Machines and Work

People often use machines to do work. In order for work to be done, a force must be applied to an object through a distance. Machines are most commonly used to change the direction, or the magnitude, of an applied force. There are several major types of simple machines-- levers, pulleys, wheels and axles, inclined planes, and wedges. As we remember, work equals force times distance. A lever allows less force to be applied over a longer distance. A lever consists of a bar turning around a fixed point called the fulcrum, using a force applied at the second point to lift a load located at a third point. Hammers are used as levers to remove nails from wood. Another simple tool is an inclined plane which is very similar to the lever. Again, the inclined plane reduces the amount of force required to move an object, but increases the distance. A pulley changes the direction of a force and can also change the amount of force required to move an object based on the circumference of the pulley. A wheel of axle changes the amount of force necessary to set an object in motion. For example, a doorknob. As the size of the doorknob increases, the less force is required to turn the axle, which unlocks the door. A wedge changes the amount of force being directed at an object. For example, the sharp edge of axe is a wedge that concentrates force along a very narrow part of a log allowing it to be split easily. Compound machines are made by combining two or more simple machines. A pair of scissors is a compound machine. The two blades and handles act as levers, the pivot point being the fulcrum, and the edges of the blades are wedges against the cutting surface.