“3D” stands for “three-dimensional.” 3D objects take up space in three dimensions. We often call these three dimensions length, width, and height.

**Geometric solids** are three-dimensional shapes that take up space.

A flat side of a geometric solid is called a **face**.

A line segment where the faces of a solid meet is called an **edge**.

A point where edges meet is called a **vertex**.

A geometric solid with no curved surfaces whose faces are all polygons is called a **polyhedron**.

When we draw 3D objects on paper, we often use dashed lines to show hidden edges.

**PRACTICE**

Answer each question below.

**7.** How many faces, edges, and vertices does this polyhedron have?

![Polyhedron](image1)

Faces: _______

Edges: _______

Vertices: _______

**8.** How many faces, edges, and vertices does this polyhedron have?

![Polyhedron](image2)

Faces: _______

Edges: _______

Vertices: _______

**9.** How many faces, edges, and vertices does this polyhedron have?

![Polyhedron](image3)

Faces: _______

Edges: _______

Vertices: _______

**10.** How many faces, edges, and vertices does this polyhedron have?

![Polyhedron](image4)

Faces: _______

Edges: _______

Vertices: _______

**11.** Four equilateral triangles are attached to create a polyhedron with four faces. How many edges and vertices does the polyhedron have?

**11.** Edges: _______

Vertices: _______
A **prism** is a polyhedron with two congruent faces that are parallel. The congruent faces are called the **bases** of the prism. We name the prism by the shape of its bases. The bases of a prism are connected by parallelograms. The **height** of a prism is the distance between its bases.

All of the prisms in this chapter are called **right prisms** and have lateral faces that are rectangles.

---

### PRACTICE

Shade the bases of each prism below. Then, draw a line to connect each prism to its name.

12.  
13.  
14.  
15.  
16.  
17.  

---

<table>
<thead>
<tr>
<th>Prism</th>
<th>Faces</th>
<th>Edges</th>
<th>Vertices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triangular Prism</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rectangular Prism</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pentagonal Prism</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hexagonal Prism</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Octagonal Prism</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decagonal Prism</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

19. A nonagon is a polygon with 9 sides. How many faces, edges, and vertices does a nonagonal prism have?

19. **Faces:** 

   **Edges:** 

   **Vertices:**
A **pyramid** is a polyhedron that has one polygon as a base. All other faces of the pyramid are triangles that meet at a single vertex called the pyramid’s **apex**.

Like a prism, a pyramid is named by the shape of its base.

**PRACTICE**

Shade the base of each pyramid below. Then, draw a line to connect each pyramid to its name.

20. ![Triangular Pyramid]  
21. ![Square Pyramid]  
22. ![Pentagonal Pyramid]  
23. ![Hexagonal Pyramid]  
24. ![Octagonal Pyramid]  

25. Write the number of faces, edges, and vertices of each pyramid in the table below.

<table>
<thead>
<tr>
<th>Pyramid</th>
<th>Faces</th>
<th>Edges</th>
<th>Vertices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triangular Pyramid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Square Pyramid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pentagonal Pyramid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hexagonal Pyramid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Octagonal Pyramid</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

26. A heptagon is a polygon with 7 sides. How many faces, edges, and vertices does a heptagonal pyramid have?

- Faces: ________
- Edges: ________
- Vertices: ________

27. An icosagon is a polygon with 20 sides. How many more edges does an icosagonal prism have than an icosagonal pyramid?

- ________
A *regular tetrahedron* is a special type of pyramid whose four faces are equilateral triangles.

A *cube* is a special type of rectangular prism in which all six faces are squares.

A *sphere* is a round 3D object, like a ball.

A *cylinder* is like a prism, but with circles as its bases.

A *cone* is like a pyramid, but with a circle as its base.

**PRACTICE**  Answer each question below.

28. Which solids at the top of this page are polyhedra? Which are not? Explain. (You can review the definition of a polyhedron on page 8.)

29. A solid rubber sphere is cut into two pieces with one straight cut. What is the shape of the new flat sides of both pieces? Does it matter where the sphere is cut?

30. Phyllis splits a *cylinder* of cake into two pieces with one straight cut. ★ Circle all of the shapes below that could be the flat sides of both new pieces.

31. James splits a *cone* of cake into two pieces with one straight cut. ★ Circle all of the shapes below that could be the flat sides of both new pieces.