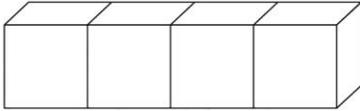**Master 8.18**   **Step-by-Step 1**
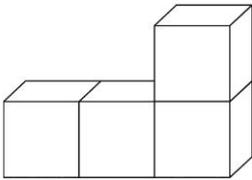
Lesson 8.1, Question 15

Step 1   Join the linking cubes in a row.
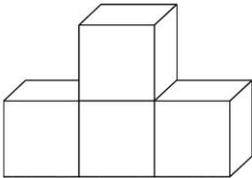

Draw the front, top, and side views.

Step 2   Move one end cube and place it on top of another cube.

Draw the front, top, and side views.

Step 3   Move the same cube. Place it on top of another cube.

Draw the front, top, and side views.

Step 4   Find a different arrangement.
Draw all the views.

Master 8.19   **Step-by-Step 2**

Lesson 8.2, Question 10

You will need square dot paper and 5 linking cubes.

Step 1   Use all 5 linking cubes to build an object.
Decide which is to be the front face, and which is to be the top face.

Step 2   Draw the front, top, and side views of the object.

Step 3   Choose a horizontal rotation: _____
Choose a vertical axis.
Rotate your object.
Draw the new front, top, and side views of the object.

Step 4   Describe a different rotation that has the same views as those drawn in *Step 3*.
_____
Place the object in its original position.
Rotate the object using the rotation described in *Step 4*.
Draw the new front, top, and side views of the object.
Are the views the same as those in *Step 3*? _____
If not, try a different rotation.

Step 5   Choose a vertical rotation: _____
Choose a horizontal axis.
Rotate your object.
Draw the new front, top, and side views of the object.

Step 6   Describe a different rotation that has the same views as those drawn in *Step 5*.
_____
Place the object in its original position.
Rotate the object using the rotation described in *Step 6*.
Draw the new front, top, and side views of the object.
Are the views the same as those in *Step 5*? _____
If not, try a different rotation.

Name _____ Date _____
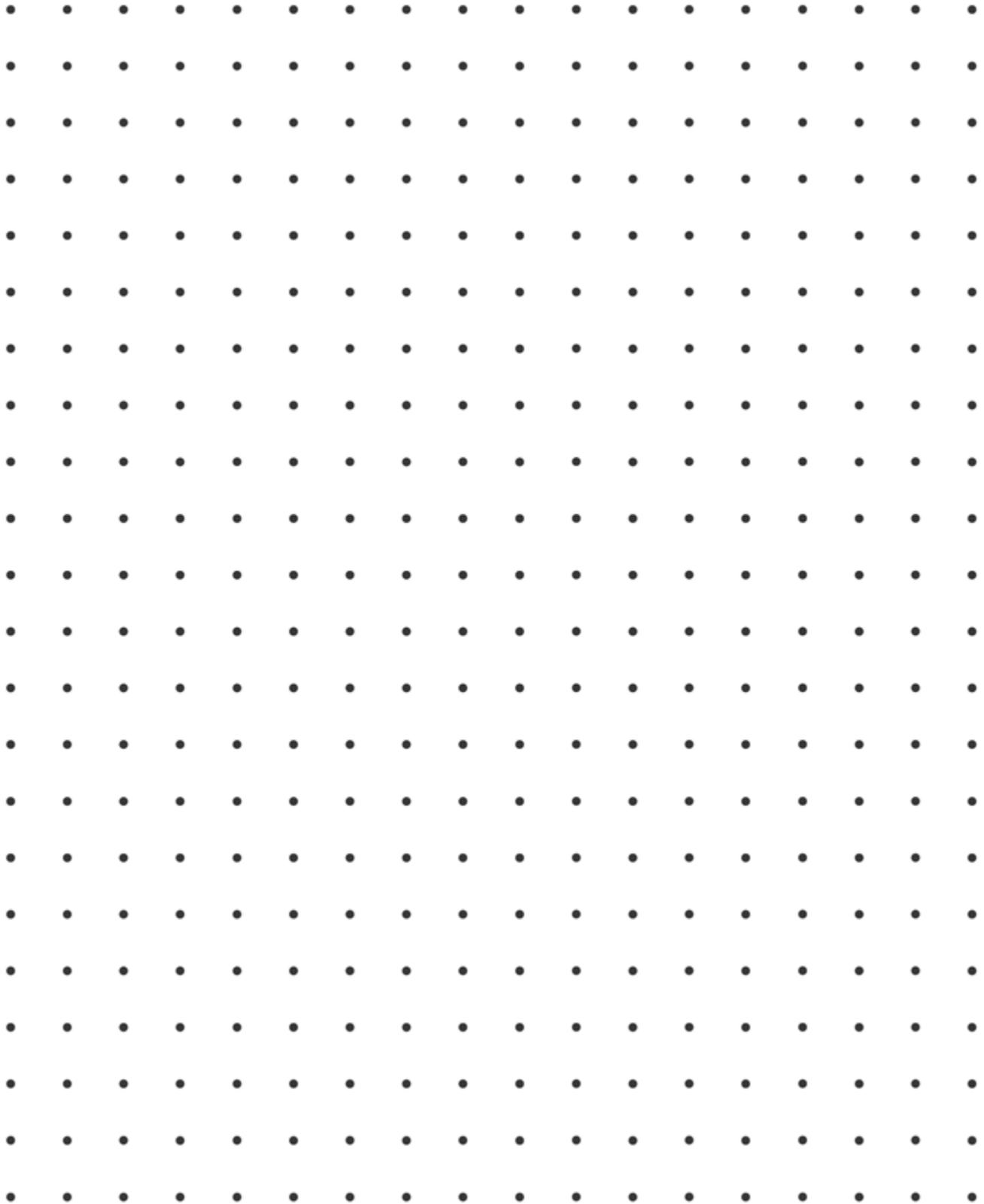
Master 8.20   **Step-by-Step 3**

Lesson 8.3, Question 9

You will need linking cubes.

Step 1   Which views show no changes in depth? _____
How do you know? _____
Choose one of these views. Build that side of the object.

Step 2   Rotate the object, then add cubes to match another view with no changes in depth.

Step 3   Rotate the object, then add cubes to match another view with no changes in depth.

Step 4   Check the top and front views of the object.
Add cubes so that these views match the given views.

Step 5   Describe the object. _____

Step 6   Can you add or remove a cube from the right side of the object so that the top, front, and left side views remain the same? _____
Suppose one side view had not been shown. Would you have been able to build the object?
Explain. _____

Step 7   Can you add or remove a cube from the back of the object so that the top, front, and left side views remain the same? _____
Suppose the back view had not been shown. Would you have been able to build the object?
Explain. _____

Step 8   If your answer in *Step 7* is yes, build the object.

Step-by-Step 4

Lesson 8.4, Question 9

You will need a copy of *Diagrams for Lesson 8.4 Practice Questions 5, 6, 7, and 9* (Master 8.11), tracing paper, and scissors.

Step 1   Trace, then cut out one of the tessellating shapes.

Step 2   Place your cutout over Shape A.
Do Shapes A and B have the same orientation, opposite orientations, or different orientations?
Which transformation might this be? _____
Describe the transformation that takes Shape A to Shape B.
Remember to describe any point of rotation or line of reflection that you use.
_____

Step 3   Place your cutout over Shape A.
Do Shapes A and C have the same orientation, opposite orientations, or different orientations?
Which transformation might this be? _____
Can you use the transformation named above to move Shape A to Shape C? Why or why not?
_____
If your answer is yes, describe the transformation.
If your answer is no, describe a different transformation that moves Shape A to Shape C.
_____

Step 4   Place your cutout over Shape A.
Do Shapes A and D have the same orientation, opposite orientations, or different orientations?
Which transformation does this indicate?_____
Describe the transformation that moves Shape A to Shape D.
_____

Step 5   Place your cutout over Shape A.
Do Shapes A and E have the same orientation, opposite orientations, or different orientations?
Which transformation does this indicate?_____
Describe the transformation that moves Shape A to Shape E.
_____

Step 6   Repeat steps similar to *Steps 2* to *5* with the cutout over each of Shapes B, C, D, and E.

Master 8.22   ## Step-by-Step 5

Lesson 8.5, Question 12

You will need a copy of *Diagrams for Lesson 8.5 Practice Questions 11 and 12* (Master 8.13), tracing paper, scissors, and tape.

Step 1   Trace, then make cutouts of the 6 different polygons.

Step 2   Choose 2 polygons that you think might combine to make a composite shape that tessellates.
Remember that a composite shape is a combination of 2 or more polygons.
Tape the polygons together.
Then use tracings to try to create a tessellation on a piece of plain paper.

Step 3   If you were able to create a tessellation in *Step 2*, find the sum of the angles at each point where vertices meet. _____
How do you know the composite shape tessellates? _____
How else can you tell that the composite shape tessellates?
_____

Step 4   If you were unable to create a tessellation in *Step 2*, try a different combination of polygons until you find a composite shape that tessellates.
Find the sum of the angles at each point where vertices meet. _____
How do you know the composite shape tessellates? _____
How else can you tell that the composite shape tessellates?
_____

Step 5   Try to make as many different composite shapes that tessellate as you can.
Create the tessellation each time.

Master 8.23 **Step-by-Step 6**

Lesson 8.6, Question 12

You will need the tessellations you created in Lesson 8.5, and square dot paper (PM 25) or isometric dot paper (PM 26).

Step 1 Choose one of the tessellations you created in Lesson 8.5.
Choose a tessellation you can describe in more than one way.

Step 2 Copy the tessellation on dot paper.
Use the letters A to E to label 5 of the shapes.
Colour the tessellation.

Step 3 Let Shape A be the original shape.
Describe a transformation that might have been used to move Shape A to each of Shapes B, C, D, and E. Do this in as many different ways as you can.

_____
_____
_____
_____
_____
_____
_____

Step 4 Each image is congruent to the original shape.
What does this tell you about the area of each shape?

_____

How can you describe the tessellation in terms of conservation of area?

_____
_____
_____