Give it a Push! Give it a Pull!
A Look at Forces

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If you've seen someone pushing a swing, then you've seen forces at work.

Pushes and Pulls

A force is a push or a pull. Forces are always with you. They are all around you.

When a truck pulls a boat, you see the truck doing the pulling.

Most of the time, you can see the cause of a force. A person pushes a swing. A truck pulls a boat.

Sometimes the cause of a force is invisible.
Wind pushes leaves across a sidewalk.

The wind is invisible.

Gravity pulls a paper airplane down. Magnetism holds magnets against a fridge.

magnet against the
invisible.

Putting Things in Motion

Forces put things in motion. Pushing the pedal makes the tire spin.

Pulling a wagon makes it roll.

This toy car moves away from the boy when he pushes it.

Pushing and pulling your pencil lets you write your name.

A push moves something away from the force.
A pull moves something closer to the force.

Thanks to forces, you can write on a sheet of paper.

noves closer to the girl when
t.

Stronger forces can make things move farther. You can throw a ball across the yard with a strong push.

A strong force will make a football sail far away from you.

A gentle force will make a toy boat move a short distance from you.

A gentle force makes things move only a little. A little push gets this boat on its way.

An object's weight can change the force needed to move it. It takes a lot of force to pick up a heavy suitcase. It only takes only a little force to lift a light feather.

Direction and Speed

A force makes something move in one direction. Another force can change it. A pitcher throws a ball to the batter.

The batter hits the ball.
The ball flies in a different direction.

A strong push of a bobsled makes the sled move very quickly.

Forces change the speed of things. A strong force can make something move quickly.

A strong wind makes a sailboat race across the lake. A hard pull on the wheels makes a wheelchair speed along the ground.

Forces make things stop moving. A brick Wall will stop a ball. The wall has a lot of

This racer pulls hard on the wheels of his special wheelchair so he can win the race!

Force. It pushes against the ball.

A tennis ball will stop moving forward when it hits a brick

A glass window has less force than a brick wall, so a ball may sail right through it. That's bad news for whoever

A glass window may not stop

a ball.
Glass pushes against a ball too. But
the ball pushes even harder than the glass.

An object's weight can give an idea of the force needed to stop it. It takes a lot of force to stop a train.

g with a huge amount of
ke this great big train

It takes a little force to stop a ping-pong ball.

A small paddle is enough to stop a tiny ping-pong ball.

Friction

Friction is a force that slows things down or makes them stop. Rubbing your feet on the ground creates friction. The friction makes the swing stop.

ated when an object – such
rubs against another object
ground.

Friction from the brakes makes your bike stop.

When you hit the brakes on your bike, the brakes rub against the wheels.

A smooth surface makes less friction. You can slide easily on ice but not on grass.

Changing Shape

Forces change the shape of things. It takes a push to flatten dough. It takes a pull to stretch it out.

Someone made this balloon animal by pulling on and twisting a balloon.

The force of the wind bends with the trees.
Twisting a balloon changes its shape.
Forces are everywhere. They help us eat, work, and play. Nothing would happen without forces!

Glossary

direction: the way that someone or something is moving

force: a push or a pull

friction: a force that slows things down or makes them stop. Rubbing creates friction.

gravity: a force that pulls things down toward the surface of Earth

magnetism: a force that attracts certain metals to magnets

motion: movement

speed: the rate at which something moves

weight: the measure of how heavy a person or thing is