Name:_____

Start date:_____

Hand in date:_____

Mark:_____

Math 8 K&E

Shape & Space

Shape and Space

Unit: Shape and Space	I Can	Do 
1. Identify 3-D objects	I can identify 3-D objects.	Practice: p. 250, pp. 252–253
2. Classify 3-D objects	I can classify 3-D objects.	Practice: pp. 254–257
3. Describe 3-D objects	I can describe 3-D objects.	
4. Construct models of 3-D objects	I can construct models of 3-D objects.	Practice: pp. 260–262 Practice (in-class project): pp. 263–278
5. Transformations	I can identify three types of transformations.	Practice: p. 279
6. Tessellations	I can create a tessellation.	Practice: pp. 280–281

Unit: Shape and Space	I Can	Do
7. Geometry: lines, rays, line segments, and angles	I can identify lines, points, rays, line segments, and angles.	Practice: pp. 284–285
8. Geometry: intersecting and perpendicular lines	I can find the angles made by intersecting and perpendicular lines.	Practice: pp. 286–287
9. Geometry: angles and parallel lines	I can classify angles.	Practice: pp. 292–293 Mathpower 8: p. 277
10. Geometry: classifying triangles	I can classify triangles.	Practice: pp. 294–295
11. Assessment		Unit Test: pp. 297–299

Shape and Space
Split Page Vocabulary

Directions:

Draw in a picture for each term.

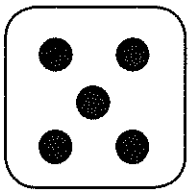
Term	Definition	Example/Picture
Polygon	A closed figure formed by three or more line segments.	
Polyhedron	A three-dimensional figure with faces that are polygons.	
Cylinder	A solid whose base and top are two equal, parallel circles.	
Prism	A polyhedron with two parallel and congruent bases in the shape of polygons. The other faces are parallelograms.	
Cube	A polyhedron with six congruent square faces.	
Pyramid	A polyhedron with a polygonal base and four triangular sides.	

NOTES:

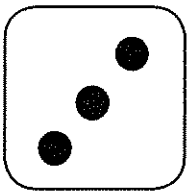
3-D Objects

Think about the sides of the die. Each side is the same; they are all square.

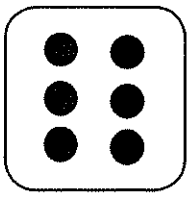
Front



Back



Top



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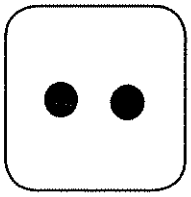
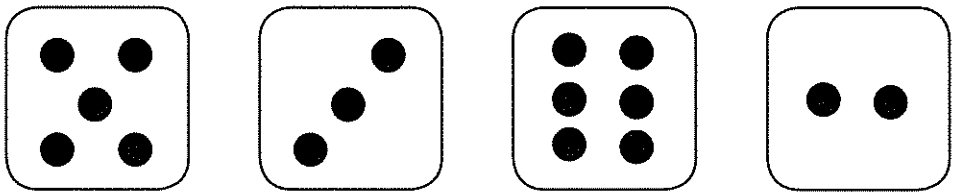
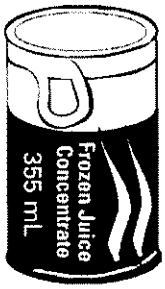


NOTES:

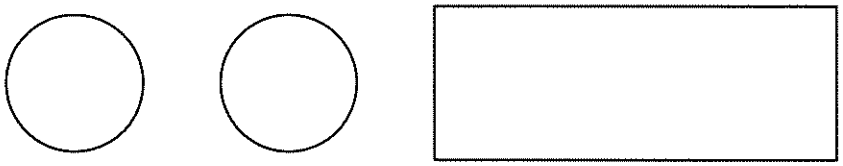
Sides (four)



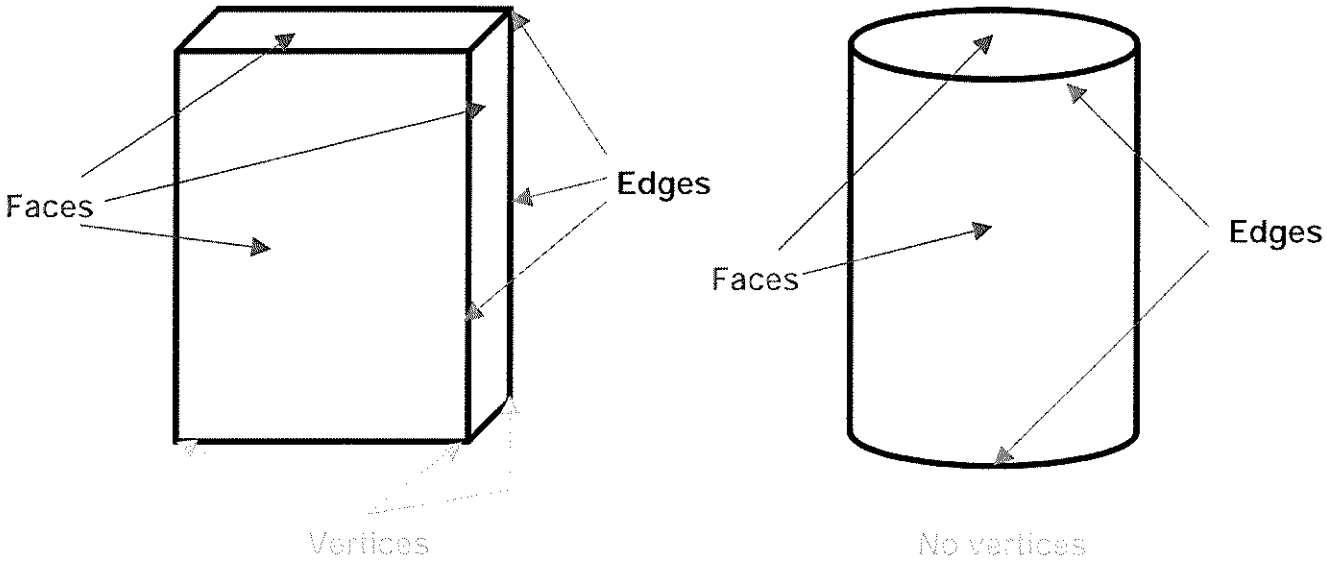
Now think about a can of juice.



It is made up of two shapes, circles and a rectangle.



3-D objects are made of faces, vertices and edges. The diagrams illustrate parts of three-dimensional objects.



A **face** of a three-dimensional object is any flat surface that makes up the object.

Faces are common two-dimensional shapes, such as rectangles, squares, circles and triangles.

An **edge** of a three-dimensional object is where two faces meet.

A **vertex (vertices)** is a corner or point of a three-dimensional object where three or more faces meet.

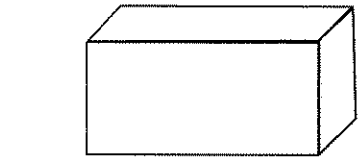
A cylinder does not have any vertices because the faces of a cylinder (top, side and bottom) do not meet in one location.

NOTES:

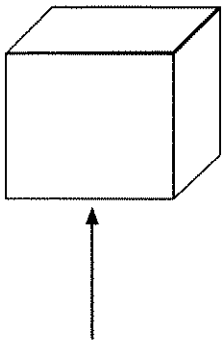
Classifying 3-D Objects

Prisms

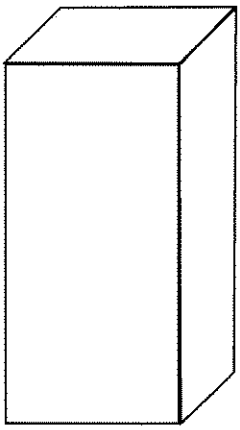
- Are named by their "bases"
- Have 2 bases
- All their faces are "quadrilateral" in shape (but not necessarily their base)



Rectangular Prism



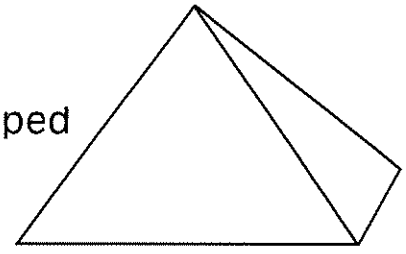
Square Prism



also called a cube

Pyramids

- Are named by their base
- Only have 1 base
- Their sides (faces) are triangular shaped



Name: _____ Date: _____

Practice: Shapes and Space

Warm-up

1. Draw a picture of a cereal box and label its front, back, top, bottom and sides.

2. What kind of three-dimensional solid is the cereal box?

_____

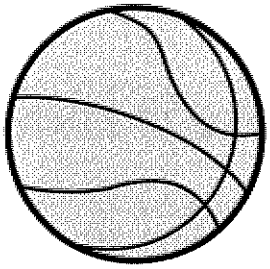
_____

NOTES:

Cylinder, Cone, Sphere

Sphere

- Only has one base
- Has no sides
- Think basketball



Cylinder

- One rectangle
- Two circular faces
- Think hockey puck

Cone

- One circle face
- Like a badminton birdie
- Think ice cream cone

Name: _____ Date: _____

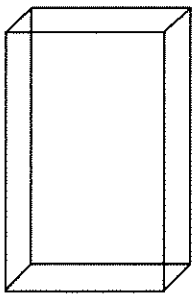
Practice: Prisms and Pyramid 1 of 2

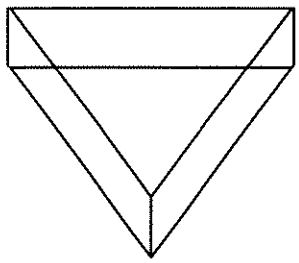
Definitions:

Polyhedron: A _____-dimensional figure composed of faces which are _____.

Prism: An example of a polyhedron. Identified by its two _____, _____ bases opposing each other. All other sides of the polyhedron are _____. The name of the polygon forming the bases gives the prism its name.

Examples:





Base: _____ Base: _____

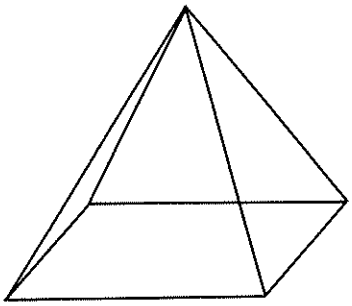
Name: _____ Name: _____

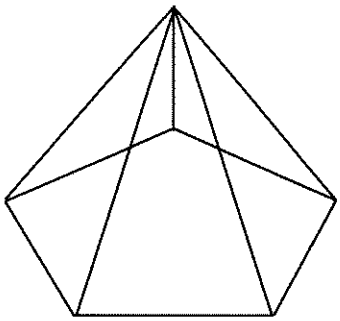
Name: _____ Date: _____

Practice: Prisms and Pyramid 2 of 2

Pyramid: An example of a polyhedron identified by its polygonal _____. All other sides of the polyhedron are _____ and meet at a common _____ opposite the base. The name of the polygon forming the base gives the pyramid its name.

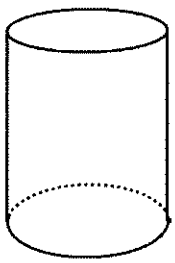
Examples:

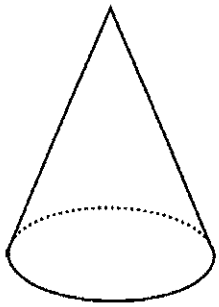




Base: _____ Base: _____

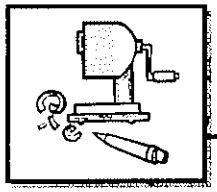
Name: _____ Name: _____





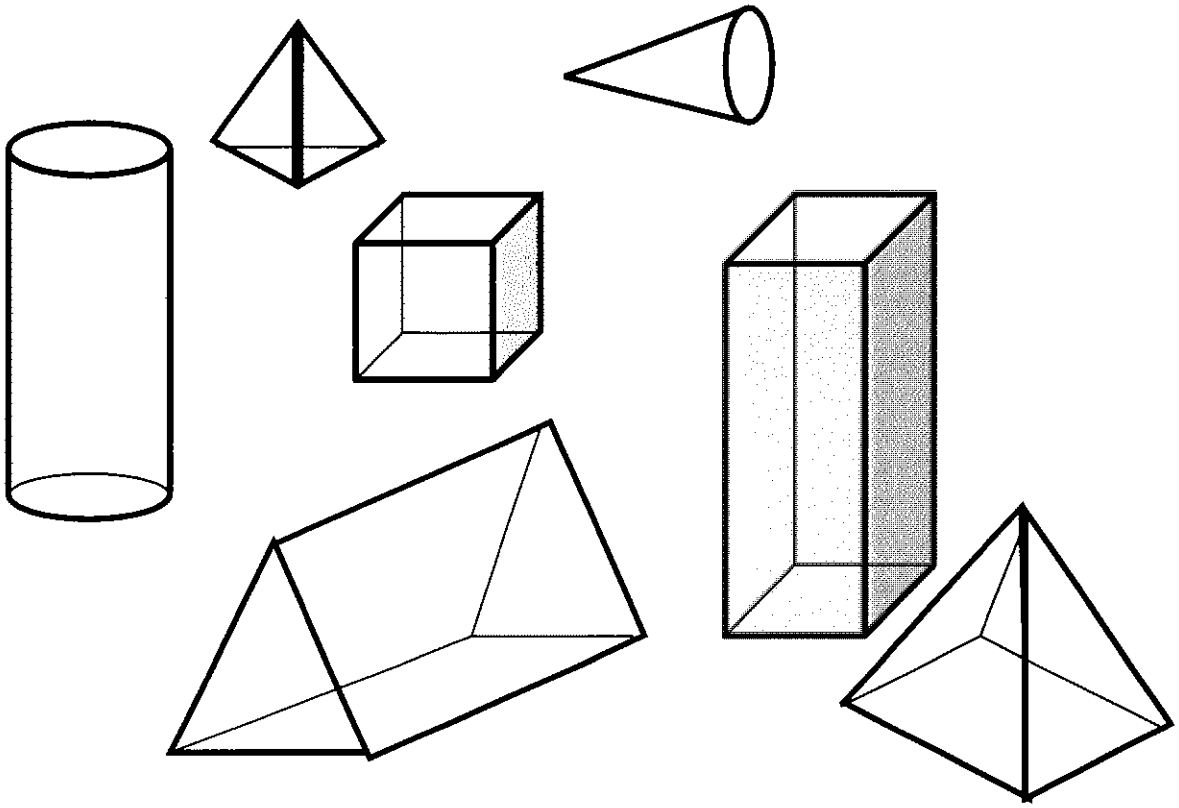
Base: _____ Base: _____

Name: _____ Name: _____



Practice: Identifying and Classifying 3-D Objects

1. Use the diagrams below or obtain 3-D objects from your teacher. Work individually, or in a group, to place these objects into groups. Be prepared to explain the reasons for your groupings.



Think About ...

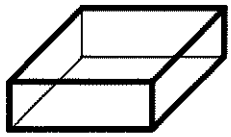
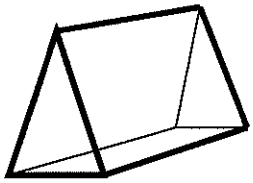
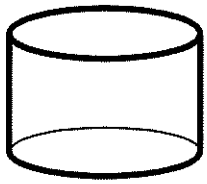
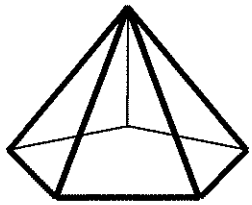
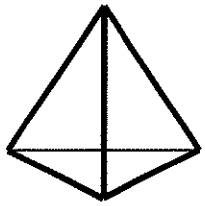
For each of the shapes above, name something in your home or community that contains the 3-D shape. Think of the roof of your house, buildings and containers.

Name: _____ Date: _____

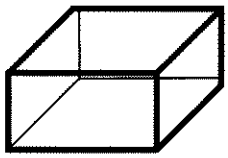
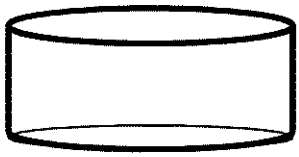
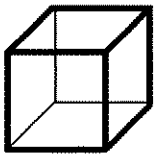
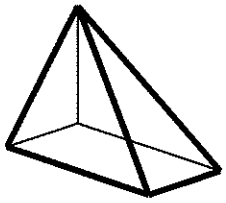
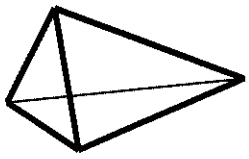
Practice: Identifying and Classifying 3-D Objects

For each of the shapes on the previous page, name something in your home or community that contains the 3-D shape. Write or draw pictures to show your answers.

Classify each of the objects below. Identify the number of faces. In the right column, list examples of these shapes from your workplace and/or community.

Object	Shape and Number of Faces	Example
		
		
		
		
		

3. Classify the following objects.

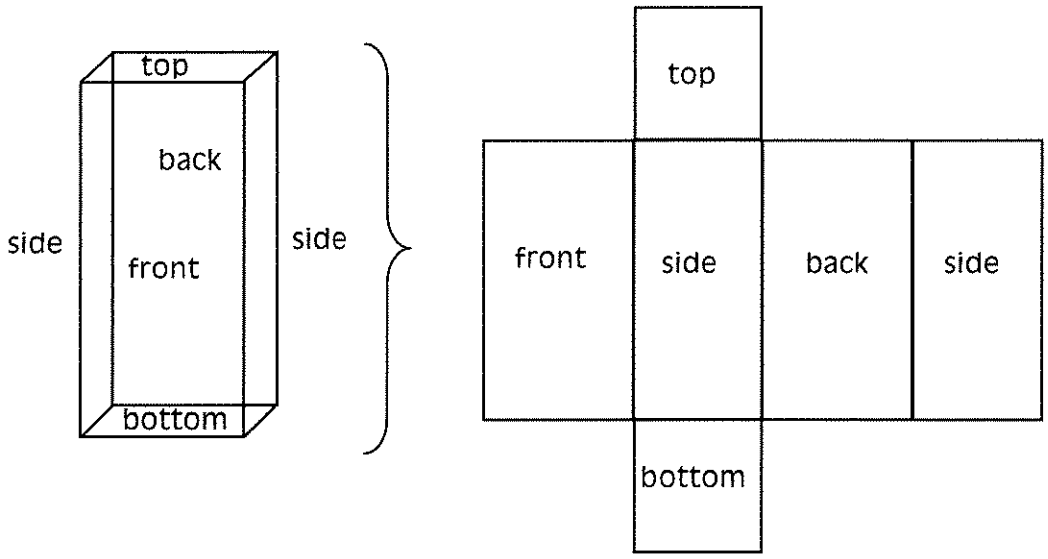
Object	Name
	
	
	
	
	

NOTES:

Surface Area of Rectangular Prisms

To calculate the surface area of a polyhedron, it is sometimes useful to draw its net (what it would look like if it cut apart and spread out) and calculate the area of each face.

In rectangular prisms, each base has four sides and, therefore, there are an additional four rectangular faces to account for (6 faces in total). Given the length, width and height, each face is easily calculated.



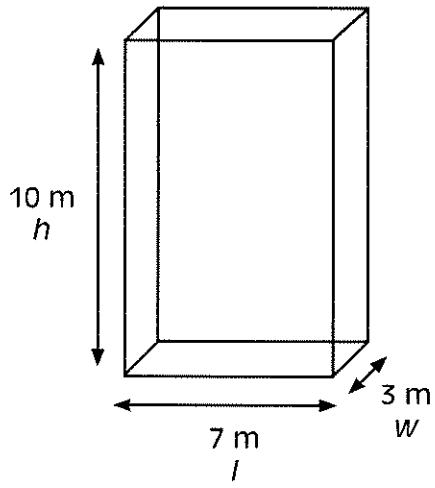
NOTES:

Surface Area of Rectangular Prisms

We can see that there are three pairs of equal faces in a rectangular prism. It can then be said that the total surface area of a rectangular prism is $2 \times$ (base) + $2 \times$ (side) + $2 \times$ (face).

Can we simplify this formula?

Example:



base: $3 \times 7 = 21\ m^2$

side: $3 \times 10 = 30\ m^2$

face: $7 \times 10 = 70\ m^2$

Total Surface Area $= 2 \times (21 + 30 + 70)$

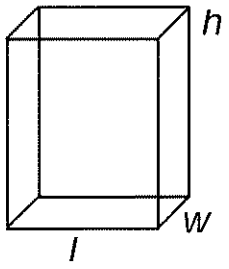
$= 2 \times 121 = 242\ m^2$

Name: _____ Date: _____

Practice: Surface Area of Rectangular Prisms

Calculate the surface area of the following prisms.

1. $l = 5$ cm, $w = 6$ cm, $h = 7$ cm



2. $l = 8$ m, $w = 6$ m, $h = 11$ m

3. $l = 5$ cm, $w = 6$ cm, $h = 4$ cm

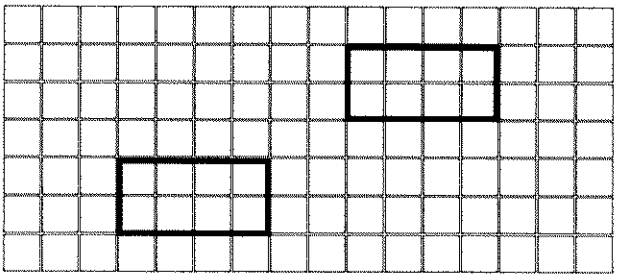
Mathpower 8 Textbook
Page 249—Questions 1, 2, 4

Name: _____ Date: _____

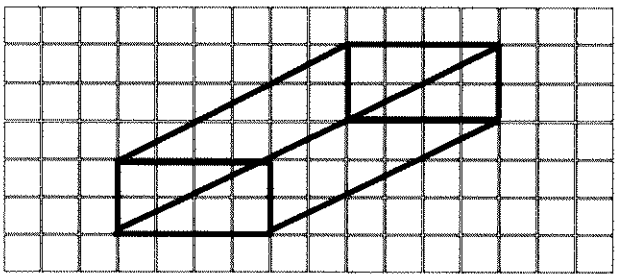
Practice: Drawing 3-D Objects on Grid Paper 1 of 2

Example:

1. Draw the two end faces of the object.



2. Connect similar points. Keep line segments the same length and parallel to each other.



Name: _____ Date: _____

Practice: Drawing 3-D Objects on Grid Paper 2 of 2

3. Get Creative

   Create your own shapes on the graph paper below. Use the example above to help you get started.

Name:_____ Date:_____

Practice: Shape and Space In-class Project

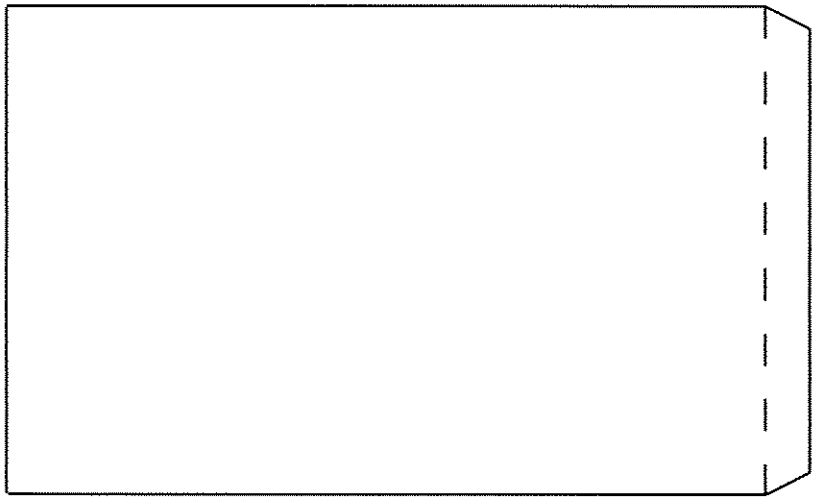
Objective: Using the next six pages, construct, name and identify parts of each three-dimensional solid listed below.

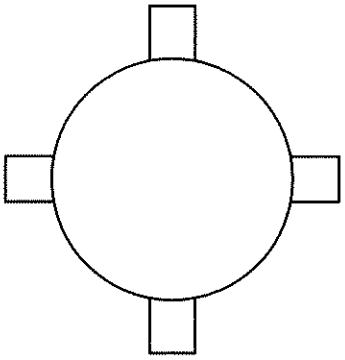
Object	Name	# of Faces	# of Edges	# of Vertices
1.				
2.				
3.				
4.				
5.				
6.				
7.				

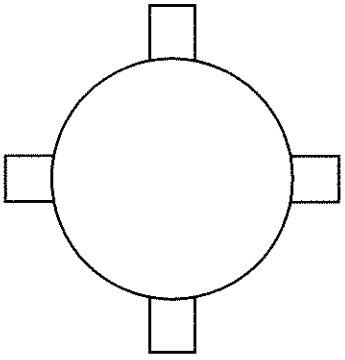
* As an extension, find the surface area of four of the shapes.

Name:_____ Date:_____

Practice: Shape and Space In-class Project 1 of 7

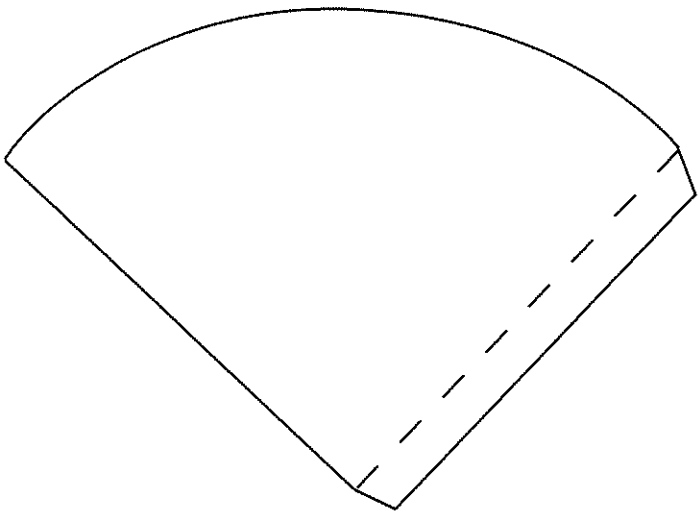


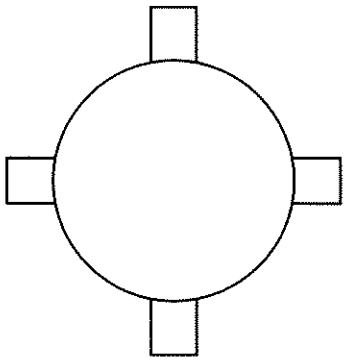




Name: _____ Date: _____

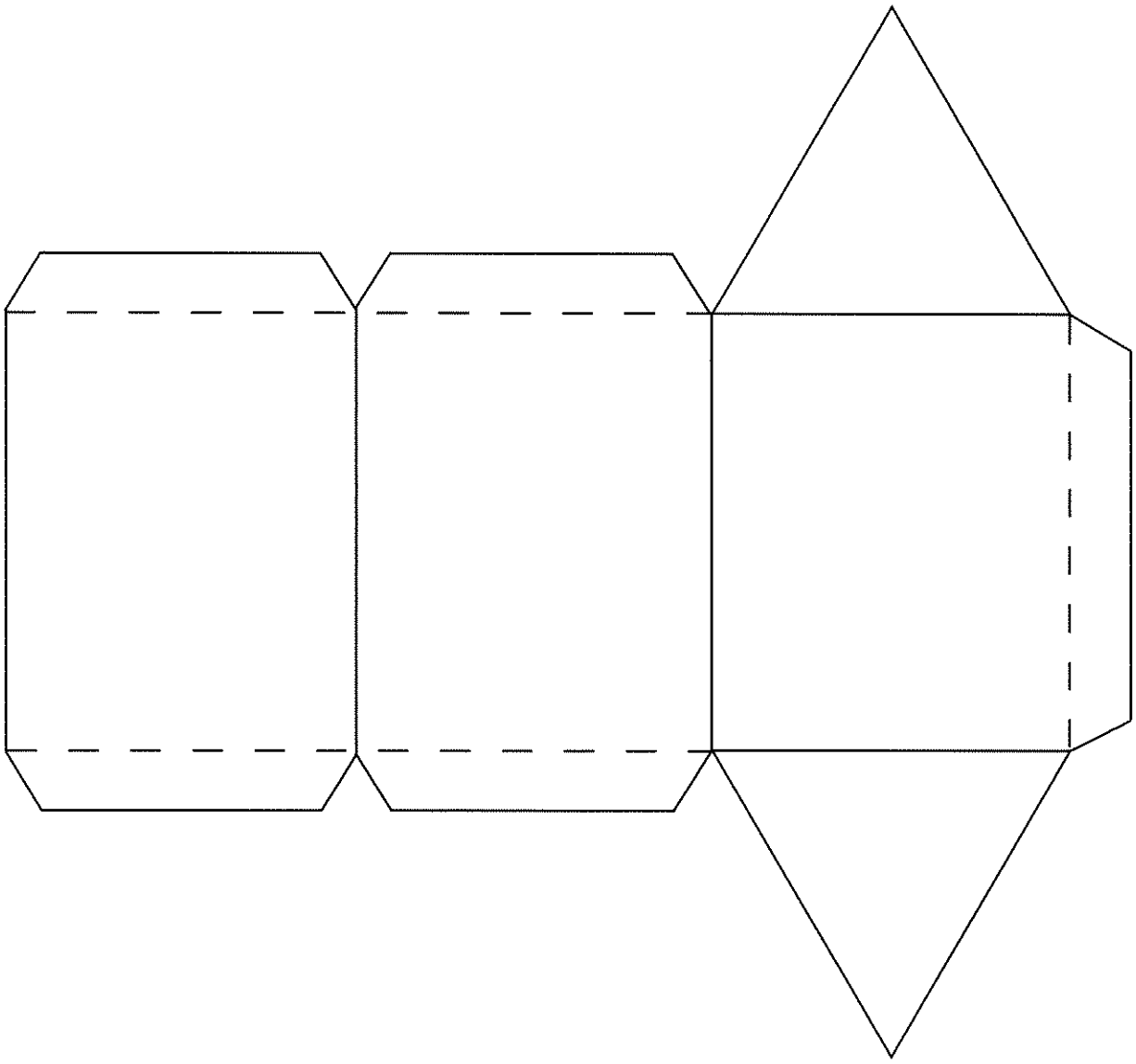
Practice: Shape and Space In-class Project 2 of 7





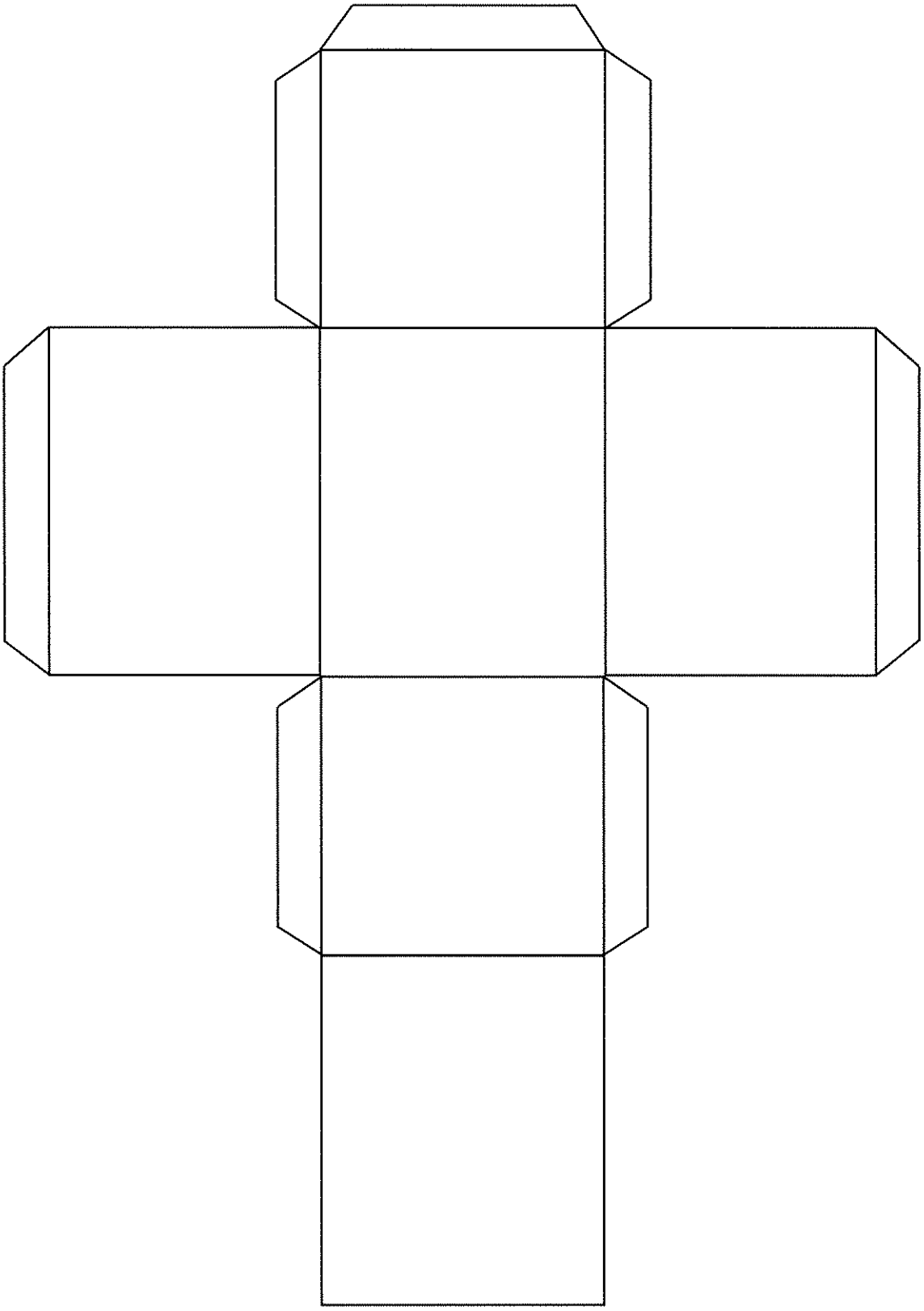
Name: _____ Date: _____

Practice: Shape and Space In-class Project 3 of 7



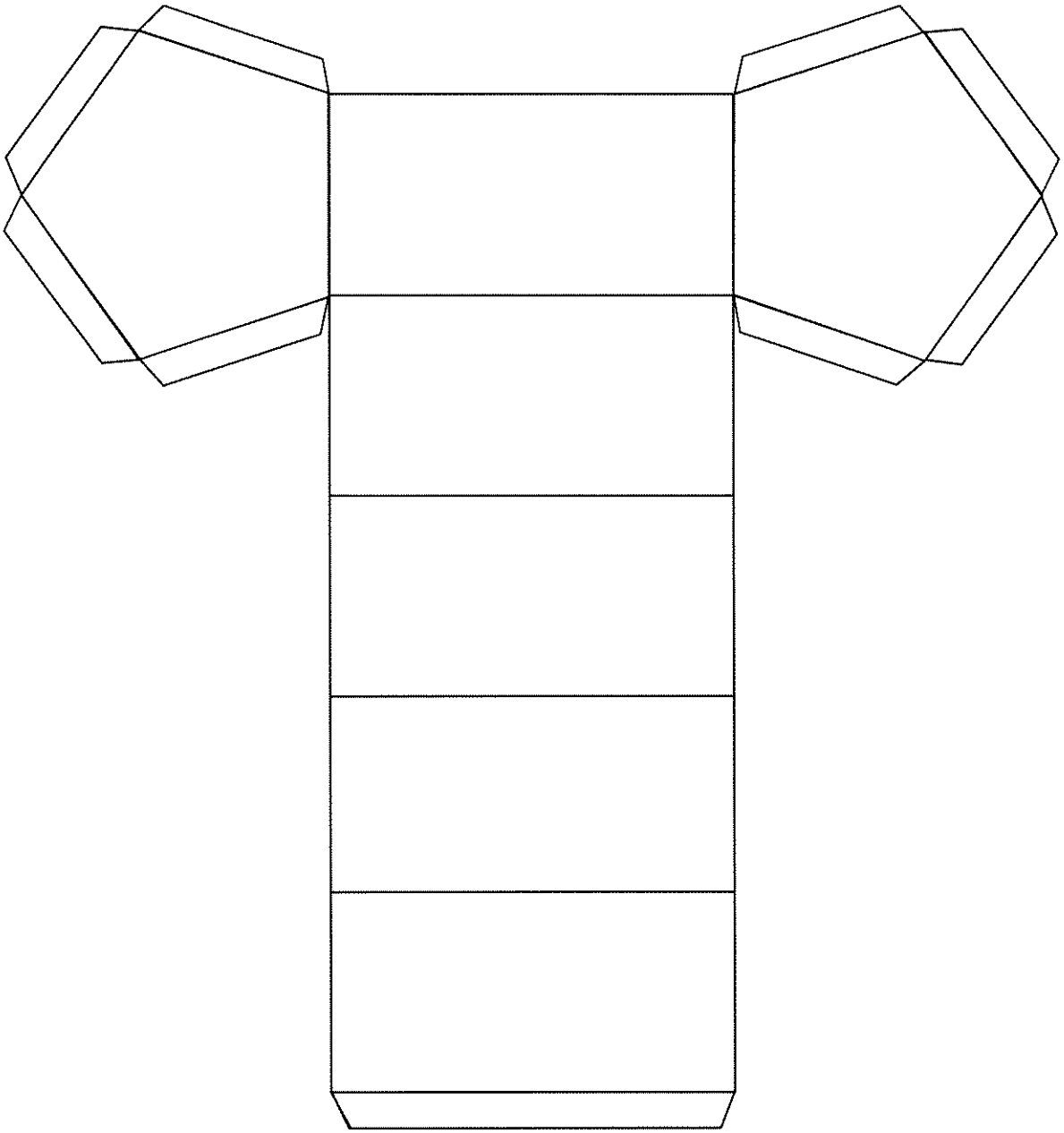
Name: _____ Date: _____

Practice: Shape and Space In-class Project 4 of 7



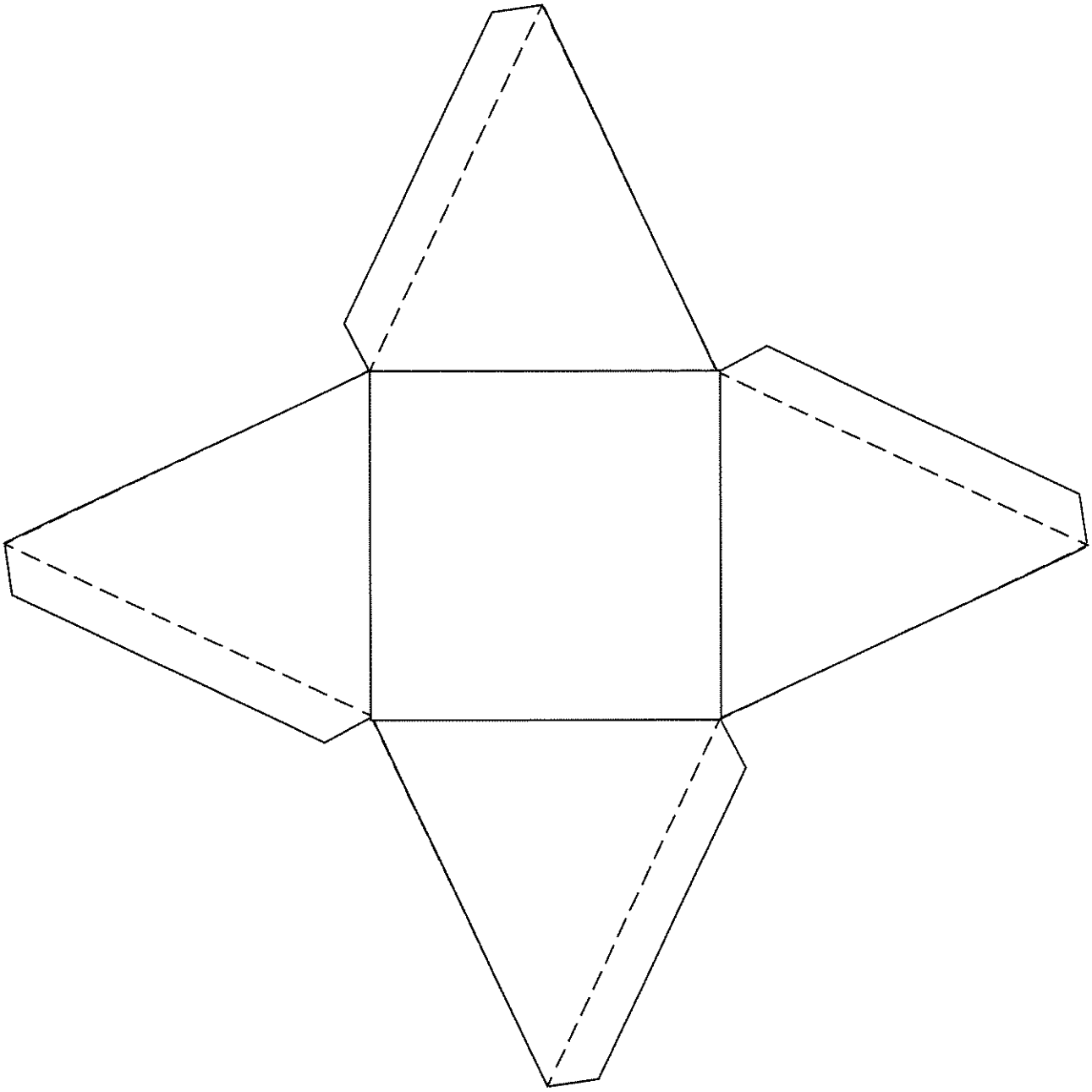
Name:_____ Date:_____

Practice: Shape and Space In-class Project 5 of 7



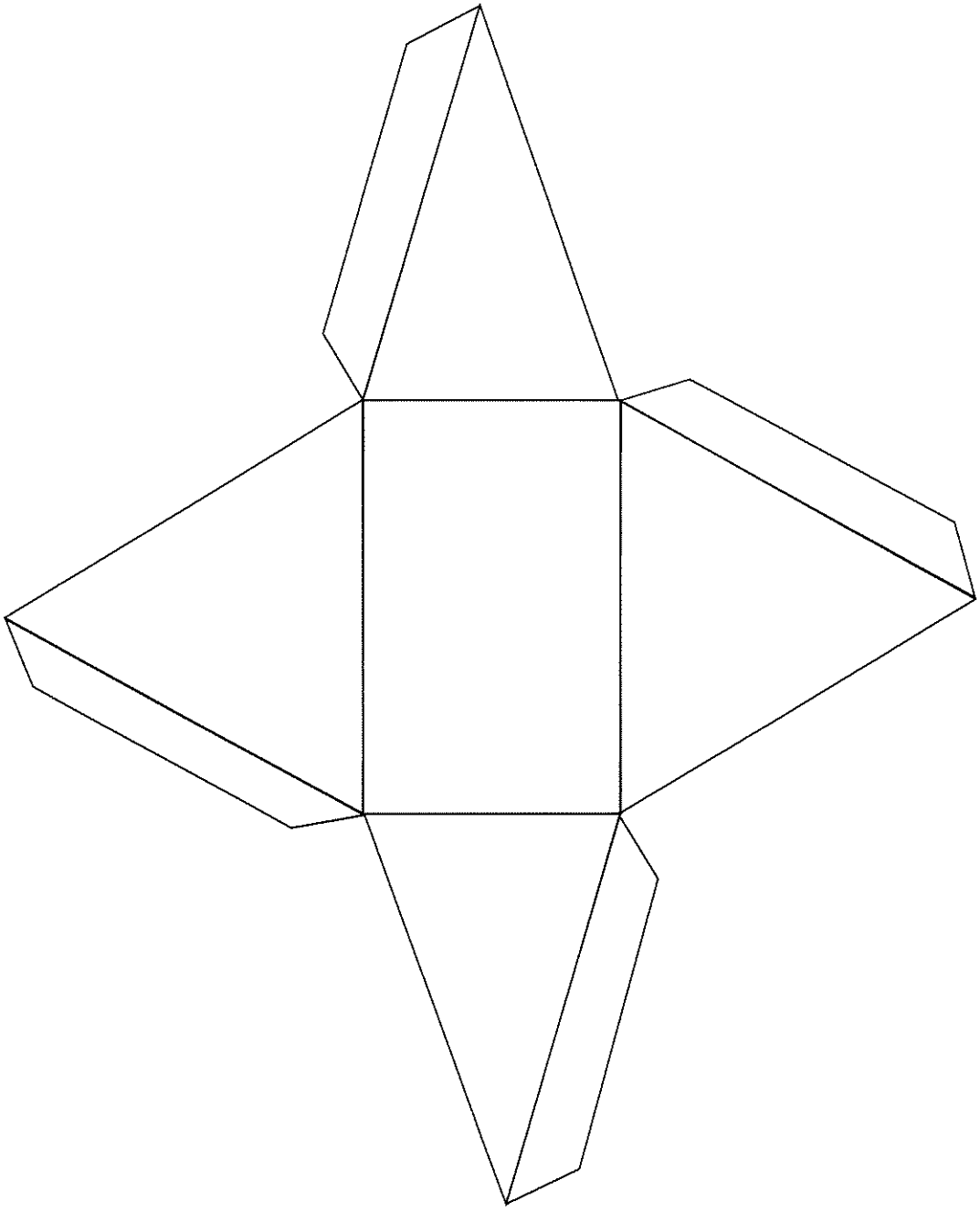
Name: _____ Date: _____

Practice: Shape and Space In-class Project 6 of 7



Name:_____ Date:_____

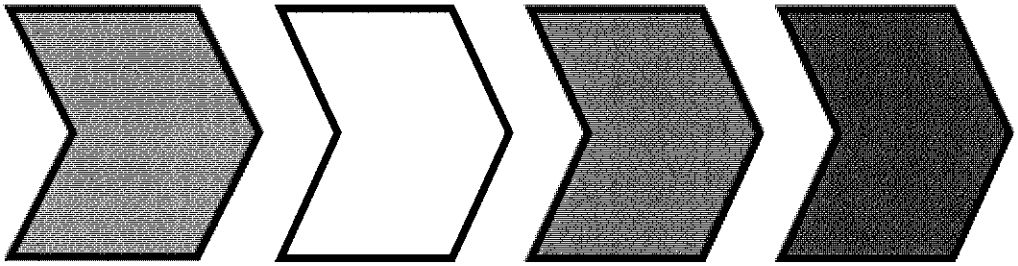
Practice: Shape and Space In-class Project 7 of 7



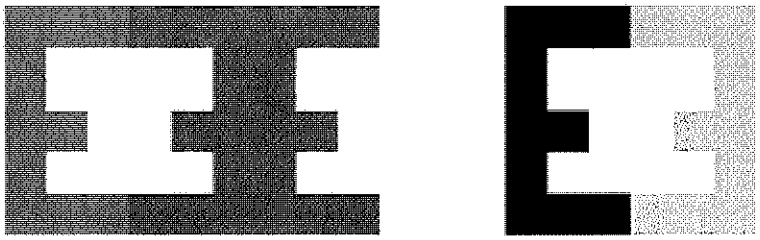
Creating Designs with Transformation

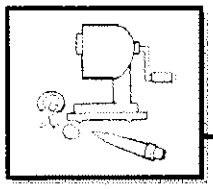
Transformations can be used to create interesting patterns and designs with basic shapes.

The pattern below was created from the original shape (far left) that has been **translated** to the right three times.



The original shape (far left) has been **reflected** or **flipped** five times to create the pattern below.





Practice: Creating Designs with Transformations

1. Make a shape. Use pencil and paper, a computer drawing program or another strategy to reproduce the shape.

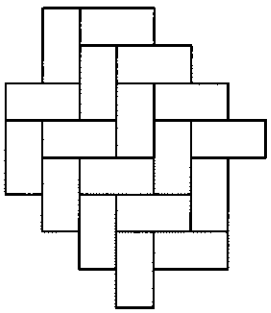
   

   Fill the entire page with translations and reflections of your shape.

   Colour/shade your design with the aid of the computer or by hand when finished to create a dazzling piece of artwork ready to display on a wall.

Tessellations

Homeowners or landscaping companies may use paving stones to create interesting patterns for a patio or walkway using one or more shapes placed together. These are called tessellations.

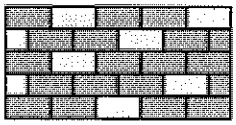


A **tessellation** is a shape that is repeatedly used to form a pattern over an entire surface with no gaps between shapes or any overlapping of shapes.

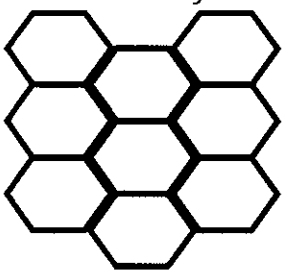
Tessellations can be made using regular geometric shapes, such as squares, rectangles or triangles.

Examples

Brick Wall



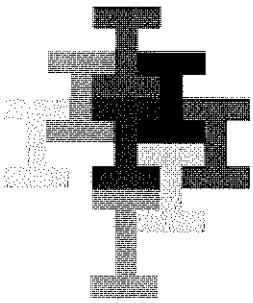
A Bee Honeycomb



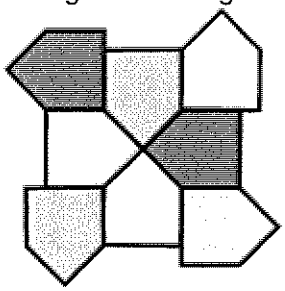
Tessellations can also be made using irregular geometric shapes.

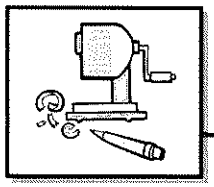
Examples

The letter "I"



Irregular Pentagons





Practice: Creating Tessellations

1. Create a variety of tessellations using pencil and paper, grids, computer or other strategies. Use colour to add interest to your designs. Be prepared to compare and discuss your tessellations with classmates.