

## **Sir Cumference and the Sword in the Cone**

See main web page for printables for this unit.

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### **Social Studies**

Note: See more Social Studies Lessons under **Lessons to be Used Throughout Unit**

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### **Science**

#### ***Stalactites-***

The cones in the path on pages 24-25 look like stalactites. Stalactites are cone-like structures that hang from limestone caves. They are made up of different minerals that are in water that drip from the cave ceiling. Stalagmites are formed below the stalactites as water drips off of them onto the cave floor. Stalagmites are also cone-shaped. See this [site](#) for diagrams and pictures. For a fun activity, put a big blanket over your kitchen table to make a “cave”. Then roll up paper into cones. Attach some cones to the underneath of the table and some to the floor under the table. You now have a cave that your child can play in that has stalactites and stalagmites. To remember the difference between the two words: Stalactites hold on tight to the ceiling and Stalagmites reach to the ceiling with all their might.

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### **Language Arts**

#### ***Vocabulary -***

Euclideans - this is an imaginary group of people in the book, but it refers to Euclid, a Greek mathematician who worked in geometry.

Heaved - to raise or lift with force

Aloft - high in the air

Wit- understanding or intelligence

Bestow- give

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### **Math**

#### ***Polyhedron-***

Polyhedra (plural for polyhedron) are solid figures having many faces. They have straight sides. Some examples from the book are the cube, triangular prism, rectangular prism, and pyramid. Other examples are the Platonic and Archimedean Solids which are described below. You might have your child try drawing some of the polyhedra on page 12 in the book. Also, have your child look around the house for examples of the 4 polyhedra from page 12. Can he/she make a list of items that are shaped like cubes, rectangular prisms, etc.?

Creating Polyhedron-Go to some of these websites to print (best on cardstock) the models to create some polyhedra. Once you and your child have made some of these you can use them to talk about the vertices (points), edges, faces of solids.

#### [Polyhedron Models](#)

Another [site](#) for Polyhedron models. This site includes Platonic and Archimedean solids.

Create a [12 Sided Calendar](#)! This is a polyhedron.

**Vertex-**

A vertex is a point on a geometric solid common to three or more sides. Have your child look through some of the pictures in the book and find some of the geometric solids. Can he/she find the vertices (plural for vertex)?

**Edges, Points, Faces-**

These are parts of polyhedra. The edges are where two faces meet. The faces are the flat surfaces of the solid. The points are also called vertices (singular for vertex) and are where at least three edges meet. If you have made some models of polyhedra have your student identify the edges, points, and faces of them. You could also have your child draw some polyhedra and label the points, faces, and edges.

**Geometric solids-**

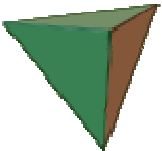
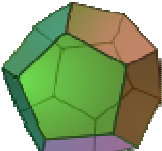
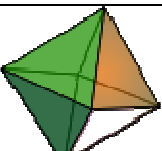
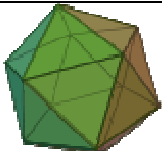
Geometric solids are shapes that have three dimensions (height, width, and depth). Here are some examples of geometric solids: sphere, cone, pyramid, cube, etc. It is interesting to note that all polyhedra are geometric solids, but not all geometric solids are polyhedra. By definition polyhedra have to have faces (flat sides). Therefore the sphere, cone, or cylinder are not polyhedra.

**Platonic solids-**

While Platonic solids are not discussed in the book, they are polyhedra and a fascinating study. There are only five Platonic solids. Each one is a polyhedron with every face being a regular polygon of the same size and shape. They are also convex (no "dents" or indentations in them). They are named after the ancient Greek philosopher, Plato. Can your child find any Platonic solids in the book? Below are websites with models that you can print and make of the solids. There is also a link above for a cool 9-minute video that describes Platonic solids. Can your child find the vertices, edges, and faces on the solids?

[Video of Platonic Solids](#)  
[Platonic Solids Models](#)

Here are some diagrams of them provided by Wikipedia.

Tetrahedron		Hexahedron (or cube)	
Octahedron			

**Geometric solids chart-**

If you have done the lessons on geometric solids, polyhedra, and Platonic solids have your child fill in the chart provided on the main page. Your first category is geometric solids within that category are polyhedra and within polyhedra you have Platonic solids.

Here are some possible answers:

Geometric solids-sphere, cone, pyramid, cube, triangular prism, rectangular prism, etc. (any 3-D shape)

Polyhedra-cube, rectangular prisms, pyramid, octahedron, etc. (any 3-D shape with flat faces)

Platonic Solids- There are only five. See the list in the Platonic solids section.

### ***Archimedean Solids-***

This is a more advanced concept. Archimedean solids are polyhedra, but unlike the Platonic solids they have different shaped faces. So for example their faces might be a mixture of triangles and pentagons instead of all triangles like the Octahedron above. See this [link](#) for more info.

### ***Euler's Law-***

Leonhard Euler (pronounced "Oiler") Euler lived from 1707 to 1767. Can your student do a quick math calculation and figure out how old he was when he died? He was one of the leading mathematicians of the 18<sup>th</sup> century (the 1700's). He was born in Switzerland. He investigated many aspects of geometry such as the Greek concept of "Perfect Bodies". The Greeks defined the perfect body as the form built from identical regular polyhedra. These polyhedra came to be known as the Platonic solids. Euler related the number of faces (F), vertices (V) and edges (E) of a polyhedron. The formula is  $F + V = E + 2$ . Can your child make a chart of some polyhedra and test Euler's formula by counting the number of faces, vertices and edges and plugging them into the formula...does it always work?

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## **Art**

### ***Tapestry-***

On page 15 there is a mention of a tapestry. A tapestry is a form of textile art. It is woven by hand on a loom. One of the most famous tapestries during medieval times is the Bayeux Tapestry. It is a very long tapestry (about 230 ft.) that depicts the events surrounding the Norman invasion of the British Isles in 1066 AD. Check out this [site](#) to see pictures of the tapestry and read the story surrounding it.

### ***Creating Polyhedra with Gumdrops-***

Here is a fun activity for your child after he/she has studied polyhedra. You will need round toothpicks and gumdrops. Start by making a cube. Take four toothpicks and four gumdrops. Make a square with them. The gumdrops are the corners/vertices of the square and the toothpicks are the edges. Poke another toothpick into the top of each gumdrop in the square. Put a gumdrop on top of each toothpick and then connect the gumdrops with toothpicks to complete the cube. Can your child make other polyhedra? How about some of the other Platonic solids?

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