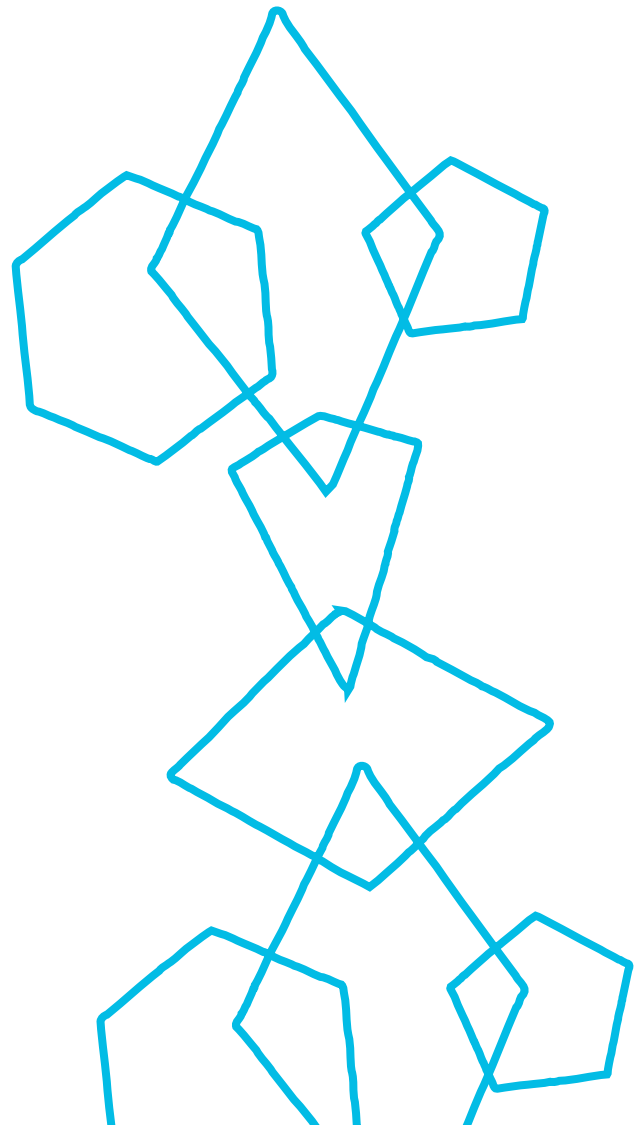


geo *planepuzzles*

Exploring Properties of 2D Shapes

Sample Activities

ALLAN TURTON
CALVIN IRONS



5. What Is It?



Preparation

No preparation is required.

Activity

1. Suggest a property of a shape to the students and direct them to construct a shape that has that property. For example, if you say, *This shape is a closed shape*, the students can construct any shape, providing it is closed. Have the students construct three or four examples of the shape you describe.
2. Give the students additional clues to limit their choice of shapes. For example, say, *This shape also has straight sides*, so that the shape must be a polygon. Then say, *The shape has only five angles*, so that the shape must be a polygon with only five angles, that is, a pentagon.

6-8

Use triangles (including equilateral triangles), rectangles (including squares and oblongs), pentagons, and hexagons. The properties can include whether the shape is open or closed, the number of sides, the number of corners, and the number of square corners.

8-10

In addition to the above shapes, use octagons, rhombuses, trapezoids, and kites. The properties can also include whether a shape is regular or irregular, and whether it has acute, obtuse, or right angles.

10-12

In addition to the above shapes, use ellipses, isosceles triangles, and scalene triangles. The properties can also include whether a shape is convex or concave.

Materials

- Geoboards and rubber bands or similar (e.g. drinking straws and pipe cleaners) — 1 set for each student
- Square-corner tester — 1 for each student

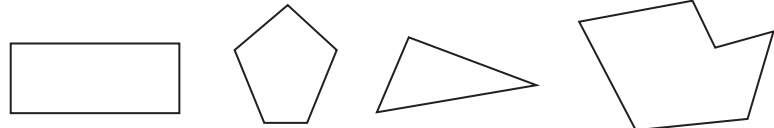
Did You Know?

The interior angles of a convex two-dimensional shape are all less than 180° .

Concave two-dimensional shapes have at least one interior angle that is greater than 180° .

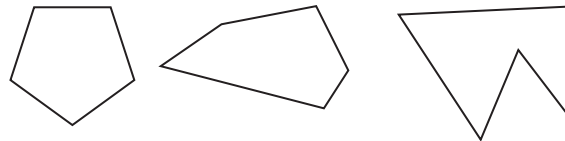
The shape has straight lines.

(This means it cannot have any curves.)



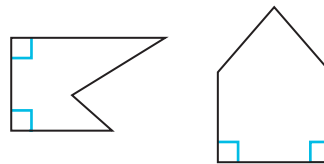
The shape has five sides.

(This means it can only be a pentagon.)



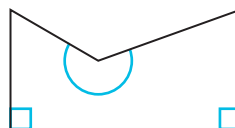
The shape has two right angles.

(Two right angles must be indicated.)



The shape is concave.

(Two right angles and the concave angle must be indicated.)



▲ Given the above sequence of clues, older students may draw shapes like these.



Materials

- Blackline Master 18 (page 76)
- Overhead projector and blank transparency sheet

Did You Know?

The word “squangles” is a combination of “squares” and “triangles”.

Did You Know?

A shape is said to have “line” or “reflective symmetry” if half of the shape is a mirror image of its other half. If a shape looks the same after being rotated through a fraction of a turn, then it is said to have “rotational symmetry”.

Shapes that are used to cover a plane to make a repeating pattern without any gaps are said to “tessellate”. The result is called a “tessellation”.

Many interesting activities on symmetry and tessellations can be found in *Simple Symmetry* and *Creative Coverings*.

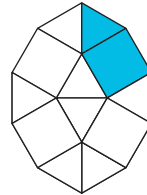
13. Squangles

Preparation

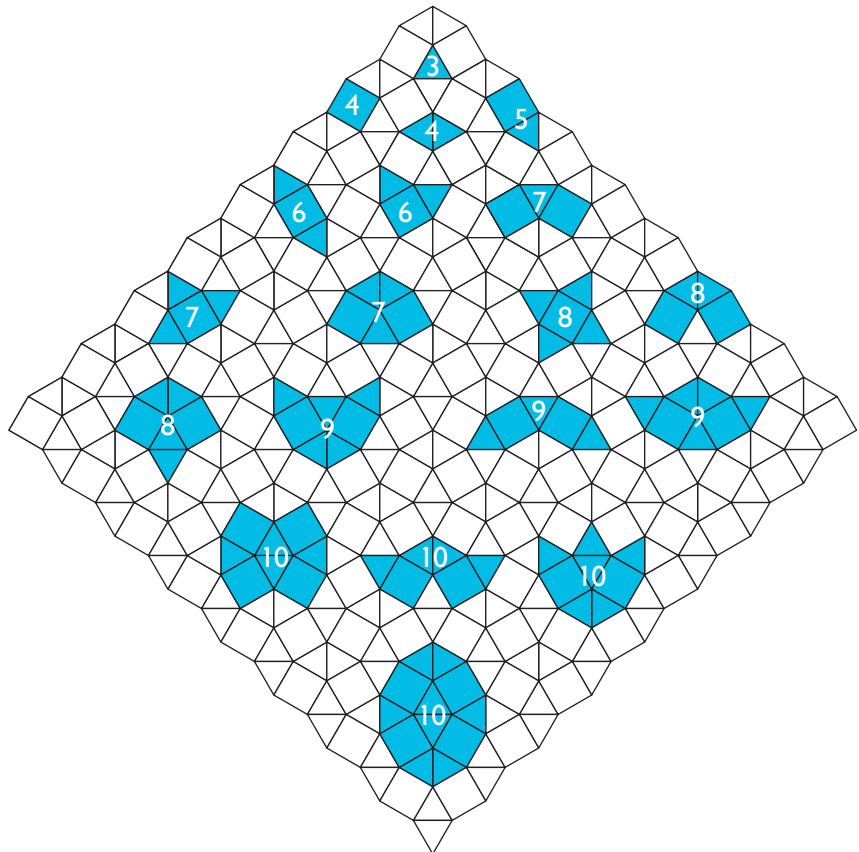
1. Make an overhead transparency (OHT) of Blackline Master 18.
2. Make one copy of Blackline Master 18 for each student.

Activity

1. Show the students the OHT of Blackline Master 18 and describe how the shapes in the tessellation can be joined to form new shapes. Use the example of a pentagon being formed by a square and a triangle.



2. Challenge the students to lightly shade shapes on Blackline Master 18 to show examples of polygons, ranging from those with 3 sides to those with 10 or more. The students should write inside each composite shape the number of sides it has. They may like to shade shapes that show reflective or rotational symmetry. Some examples that have reflective symmetry are shown below.



▲ Challenge the students to find a range of different polygons by combining squares and triangles.

3. Making It Big

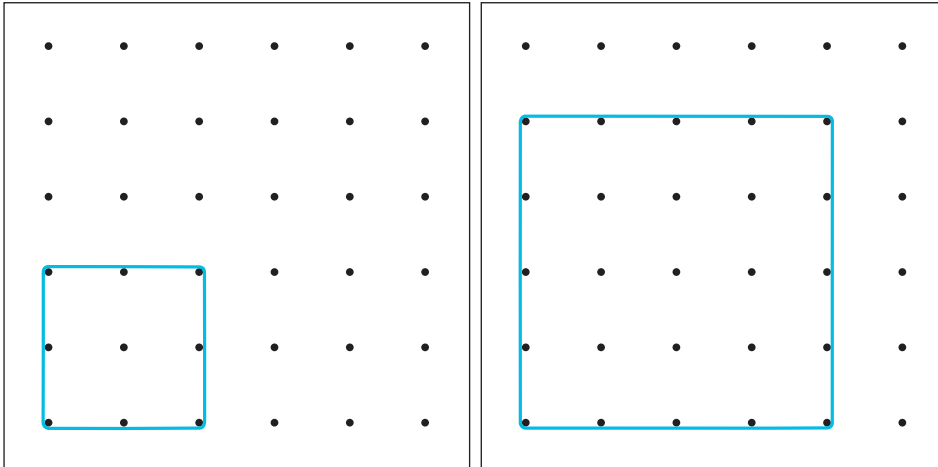


Preparation

No preparation is required.

Activity

Have one student in each pair make a small, simple shape on a geoboard. The student's partner then uses his or her geoboard to make a larger copy of the same shape. For example, if a square has a side of 2 units, a larger copy with a side of 3 units could be made. Or, if space allows, the side lengths could be doubled.



▲ Challenge the students to make enlarged versions of shapes.

Materials

- Geoboards and rubber bands for each student

4. Remember It



Preparation

No preparation is required.

Activity

1. Use the overhead pattern blocks to project a design that students have to copy with their own pattern blocks. Begin with designs that are symmetrical and use only a few pieces before trying more unusual shapes.
2. Once the students can copy the designs accurately, direct them to memorize a design you make. Show the design for 5 to 10 seconds before covering it up. The students can then attempt to recreate the design.
3. Once the students feel they have completed all they can, uncover and display the design for another 5 to 10 seconds. Cover the design and allow the students to correct their designs if necessary.
4. Discuss the strategies that the students used, such as memorizing small combinations of shapes. The students could also be asked to draw some designs freehand.
5. A harder alternative is to make your own overhead blocks from overhead transparencies. Leave them clear so that the emphasis is on shape, not color.

Materials

- Overhead projector
- Overhead pattern blocks (see note)
- Pattern blocks — 1 set for the whole class

Teaching Note

Overhead pattern blocks are transparent pattern blocks that can be used on overhead projectors. If you do not have access to overhead pattern blocks, you may like to use ordinary pattern blocks and do this activity with half the class at a time, sitting on the floor, with the blocks in the middle.