

TRIANGLES IN ARCHITECTURE

Teaching Guidelines

Subject: Mathematics

Topics: Geometry (polygons)

Grades: 3 - 7

Concepts:

- Polygon

Knowledge and Skills:

- Can identify/describe common polygons
- Understands how the shape of a structure affects its rigidity

Materials:

- photographs of bridges or other structures which illustrate the polygons—and especially the triangles—of their supporting structure.
- colored strips of card stock (as from manila folders), one inch wide and of varying lengths (from 6” to 10” long); each end of each strip should be hole-punched (five per student.)
- round-head paper fasteners (the type with “legs” that fold back, to be used to fasten the ends of the colored strips together) (five per student)
- plastic drinking straws (30 for each team of two students)
- masking tape (one roll for each two students.)

Procedure:

Show the photographs of the structures to the students and ask what they observe. Lead discussion to the use of polygons, and particularly to the use of triangles.

Ask students to tell you what they know about polygons, leading to review of the definition of the types of polygons.

Tell students you would like each of them to make a polygon with the colored strips and fasteners, and give them a short time (a few minutes) to do so.

Have several students show you the polygons they made and describe them. Get the students to use terms such as “regular,” “isosceles,” “irregular” as well as the names of the types of polygons.

Select two students who made triangles and two who made other polygons. Have them come to the front of the room and hold up their shapes by one corner. Ask the class what they observe, and lead the discussion to the realization that the triangles are the only shape that doesn’t collapse.

Tell students that you want to give them an opportunity to use what they know about polygons, and that they are going to have a “building contest.”

Arrange students in teams of two, and make sure the straws and tape are distributed evenly to all teams.

Tell students that each team will have 10 minutes to build a structure with their straws and tape. At the end of the 10 minutes the tallest structure which stands alone will be the winner.

Start the contest, circulate as it’s being done, and stop it after exactly 10 minutes. Announce the winning structure, and have the winning team describe their strategy. If you wish, have a few of the other teams with relatively tall structures describe their strategies.

Review in discussion the main points of the lesson.