

Launch:

Find (in the classroom) one example of each of the following

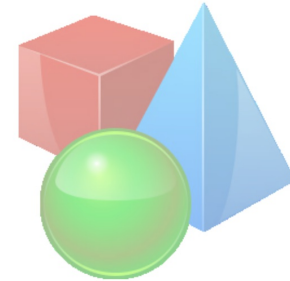
1. A point
2. A line (or line segment)
3. A part of a plane


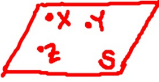
1.2/1.3 Drawing 3D Objects

Objectives:

To understand the properties of points, lines & planes.
To write and follow careful directions.

To identify and represent parallels.



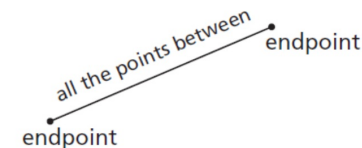
	POINT	LINE	PLANE
MODEL	•P		
DRAWN	as a dot	with an arrow on each end	as a slanted 4 sided figure
NAMED BY	a capital letter	- two points - a lowercase letter	- three points - a capital letter
FACTS	has no size or shape	has no width or height	has no height
WORDS / SYMBOLS	point P	- \overleftrightarrow{AB} - line m	- plane XYZ - plane S

Vocabulary:

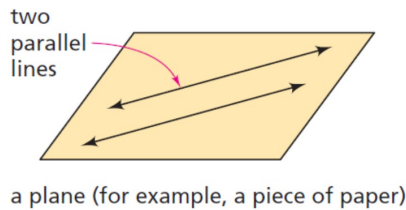
A **prism** is a solid formed by translating a given base shape into the third dimension along a line.



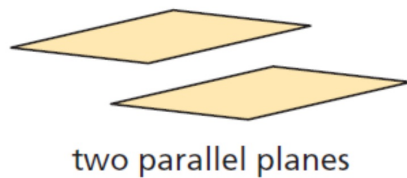
A **line segment** is part of a line that contains two endpoints and all the points between the two endpoints.



Parallel lines are lines in the same plane that do not intersect.



Parallel planes are planes in space that do not intersect.



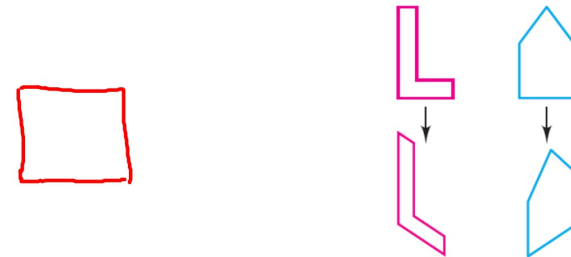
LETS DRAW!

Follow along on p.13 in your text

ON THE WHITEBOARD

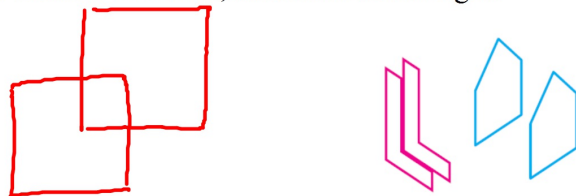
Step 1

Choose a letter or other shape. Draw it in your notebook. This shape is the base of the prism that you will draw. The example at the right shows two bases. One is an L-shaped hexagon and the other is a house-shaped pentagon. If you like, you can rotate the base of your prism into the third dimension, as shown at the right.



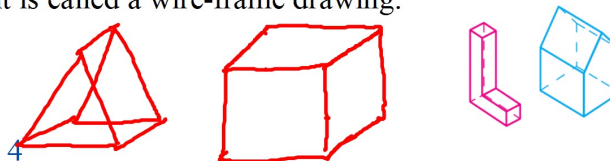
Step 2

A prism needs two parallel bases, so draw a copy of your base shape near the first. Take care to make the line segments of the copy parallel to (and the same size as) the corresponding line segments of the first base. Note that the word base does not necessarily mean the bottom or the top of the solid. It can mean the front or the back, as shown at the right.



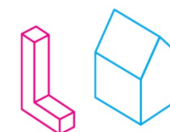
Step 3

Now connect the corresponding corners of the two bases. The result is called a wire-frame drawing.



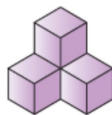
Step 4

Wire-frame drawings can be visually confusing. Erasing the back lines may help the eye make sense of the picture. (It is usually easier to start with the wire-frame drawing and then erase the back lines, than it is to draw the correct view from scratch.) Go ahead and erase the appropriate lines in your picture.



5. Three-dimensional solids can also have symmetry. A *plane of symmetry* of a three-dimensional figure divides it into two identical pieces. If you think of replacing the plane with a mirror, the half of the figure that is reflected in the mirror looks the same as the half that is hidden behind the mirror. Find five different symmetrical objects around your house, such as tissue boxes, cans of soup, and so on. Describe the planes of symmetry of each. You may include drawings of your descriptions.

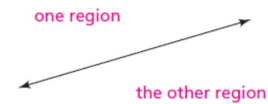
8. **Standardized Test Prep** The Soma Cube is a cube with three units on each side. You can construct the cube 240 different ways from six shapes called tetracubes and one shape called a tricube. One of the tetracubes, shown at the right, is a branch or corner piece that is made of four cubes. One cube has one face of each of the other cubes attached to it. (The Soma Cube was invented by Piet Hein. www.piethein.com)



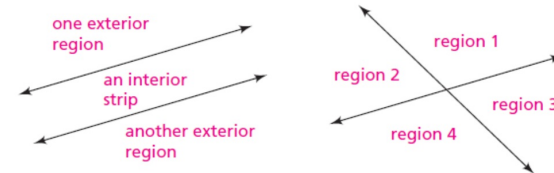
How many planes of symmetry does this tetracube have?

- A. 1 B. 2 C. 3 D. 4

6. A plane is infinite. Any line in a plane divides the plane into two regions.



Two lines may divide a plane into three or four regions, depending on how you place the lines.



With five lines, what is the maximum number of regions into which you can divide a plane?

Check Your Understanding

1. Read the following directions.

Face north. Walk four feet. Turn right. Walk six feet. Turn right again. Walk four feet. Turn right again and walk six feet. Turn right again.

Suppose you follow these directions.

- What shape will your path form?
- In what direction will you be facing when you finish?
- The direction *turn right* does not specify how far to turn. Yet you probably made an assumption. What was your assumption? What makes it seem reasonable?

2. Pick a simple shape.

a. Describe it by name.

b. Describe it with a recipe that you can use to draw it.

3. Read the following recipe.

Draw two segments that are perpendicular at their midpoints. Connect the four endpoints in order.

a. Draw a shape that the recipe above describes.

b. Does the recipe describe only one shape? Explain.

4. Read the two recipes below.

Recipe 1: Draw two perpendicular segments that share one endpoint. Make one segment 3 cm long and the other segment 6 cm long. Connect the other two endpoints.

Recipe 2: Draw a right triangle with legs of length 3 cm and 6 cm.

a. Do the two recipes describe the same shape?

b. Draw the shapes that each recipe describes.

5. A quadrilateral has horizontal, vertical, and diagonal lines of symmetry.

a. Draw a quadrilateral that fits this description.

b. Is there only one quadrilateral that fits the description? Explain.

6. What three-dimensional solid has a circle as every cross section?