

#617 Some **SOLID** ideas for learning Geometry

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Learning outcomes

Participants will explore hands-on activities and challenging tasks to develop spatial sense to meet middle school geometry standards

Gr: 6- area, surface area and volume

Gr: 7- relationships between geometric structures

Gr: 8- volume

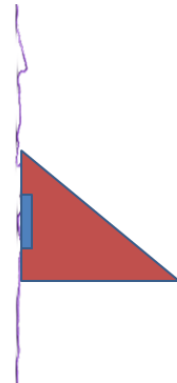
CCSS.Math.Content.6.G.A.4

Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures.

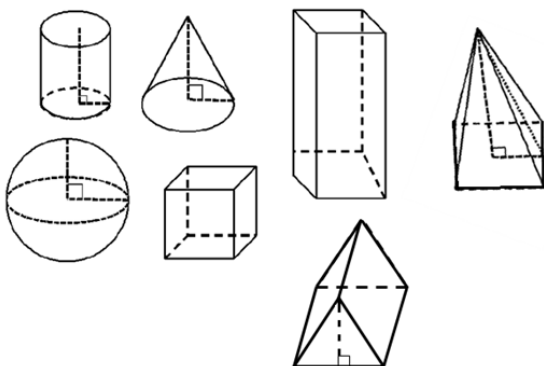
Apply these techniques in the context of solving real-world and mathematical problems.

Spinning solids

- yarn
- 2D figures
- Tape



What do THEY see?



CCSS.Math.Content.7.G.B.4

Know the formulas for the area and circumference of a circle and use them to solve problems;

Give an informal derivation of the relationship between the circumference and area of a circle.

CCSS.Math.Content.7.G.B.6

Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

CCSS.Math.Content.8.G.C.9

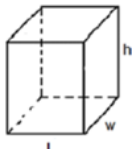
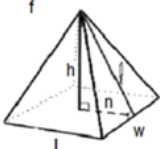
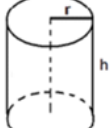
Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

Make playdoh models of the solids. Use the tissue paper to make "jackets" for the solids.

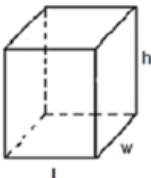
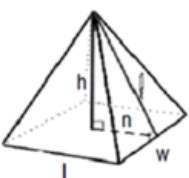
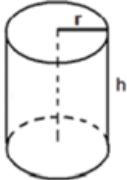
Compare your "jackets" to these nets. What do you notice?

 Cube Faces: 6 Edges: 12 Vertices: 8	 Cuboid Faces: 6 Edges: 12 Vertices: 8	 Triangular Prism Faces: 5 Edges: 9 Vertices: 6
 Square-based Pyramid Faces: 5 Edges: 8 Vertices: 5	 Cone Faces: 2 Edges: 1 Vertices: 0 or 1	 Cylinder Faces: 3 Edges: 2 Vertices: 0

Comparing Volume formulas

 $V = Bh$ $V = lwh$	 $V = \frac{1}{3}Bh$ $V = \frac{1}{3}lwh$
 $V = \frac{1}{3}Bh$ $V = \frac{1}{3}\pi r^2 h$	 $V = Bh$ $V = \pi r^2 h$
 $V = \frac{4}{3}\pi r^3$ $V = 4(\frac{1}{3}\pi r^2)r$	

Comparing Surface Area formulas

 $S.A. = 2lw + 2lh + 2wh$	 $S.A. = \frac{1}{2}lp + B$
 $S.A. = \pi rl + \pi r^2$	 $S.A. = 2\pi rh + 2\pi r^2$
 $S.A. = 4\pi r^2$	

CCSS.Math.Content.7.G.A.3

Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.

Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

Activity Instructions Exploration Related Resources Print All

Select a shape: **Cube** ☒ Solid ☐ Net

Zoom Level:

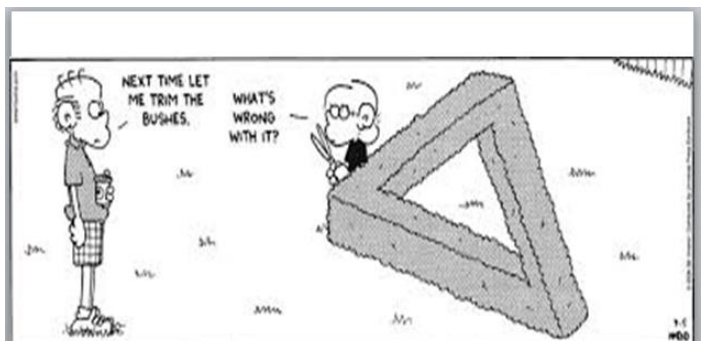
☐ Transparent ☐ Shaded

Faces (F) =
Edges (E) =
Vertices (V) =
☐ Show Total



Geometric Solids – Illuminations
<https://illuminations.nctm.org/activity.aspx?id=3521>

This tool allows you to learn about various geometric **solids** and their properties. You can manipulate and color each shape to explore the number of faces, etc.



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