**Activity 6.1.4b Euler’s Formula**

**Materials:** You will need access to a number of polyhedra. These nay be the same ones you used or made in previous activities of this investigation.

1. For each Polyhedron provided count the number of faces, vertices, and edges, then fill in each chart below.

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| --- | --- | --- | --- | --- |
| Number of Polyhedron | Number of Faces(*F*) | Number of Vertices(*V*) | Number of Edges(*E*) | *F* + *V* |
| Cube (regular hexahedron) | 6 | 8 | 12 | 14 |
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1. Based of the data gathered make a conjecture on the relationship between the number of faces, vertices, and edges of any polyhedron. (Hint: Look at the last two columns.)
2. Write your conjecture as a formula with *F*, *V,* and *E* as the variables. This formula is known as Euler’s formula.
3. Can you come up with three numbers satisfy the formula but where no polyhedron has these properties?
4. Here is a sketch of a pentagonal prism. Count faces, vertices, and edges, Verify that Euler’s formula holds.

*F* = \_\_\_\_\_, *V* = \_\_\_\_, *E* = \_\_\_\_\_\_

1. Here is a sketch of a hexagonal pyramid. Count faces, vertices, and edges, Verify that Euler’s formula holds.

*F* = \_\_\_\_\_, *V* = \_\_\_\_, *E* = \_\_\_\_\_\_

1. Here is a sketch and a net for a **square antiprism**. Two squares are joined by eight triangular faces. Count the edges and vertices and verify Euler’s formula:

 *F* = \_\_\_\_\_, *V* = \_\_\_\_, *E* = \_\_\_\_\_\_