Shape Up! *E009 scoring rubric*

Math Domain

✓ Number/Quantity	✓ Shape/Space	☐ Function/Pattern
☐ Chance/Data	☐ Arrangement	

Math Actions (possible weights: 0 through 4)

☐0☐ Modeling/Formulating	☐2☐ Manipulating/Transforming
☐2☐ Inferring/Drawing Conclusions	☐1☐ Communicating

Math Big Ideas

☐ Scale	☐ Reference Frame	✓ Representation
☐ Continuity	☐ Boundedness	✓ Invariance/Symmetry
✓ Equivalence	☐ General/Particular	☐ Contradiction
☐ Use of Limits	☐ Approximation	☐ Other

The intent of this task is to have students demonstrate their ability to distinguish the attributes of perimeter and area of planar shapes, as well as their understanding of the additive properties of area.

1. One can see by counting grid squares that the area of shape A is 12 square units, while the areas of B and C are each just 10 square units; thus B and C are tied for having the smallest area. In figure B , note that the incompletely filled blocks can be pieced together to make full square.

2. The perimeters of A and C are easily counted to be 14 units and 18 units respectively. As for figure B, the horizontal and vertical pieces of the edge give 10 units of length, plus there are two diagonal sides that must have lengths of **at least** 4 units, so the whole perimeter must be greater than 18 units. Another way to look at this is that the perimeter must be smaller than 10+(2 x 6), or 22 units, and larger than 10 + (2 x 4), or 18 units. This gives B the largest perimeter.(To get the lengths of the diagonal sides exactly, one would have to apply the Pythagorean Theorem).

	partial level	**full level**
Modeling/ Formulating (weight: 0)		
Transforming/ Manipulating (weight: 2)	Correctly compute area and perimeter for A and C.	Additionally, correctly examine the area and perimeter of figure B, which has diagonal sides.
Inferring/ Drawing Conclusions (weight: 2)	Correctly order areas.	Correctly order areas **and** perimeters and offer an argument for these decisions.
Communicating (weight: 1)	Give clear numerical answers, but do not include units.	Communicate perimeter and area with appropriate units.