

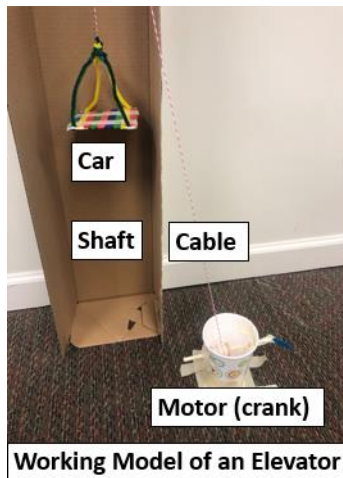


## Elevators Rise to the Top



Elevators are super useful machines. They lift people (and other things) up and down in tall buildings where it would be difficult to move up using a just stairway or a ramp. In order to move people up, elevators must pull with a force strong enough to overcome the force of **gravity** that pulls down on both the elevator and the things inside it. In order to move them down, they must move smoothly and safety as the brakes are applied.

The basic parts of an elevator include a car, shaft, motor (cranking device), cable, and a counterweight. The **car** provides a sturdy and safe area for people to ride up and down. The **shaft** provides the tunnel like structure where the car can move safely from floor to floor. The **motor**, or cranking device, provides the power needed to pull the elevator to the top. The **cable** attaches to the motor, the top of the shaft, and the car.



Most elevators also contain a counterweight. The counterweight helps to balance the weight of the car and it makes it much easier for the motor to lower the car smoothly. Counterweights work a lot like the brakes in a car. The model elevator that we make in this STEM Challenge will not include a counterweight.

In this STEM Challenge, your task is to **design, build, test**, and improve a working model of an elevator that uses a cranking device to move an object to the top of a structure.