

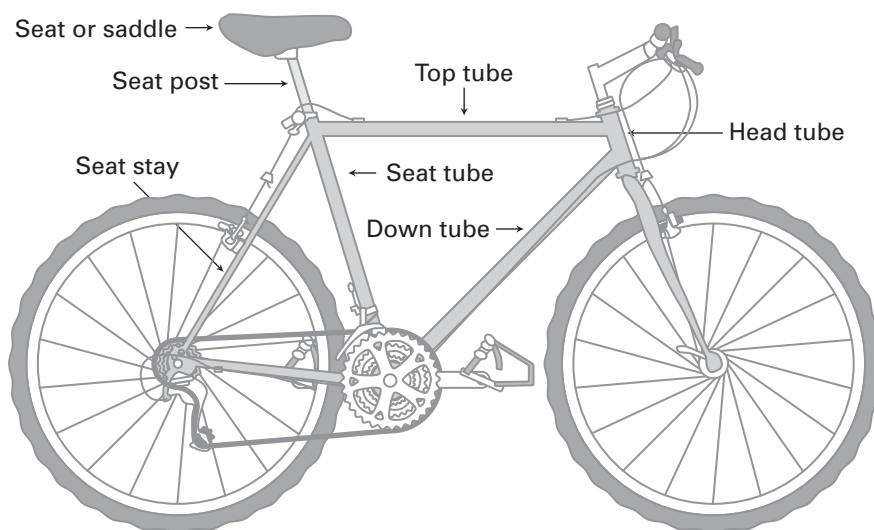
Real-Life Application: When Will I Ever Use This?

For use with pages 272–278

Cycling

In the 1800s, the modern safety bicycle was developed which included the pneumatic tire, the chain drive, and the development of gears. These first bicycles had frames made of cast iron or wood. A typical bicycle could weigh approximately 80 pounds. Today, these frames are made of steel, aluminum, titanium and carbon fiber, creating a lighter and stronger bicycle frame.

The frame design has not changed much since the 1800s. This popular frame design is called the diamond or a double-triangle. This frame design is effective because it provides bracing angles and design strength. Today the most common bicycle designs are the diamond design and a three-triangle design.



1. How many triangles are there in the bicycle pictured above?
2. Copy the triangles pictured in the bicycle above. Use the angle bisector of an angle to find the incenter of each triangle in the bicycle.
3. Draw a perpendicular segment from the incenter of each triangle to the sides of the triangle. What can you conclude about these perpendicular segments?
4. The size of an adult bicycle is the length of the *seat tube*. The seat tube is the cylinder that extends from just below the seat to the axle of the pedals. As the seat tube of the bicycle increases in length, does the incenter of the triangle become closer to or farther from the ground? Give an example to justify your answer. What advantage does one incenter have over the other?