

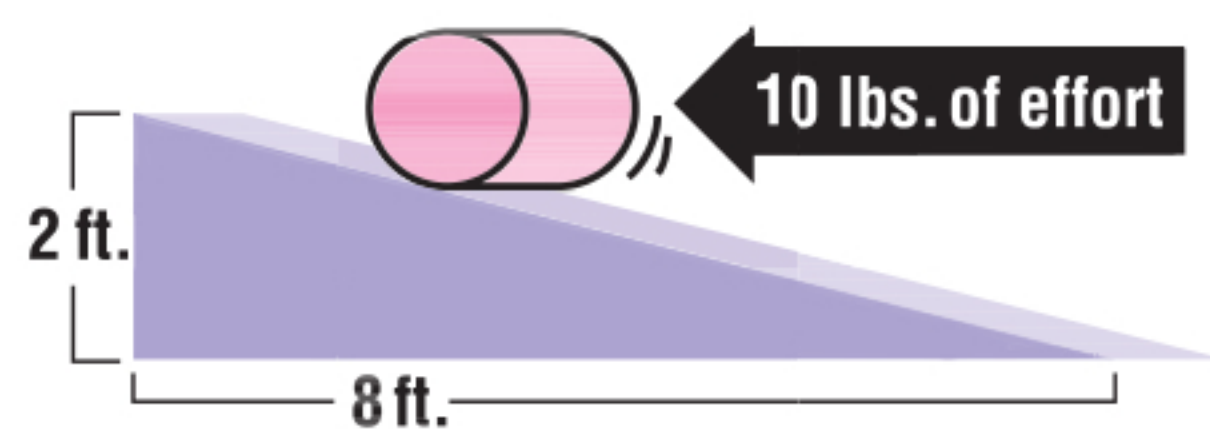
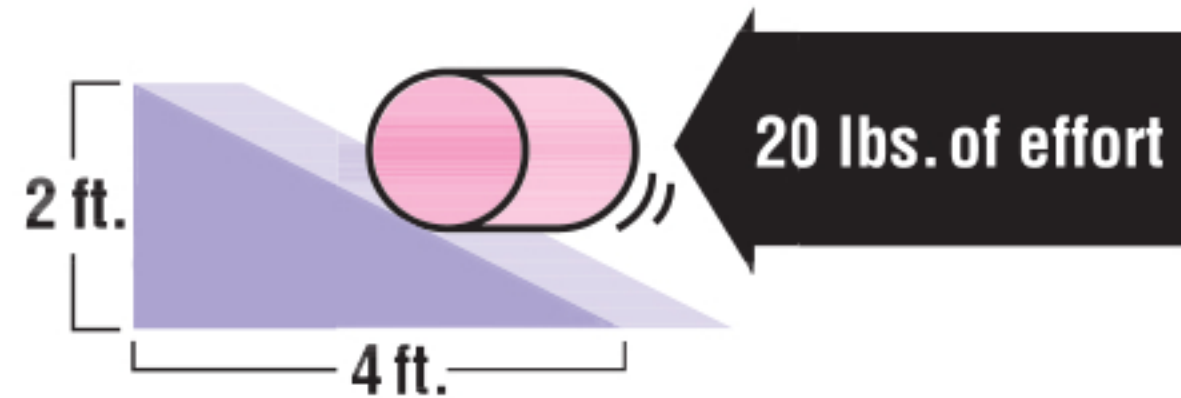
# Simple Machines



Cars and bicycles. Forklifts and cranes. Water faucets and even the flush mechanism on toilets. All of these are “complex machines” made by putting together combinations of 6 simple machines: the lever, wheel and axle, pulley, screw, wedge, and inclined plane.

The **inclined plane** is the simplest of the simple machines. It is a fancy name for a flat, sloping surface.

The most obvious example is a ramp. If you need to lift a heavy load to a higher level, the inclined plane can help.



Here's what happens to the amount of effort needed when you roll a 40-pound drum up these 2 ramps.

The **wedge** may be the original simple machine. It's mainly used for splitting or separating things. Think of the head of an axe. Thwack! You just divided that log in two. Imagine doing that with your bare hands!



Archaeologists have found wedges (in the form of stone hand axes) that were used by our pre-human ancestors 2.6 million years ago.

A **screw** doesn't look much like a machine. But it's actually one of the coolest machines around.



A screw transforms energy from turning (rotational energy) into up-and-down energy. So by turning a screw, you can lift things up, push things down, and hold things together.

Wrap your mind around this! The screw is an inclined plane wrapped around a cylinder. On a screw, the inclined plane is called the thread.

A **lever** is a straight bar or rod that turns on a pivot point, or fulcrum. You can use levers to lift heavy loads, pry things (like cans of paint) open, and hurl projectiles.



Seesaws, crowbars, bottle openers, baseball bats, and brooms are all examples of levers.

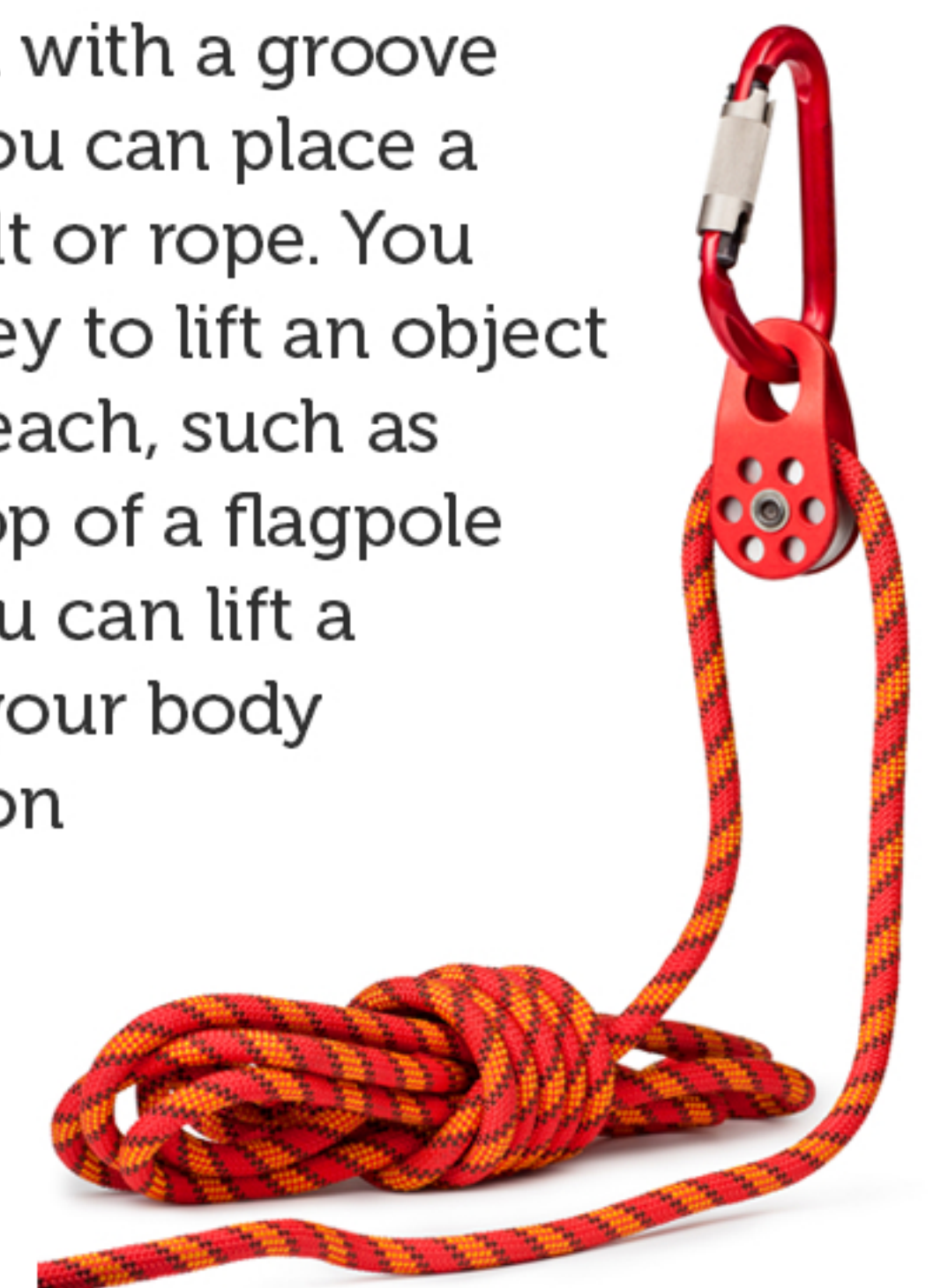
Life without the **wheel and axle**? Hard to imagine. They've been around for more than 5,000 years. The genius of the wheel and axle is that they can be used to push and pull heavy loads in everything from wagons to semitrucks. AND they



The wheel and axle are everywhere you turn: Ferris wheels, doorknobs, screwdrivers, bike wheels and gears, skateboards, and more.

can be used to operate mechanisms such as doorknobs and faucet handles.

A **pulley** is a wheel with a groove in the rim in which you can place a cable, chain, cord, belt or rope. You can use a simple pulley to lift an object to a place you can't reach, such as raising a flag to the top of a flagpole or a sail on a boat. You can lift a heavy load by using your body weight to pull down on the rope.



When combinations of pulleys are put together, they can lift even heavier loads.