

building big things other simple machines

inclined plane
wedge
screw

reading

Simple Machines: Part 1

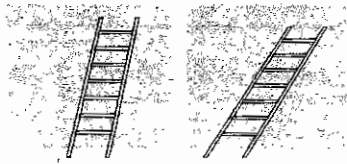
In class, you investigated one type of simple machine — the inclined plane. There are actually six types of simple machines. You will learn about three of them in this reading. Some simple machines make things easier by changing the direction of the applied force. For example, you might apply a pulling force and the machine converts it into a lifting force. Some simple machines (like the inclined plane) make things easier by changing the amount of force needed. You used less force lifting a heavy object with the inclined plane than lifting it directly. This almost sounds like magic. However, you saw in your investigation there is a trade-off (an exchange of one thing in return for another). The trade-off for the inclined plane was that the force had to be applied over a greater distance. You will learn more about this trade-off principle as you study other simple machines.

The Inclined Plane

The inclined plane is a simple machine that helps by requiring less force. The trade-off is that although it requires less force to lift something, the force must be applied over a greater distance. How much an inclined plane helps depends on its slope. Look at the two inclined planes in the diagram. As you discovered in your investigation, it would take much more force to push something up the first one than the second. As the distance is increased (and the slope is decreased), it requires less force.



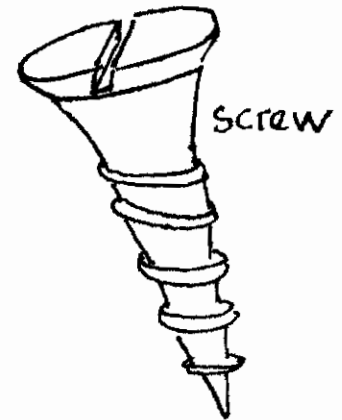
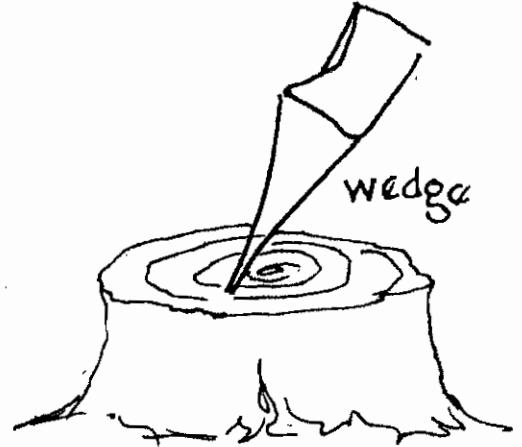
A ladder is an example of an inclined plane. It makes it easier to climb up to a certain height. It is easier to climb if the ladder is not so steep.



Many people think that the stones used to build the pyramids in Giza, Egypt were lifted into place with the help of enormous ramps.

The Wedge

The wedge is another type of simple machine. It is simply a variation on the inclined plane. The wedge is made of two inclined planes put together to make an edge. The wedge makes things easier in two ways. Similar to the inclined plane, it reduces the amount of force needed to move something. It also changes the direction of the applied force. A wood splitter is an example of a wedge. Force applied to the flat part of a wood splitter is changed to push out to the sides, acting to push apart the wood on either side of the wedge. This is why wedges are used to cut things. A knife is another example of a wedge. When you use a knife to cut an apple, the force you push down on is transformed sideways to push apart the pieces of the apple.



standard 57c

Our goal is to find out about simple machines that we did not experiment with - the wedge and the screw

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The Screw

The screw is another kind of simple machine. Actually, a screw is made up of an inclined plane wrapped around a cylinder. Think of the common screw. The thread that wraps around the screw is the inclined plane. The screw makes things easier by changing a small force in a turning direction into a larger force in a downward direction. The trade-off with using a screw is that you have to apply the force through a greater distance.

If you look at a screw, you will see that the threads on some screws are wide apart. On others, they are close together. The wider apart the threads are, the "steeper" the inclined plane. It is easier to put in a screw with narrow threads than one with wide threads. However, you will have to make many more turns of the narrow-thread screw.

Other examples of screws used in daily life include a spiral staircase and threads on twist-on bottle caps.



There are three more types of simple machines – the lever, the pulley, and the wheel and axle. You will learn about these later.

name _____

class _____ team _____

seat _____ date _____

parent
signature _____

Questions on reading

List two (2) examples of inclined plane and explain what they are used to do.

How does the inclined plane work?

think and search
question

List two (2) examples of wedges and explain what they are used to do.

How does the wedge work?

think and search
question

List two (2) examples of screws and explain what they are used to do.

How does the screw work?

think and search
question

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