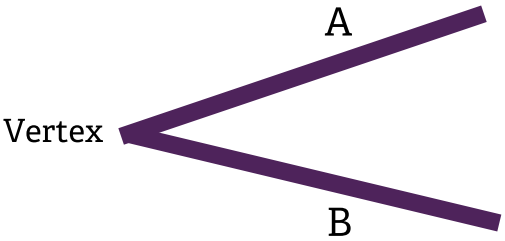
McConnell Science Museum EUREKA!

Angles at Home!

This activity is a favorite of John McConnell's. See what mathematical objects you can create with paper clips and straws! Paper straws reccommended.

What is an Angle

Draw two straight lines that meet at a point. Each line is called a ray. We will label them A & B. The point where they meet or intersect is the vertex. The angle is between the two rays.

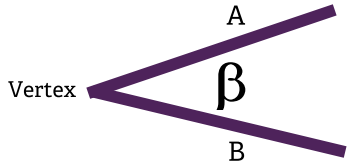


Make an Angle

1: Connect two paperclips together at the small end.

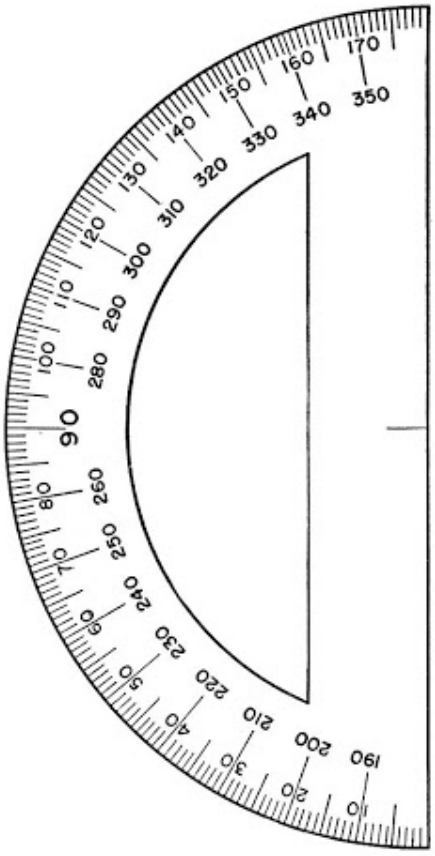
2: Slip 2 straws over the paperclips.

Did you know?
Greek letters are often used to name angles. The greek letter beta β is used in this example.



Make a Protractor

A device to measure angles is called a protractor. Print the protractor and then read the angles. Angles are measured in degrees, there are 360 degrees in a full circle.

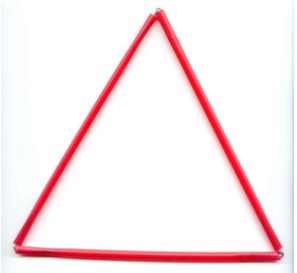


Vocabulary:
Acute Angle< 90°
Right Angle = 90°
Obtuse Angle > 90°

Triangles and Beyond!

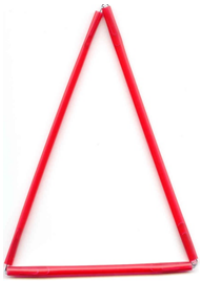
Angles of Triangles and Squares

1. Construct an equilateral triangle. How many straws, and paperclips does it take? (Equilateral triangles have 3 sides that are all the same length.)

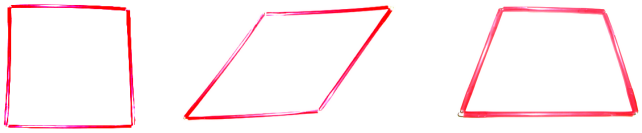


2. Measure each of the three angles and add them up. They should be close to 60 degrees each, totaling 180 degrees.

3. Now construct an isosceles triangle, with two equal sides. You may need to cut one straw. Again, measure the angles. What do you notice?

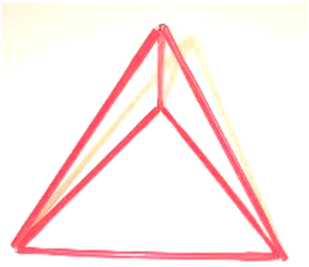


4. Experiment making squares, diamonds and parallelograms! How do their angles add up?



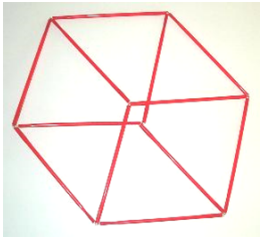
Building 3-Dimmensional Objects

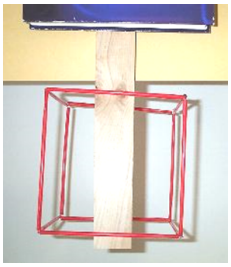
1. Connect three paper clips together to build a tetrahedron.



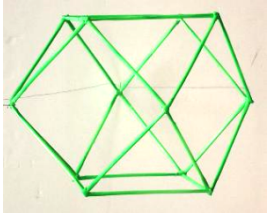
How many faces and vertices are there? How many paper clips and straw are needed? What kind of triangles are they?

2. Next try a floppy cube. To make it rigid, use a hot glue gun on the corners. Try hanging it to glue the vertices.





3. Experiment making larger shapes. Or dipping your frames in bubble solution. The frames are also fun to hang as a mobile.



Compare with Eulor's Theorem: V-E+F=2

V=# of vertices
E=# of edges
F=# of faces.