WORLD BOOK DISCOVER

Machine

Introduction

Machines << muh SHEENZ >> are devices that make doing things easier. They can do work that could not be done without them. Some machines help lift heavy furniture. Others carry big boxes for long distances. Factories use many kinds of machines, such as drills and saws. Businesses use typewriters, computers, and other office machines. Automobiles, buses, and airplanes are machines. Trucks, trains, and ships are machines, too. Without machines, modern life would be impossible.

The wheel and axle helps us lift heavy loads, such as a bucket of water, from the bottom of a well.

People have made many different kinds of machines to satisfy their needs. Early people made axes of stone. They used the axes as weapons and tools. Over time, people made wagons and carriages and then, much later, motors and cars. They made printing presses that printed books. Machines gave people more and more control over the world around them. To make these machines work, people learned how to use the power of falling water and such fuels as coal and oil.

Some machines have just a few parts. Other machines have many parts. But all machines are based in some way on six kinds of simple machines. These six simple machines are (1) the lever, (2) the wheel and axle, (3) the pulley, (4) the inclined plane, (5) the wedge, and (6) the screw.

The inclined plane makes it easier to slide or skid a heavy box upward than to lift if directly.

The simplest kind of lever is a rod or bar. It rests and turns on a support called a fulcrum << FUL kruhm >> . A force is applied at one part of the lever. This force lifts a load, or weight, at another part. There are several kinds of levers. A seesaw, a wheelbarrow, and your own arm are all levers.

A wheel and axle works with spinning forces. A large wheel is connected to a smaller shaft called the axle. Spinning the wheel causes the axle to spin, and vice versa. Using the wheel to turn the axle takes less force than turning the axle itself. But the wheel must be turned farther. One kind of wheel and axle is called a windlass. It is used to lift a bucket of water from a well. The bucket is tied with a rope to the axle. The axle connects to a crank that is easy to spin. As the crank spins, the axle winds the rope, pulling the bucket up.

A pulley is similar to a wheel and axle. It is basically a wheel with a rope wound around it. Pulling one end of the rope causes the other end to rise. Pulleys make it easier to lift heavy loads.

The inclined plane is a ramp. It may not seem like a machine, but it helps people do work. For example, a person may not be able to lift a heavy box into the back of a truck. But an inclined plane makes this work easier. The person can slide the box up a ramp and into the truck. Pushing the box up the ramp takes less force. But the box has to move a greater distance.

A wedge is thick at one end and narrows to a thin edge. An ax is an example of a wedge. To split a log, you pound the ax down. The shape of the wedge changes the downward force to sideways forces. The sideways forces split the log apart.

The wedge is a machine that can be used to split or pierce objects.

A screw is an inclined plane that has been twisted. It has a thread that winds around a central rod. The thread sticks out from the body of the screw. Twisting the screw drives it downward or upward. Small screws help hold the pieces of objects together.

Machines make life easier. But no machine can create energy out of nothing. There is always some sort of tradeoff. For example, pushing a box up an inclined plane takes less force than lifting the box. But the box has to move a greater distance. Cars are made of many simple machines put together. But a car cannot move on its own. The car needs to use fuel or a battery to spin its wheels.