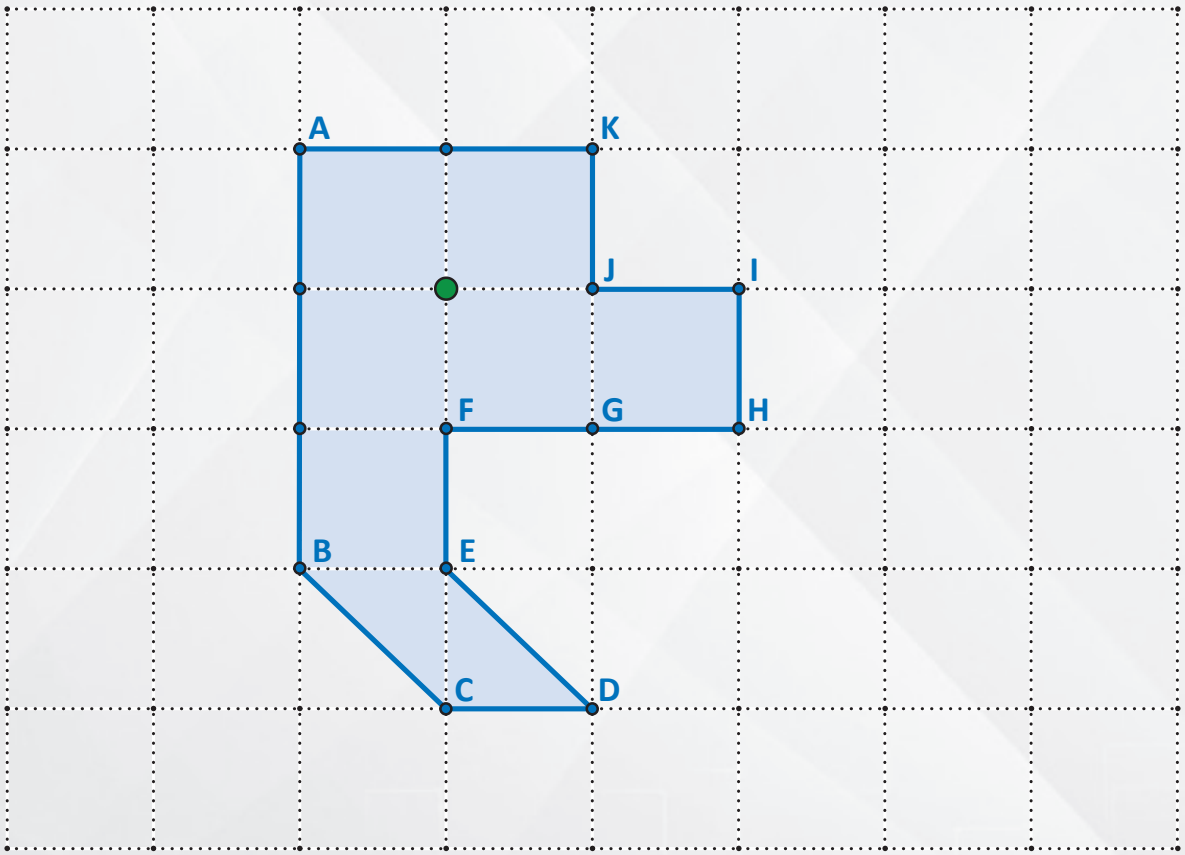
One Two

Year 6

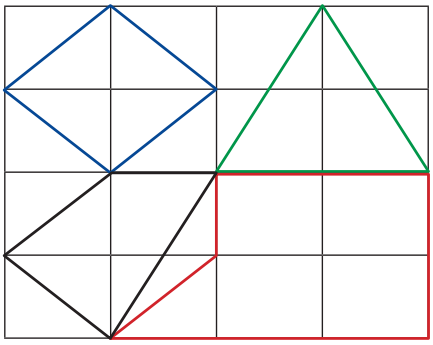
PREDICTING AREA



Rich Learning Task | Measurement

Predicting Area

What's the point of the task?



Although most area formulas that students meet involve the use of lengths, widths, bases, or heights of shapes, there is an area formula related to shapes on grids that never mentions these sorts of dimensions. It is called Pick's (or Pic's) formula and it says that the area of a shape on a geoboard is calculated by dividing the number of pegs on the perimeter by 2, adding the number of inside pegs, and subtracting 1. Because the problem is set up requiring the number of inside pegs to be 1, the combined area of all of the shapes for this task will be half of the number of pegs on the perimeter.

There are several possible shapes, not just one.

Questions to facilitate the learning

- How were the shapes you created alike? How were they different?
- Would a 5-sided shape be possible? If not, why not? If so, what would it look like?
- What did you notice about the number of pegs on the boundary of your shapes?
- What did you notice about all the areas?

Scaffolding the learning

- How do you know that your shape cannot be too big?
- Could your shape be a rectangle with horizontal and vertical sides? Why or why not?

Extending the learning

Students might create shapes with exactly 2 pegs (or 3 pegs) inside and see how the areas do or do not change from when there is 1 peg inside.

Predicting Area

Curriculum connections

This activity relates to finding areas of parallelograms using methods other than l x w. It also encourages students to go beyond the one case and to seek generalisations.

Rubric

Level 1	Level 2	Level 3	Level 4
The student is not able to create the required shapes. The student is not sure whether large shapes are possible.	The student creates a shape or two, but does not see what the shapes have in common. The student struggles to figure out the areas for some or all of the shapes. The student is not sure whether large shapes are possible.	The student creates a shape or two, but does not see what the shapes have in common. The student struggles to figure out the areas for some or all of the shapes. The student is not sure why very large shapes are not possible.	The student creates a sufficient number of shapes to see that the area of the shape is the same as half the number of pegs on the boundary. The student uses thoughtful strategies to figure out the areas of the shapes s/he creates. The student can explain why very large shapes are not possible.

Predicting Area

Make as many shapes as you can on the board where the vertices are positioned on the pegs, and so there is exactly one peg inside the shape.

How can you predict the area of the shape by knowing how many pegs are on its outside?