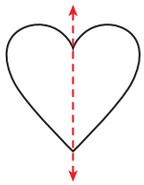
Section Overview

Professional Development

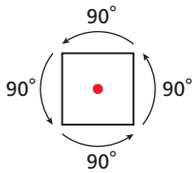
Symmetry — Lesson 12-5

Why? Botanists study properties of self-symmetry in plants. Symmetry is also important in design, architecture, and art.

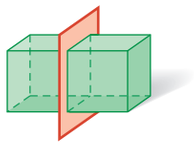
A figure has **line symmetry** if it can be reflected across a line such that the image coincides with the preimage. The **line of symmetry** divides the figure into two congruent halves.



A figure has **rotational symmetry** if it can be rotated about a point such that the image coincides with the preimage.

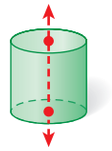


A three-dimensional figure has *plane symmetry* if a plane can divide the figure into two congruent reflected halves.



Plane symmetry

A three-dimensional figure has *symmetry about an axis* if there is a line about which the figure can be rotated such that the image coincides with the preimage.



Symmetry about an axis

Tessellations — Lesson 12-6

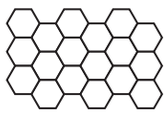
Why? Artists use tessellations to produce designs.

A **tessellation** is a repeating pattern of shapes that completely covers a plane with no gaps or overlaps.

Regular Tessellation

Only this hexagon

was used to create this regular tessellation.



Semiregular Tessellation

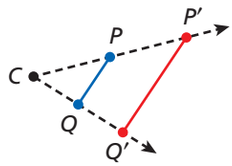
This square and equilateral triangle

were used to create this semiregular tessellation.

Dilations — Lesson 12-7

Why? Biologists use dilations to draw sketches of insects.

A **dilation** is a transformation that changes the size of a figure but not the shape of the figure.



A dilation is a transformation in which the lines connecting every point P with its image P' all intersect at a point C.

The point C is called the center of dilation, and $\frac{CP'}{CP}$ is the same for every point P.