



# CEMC at Home

## Grade 4/5/6 - Friday, May 22, 2020

### Toothpick Polyhedrons

#### You Will Need:

- Toothpicks of the same length (at least 12, but preferably more)
- Some miniature marshmallows, licorice bits, or bits of play dough.
- A flat surface on which to work

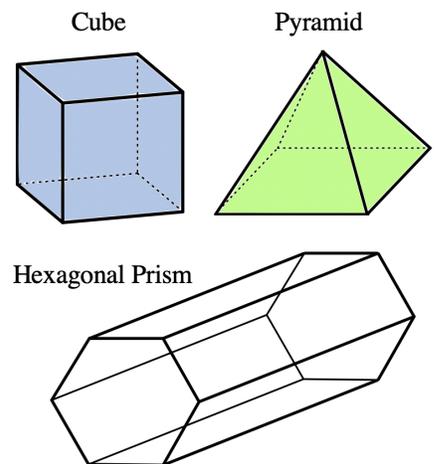


#### Introduction:

A *polyhedron* is a three-dimensional object with polygons for its faces. Recall that a polygon is a two-dimensional closed shape formed by three or more line segments. Examples of polygons include triangles, quadrilaterals, pentagons, hexagons, and octagons.

A cube is an example of a polyhedron and has six square faces. A square-based pyramid is another example of a polyhedron, and has one square face and four triangular faces.

We can build models of polyhedrons by building *skeletons* of the objects. A skeleton includes all of the edges of the polyhedron. For example, the skeleton of a hexagonal prism (another type of polyhedron) is shown on the right.



#### What to Do:

The goal of this activity is to construct models of polyhedrons using toothpicks joined together with miniature marshmallows. Toothpicks cannot be broken, but two or more toothpicks may be joined together to create edges longer than one toothpick (←—●—●—→).

Once you have constructed a new polyhedron, sketch the polyhedron carefully and state its name or make up a fun, suitable name.

#### Activities and Questions to Explore:

1. Construct a model of a square-based pyramid. How many toothpicks did you use? How many marshmallows did you use? Is there more than one way to do this?
2. See how many different polyhedrons you can construct using exactly 12 toothpicks. *For example, what could you make with a square base? A triangular base? Other bases?*
3. Now see how many different polyhedrons you can construct using *fewer* than 12 toothpicks.
4. Can you construct a polyhedron with a hexagonal base using exactly 12 toothpicks? Why, or why not?

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#### More info:

Check out the CEMC at Home webpage on Friday, May 29 for a solution to Toothpick Polyhedrons.