Ozobot Evo Classroom Application: Calculating Areas of Common Geometric Figures

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Are you a middle school teacher who teaches the calculation of areas of common geometric figures such as rectangles, triangles, parallelograms, trapezoids, circles, and ellipses? Would you like to give your students a fun way to practice these calculations in your classroom? Then the ***Ozobot Evo Classroom Application: Calculating Areas of Common Geometric Figures*** may be just what you are looking for!

All you need to do is load *PolygonAreasWithEvo.ozocode* **(share code zc4jxg)** into your classroom Ozobot Evos using the "Load Ozobot" feature of the OzoBlockly Web site and print copies of the OzoMaps on the last two pages of this document for each group of students.

The two-page maze contains eight common geometric figures on a grid background of squares, each with sides one unit in length. The geometric figures are identified and differentiated by the letters A through H. The instructions are quite straight forward:

1. Place Ozobot Evo anyplace on the perimeter of geometric figure A facing either direction. Turn Ozobot Evo on and then double-click the button to start the program. He will start moving along the perimeter while displaying a red LED.
2. When he has traversed the perimeter three or four times, he will make a turn onto the red "handle", stop, and speak the area of the geometric figure, allowing the student to check his or her answer.
3. After flashing the answer, Ozobot Evo will display a solid purple LED for 7 seconds, allowing 7 seconds for the student to move him to the next geometric figure. ***It is important that Ozobot be moved to geometric figures in alphabetical order each time the purple LED is displayed.*** After displaying the answer on the final geometric figure (H) Ozobot Evo will shut off.

Note that all of the lengths that students will need to observe, such as the base and height of a triangle, the lengths of the sides of a rectangle, and the radius (or diameter) of a circle will be *whole numbers*. The black line perimeters that Ozobot Evo follows are quite thick, so the *centers of these thick lines represent the actual perimeters of the geometric figures*. As an example, look at the rectangle shown in Figure 1. It has a length of 9 units and a width of 6 units, giving an area of 9 x 6 = 54 square units.

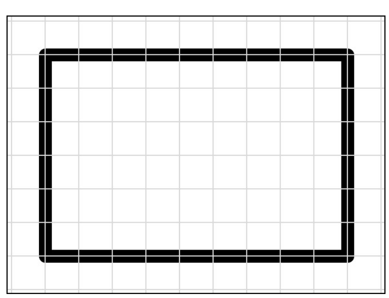

Figure 1

Answers for the Teacher

The answers shown for geometric figures A, B, C, and D turn out to be exact whole numbers of unit squares. The answers shown for figures E, F, G, and H are all rounded to the nearest number of whole unit squares.

Figure	Equation for Area (A)	Area (square units)
A - Triangle	$A = \frac{1}{2}bh$ (b = base, h = height)	28
B - Rectangle	$A = lw$ (l = length, w = width)	24
C - Parallelogram	$A = bh$ (b = base, h = height)	35
D - Trapezoid	$A = \frac{1}{2}(a + b)h$ (a = top, b = bottom, h = height)	39
E - Circle	$A = \pi r^2 = \frac{1}{4}\pi d^2$ (r = radius, d = diameter)	28
F - Half Circle	A = half the area of the corresponding circle	25
G - Ellipse	$A = \pi ab$ (a = **semi**-major axis, b = **semi**-minor axis)	27
H - Region shaded in red	Area of big circle *minus* area of small circle	26

Suggested Procedure

Give each student or lab group copies of the OzoMaps on the last two pages of this document, and ask them to compute the area of geometric figures A through H on separate paper, showing the equation they use to compute the area, but not writing on the OzoMaps (since that writing may cause Ozobot Evo to move incorrectly). After they have computed the areas, give them an Ozobot Evo programmed with *PolygonAreasWithEvo.ozomap* so that they can check their work for correctness.

Ozobot Evo

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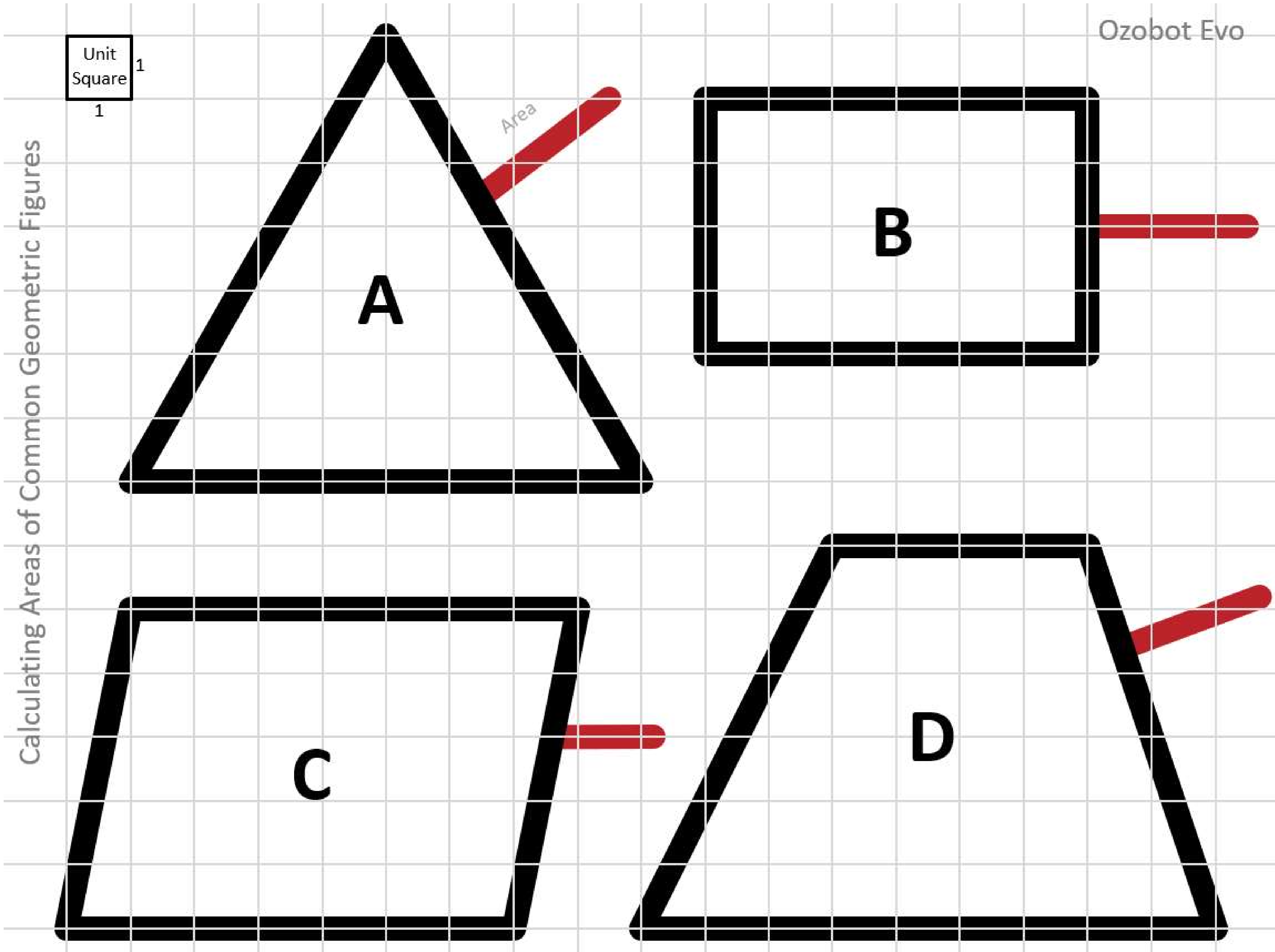

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