



Figure 14 These screws multiply force by increasing the distance over which you exert your force. The smaller the distance between threads, the greater the distance the screw travels, and the less force you have to exert.

Relating Cause and Effect How does the distance between threads affect mechanical advantage?

Screws

Like a wedge, a screw is a simple machine that is related to the inclined plane. A **screw** can be thought of as an inclined plane wrapped around a cylinder. This spiral inclined plane forms the threads of the screw.

When you use a screwdriver to twist a screw into a piece of wood, you exert an input force on the screw. As the threads of the screw turn, they exert an output force on the wood. If the threads of a screw are close together, you need to turn the screw many times in order to screw it into something. In other words, you apply your input force over a long distance. As with all machines, this increased distance results in an increased output force. The closer together the threads are, the greater is the mechanical advantage.

There are many other devices besides ordinary screws that take advantage of this principle. Examples include bolts, faucets, and jar lids. Think about a jar lid for a moment. You exert a relatively small input force when you turn the lid, but this force is greatly increased because of the screw threads on the lid (which fit into matching threads on the jar). The result is that the lid is pulled against the top of the jar with a strong enough output force to make a tight seal.

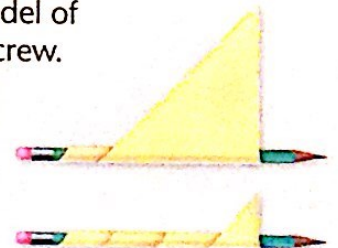
✓ **Checkpoint** How are wedges and screws related?

TRY THIS

Modeling a Screw

Here's how to make a paper model of a screw.

ACTIVITY



1. Cut out a triangle from a piece of paper.
2. Tape the wide end of the triangle to a pencil. Then wind the paper around the