

NYS 3-D Geometry Performance Indicators:

Students:

Geometric Relationships

PI G.G.1 Know and apply that if a line is perpendicular to each of two intersecting lines at their point of intersection, then the line is perpendicular to the plane determined by them

PI G.G.2 Know and apply that through a given point there passes one and only one plane perpendicular to a given line

PI G.G.3 Know and apply that through a given point there passes one and only one line perpendicular to a given plane

PI G.G.4 Know and apply that two lines perpendicular to the same plane are coplanar

PI G.G.5 Know and apply that two planes are perpendicular to each other if and only if one plane contains a line perpendicular to the second plane

PI G.G.6 Know and apply that if a line is perpendicular to a plane, then any line perpendicular to the given line at its point of intersection with the given plane is in the given plane

PI G.G.7 Know and apply that if a line is perpendicular to a plane, then every plane containing the line is perpendicular to the given plane

PI G.G.8 Know and apply that if a plane intersects two parallel planes, then the intersection is two parallel lines

PI G.G.9 Know and apply that if two planes are perpendicular to the same line, they are parallel

PI G.G.10 Know and apply that the lateral edges of a prism are congruent and parallel

PI G.G.11 Know and apply that two prisms have equal volumes if their bases have equal areas and their altitudes are equal

PI G.G.12 Know and apply that the volume of a prism is the product of the area of the base and the altitude

Apply the properties of a regular pyramid, including:

- PI** G.G.13
- lateral edges are congruent
 - lateral faces are congruent isosceles triangles
 - volume of a pyramid equals one-third the product of the area of the base and the altitude

Apply the properties of a cylinder, including:

- PI** G.G.14
- bases are congruent
 - volume equals the product of the area of the base and the altitude
 - lateral area of a right circular cylinder equals the product of an altitude and the circumference of the base

Apply the properties of a right circular cone, including:

- PI** G.G.15
- lateral area equals one-half the product of the slant height and the circumference of its base
 - volume is one-third the product of the area of its base and its altitude

Apply the properties of a sphere, including:

- PI** G.G.16
- the intersection of a plane and a sphere is a circle
 - a great circle is the largest circle that can be drawn on a sphere
 - two planes equidistant from the center of the sphere and intersecting the sphere do so in congruent circles
 - surface area is $4\pi r^2$
 - volume is $\frac{4}{3}\pi r^3$