for this assignment. They can show what they have done on the back of the Choice Board paper.

Assign appropriate text practice as needed

Assessment Plan

Performance task, observation of student groups

Bibliography

This lesson plan was created by Linda Bolin.

Authors

[Utah LessonPlans](#)