

Pyroxene

Purpose:

The purpose of this activity is to engage students in evaluating a claim made on the basis of supporting statistics.

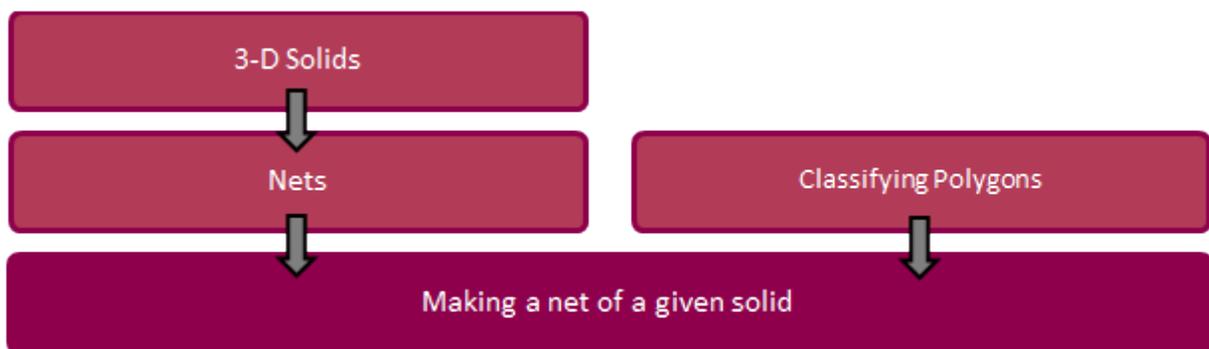
Achievement Objectives:

GM4-5: Identify classes of two- and three-dimensional shapes by their geometric properties.

GM4-6: Relate three-dimensional models to two-dimensional representations, and vice versa.

Description of mathematics:

The background knowledge and skills that need to be established before and/or during this activity are outlined in the diagram below:



Classifying Polygons

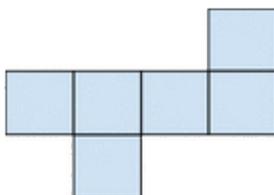
Name the polygons that make up each of the five faces (including the base) of an Egyptian pyramid.

3-D Solids

Sketch the platonic solid, the octahedron. It is made of eight equilateral triangles.

Nets

Name the solid formed from this net:



Making a net of a given solid

Create a net for the platonic solid, the octahedron. It is made of eight equilateral triangles.

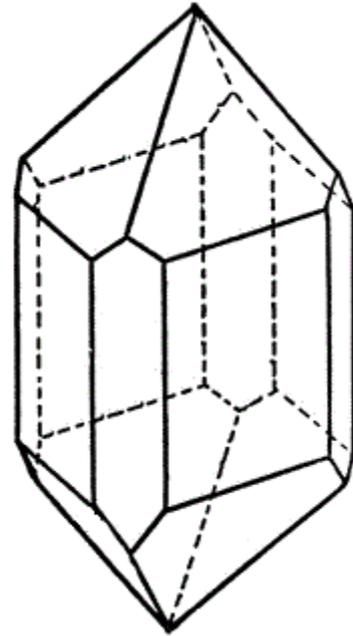
This activity may be carried out with step by step guidance, or by allowing the student to follow their own method of solution. The approach should be chosen in sympathy with students' skills and depth of understanding.

Activity:

Pyroxenes are minerals found in cooled volcanic lava. They have an interesting geometric structure.

Identify and list the irregular polygons that make up the pyroxene crystal shown in the diagram.

Use this list to construct a net for a pyroxene crystal.



The procedural approach

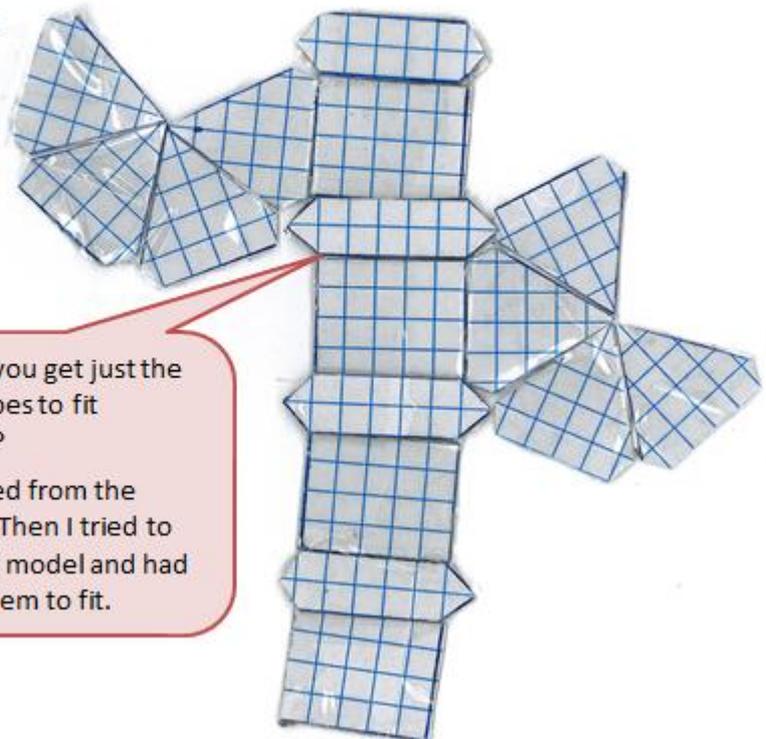
The student is able to create a net, with guidance, to build a specified solid.

Prompts from the teacher could be:

1. Look at the faces on the diagram of the solid. What shapes do you see? Count the number of sides of each of these polygons to classify them.
2. How many of each type of shape do you see.
3. Try building a model of the solid by drawing on card and cutting out all the faces that make up the solid. Where your model doesn't quite fit together, or match the solid, modify the face to fit.
4. Once you have made the solid, disassemble it to make the net.

Irregular hexagons = 6
Irregular pentagons = 8
Rectangles = 4

My net =



T: How did you get just the right shapes to fit together?

S: I estimated from the diagram. Then I tried to make the model and had to trim them to fit.

The conceptual approach

The student is able to create a net to build a specified solid.

Prompts from the teacher could be:

1. Look at the faces on the diagram of the solid. What shapes do you see?
2. How many of each type of shape do you see?
3. How are shapes connected together?
4. Design the net.

