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TEEN QUARTERLY NEWSLETTER

Move a Car with Pulleys

Do you know, you could lift a car by yourself? It's true! With the help of pulleys, it's possible. So what is a pulley and how does it make you able to lift a car?

A pulley is a rope or wire wrapped around a wheel, changing the direction of force. A simple one-wheel pulley system hanging from the ceiling lets you pull something up by pulling down on a rope.

The more wheels you add, the less force you need to pull the object. One pulley still means you're moving the full weight of the object. A second pulley, one attached to the ceiling and another to the object, reduces the force needed to lift the object.
Why does adding more pulleys make it easier to move? You're trading distance for force. The more pulleys you have in the system, the more rope you'll need to pull (more distance of rope to pull = less force needed).

This force can be measured in foot-pounds. The equation is: work = force * distance (W=F*d). So you're going to always do the same amount of work, but some work is easier than other work. Walking with a rope is easier than lifting a car straight up.

So if you want to lift a car, all you need are enough pulleys and enough rope and you can lift it. The pulleys spread the force out over the length of the rope.

That's why you see pulleys on cranes, elevators, and sailboats. They can move a lot of weight without a lot of force!

The Power of Steam

Steam changed the world. Well, the steam engine did. Taking boiling water and using the power created by steam (evaporating water) has led to some of the most important inventions in the world. And it's a technology we still use today!

The first use of steam for power was in ancient Greece. A little toy called the Aeolipile was a ball with two small vents sticking out and then mounted on a frame. The ball would be filled with water, then a fire built under it. As the water warmed, steam started to come from the vents, spinning the ball in the frame.

There were a few other experimental designs throughout time that showed steam could be used for work, but none were ever used in a practical manner until 1698 when Thomas Savery built a steam-powered water pump. His engine couldn't move a lot of water, but it could move enough to power a waterwheel, allowing factories to be built in other places besides right next to a river.

The next big step for steam engines was pumping water out of mines. The engines were still gigantic and had to be built in place, so water pumping or running machinery was the only option.

It wasn't until the 1800s that steam power was first put on a boat, then in a train. Previous designs were too heavy to move much more than themselves until that point.

Today we still use steam to keep the lights on. Most power plants use coal or nuclear energy to heat water into steam to turn giant turbines to spin the electric generators. So sometimes old technology is still useful!