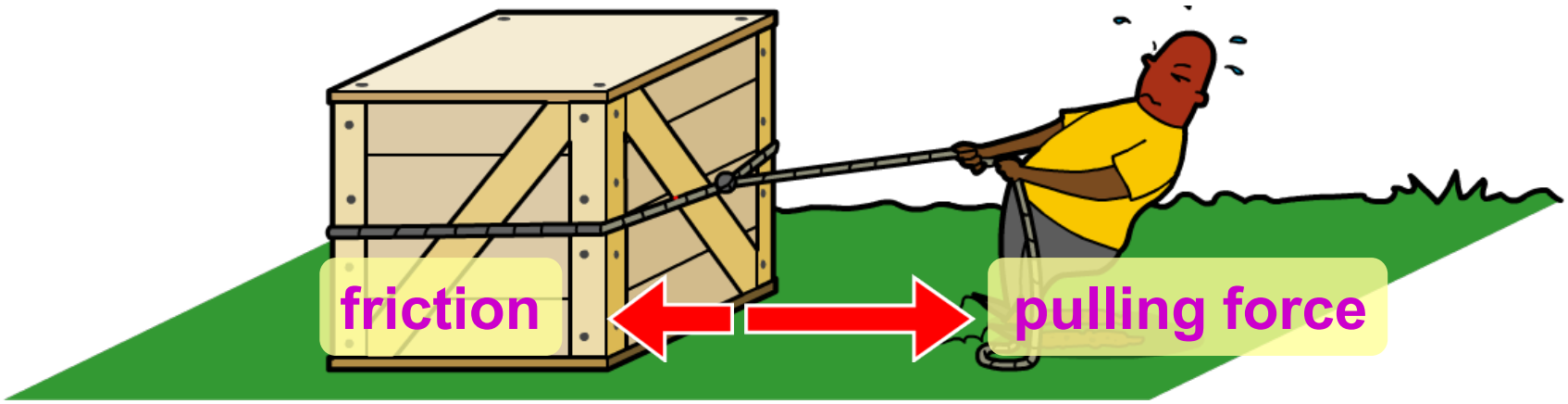
Friction

What is friction?

Friction is a resistive force that slows things down and tries to stop objects from sliding past each other.

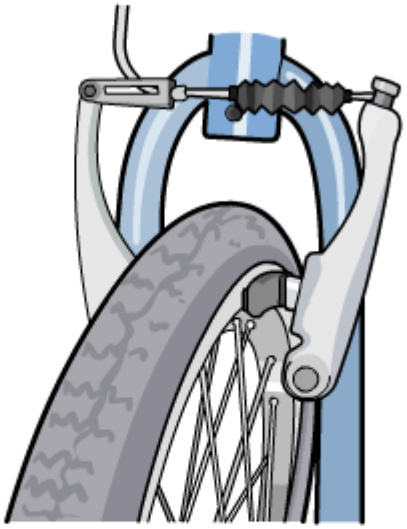


Friction always acts in the **opposite direction** to which an object is moving or trying to move.

What would happen if friction didn't exist?

Friction – useful or a problem?

Is friction useful or a problem in these situations?



The brakes on a mountain bike

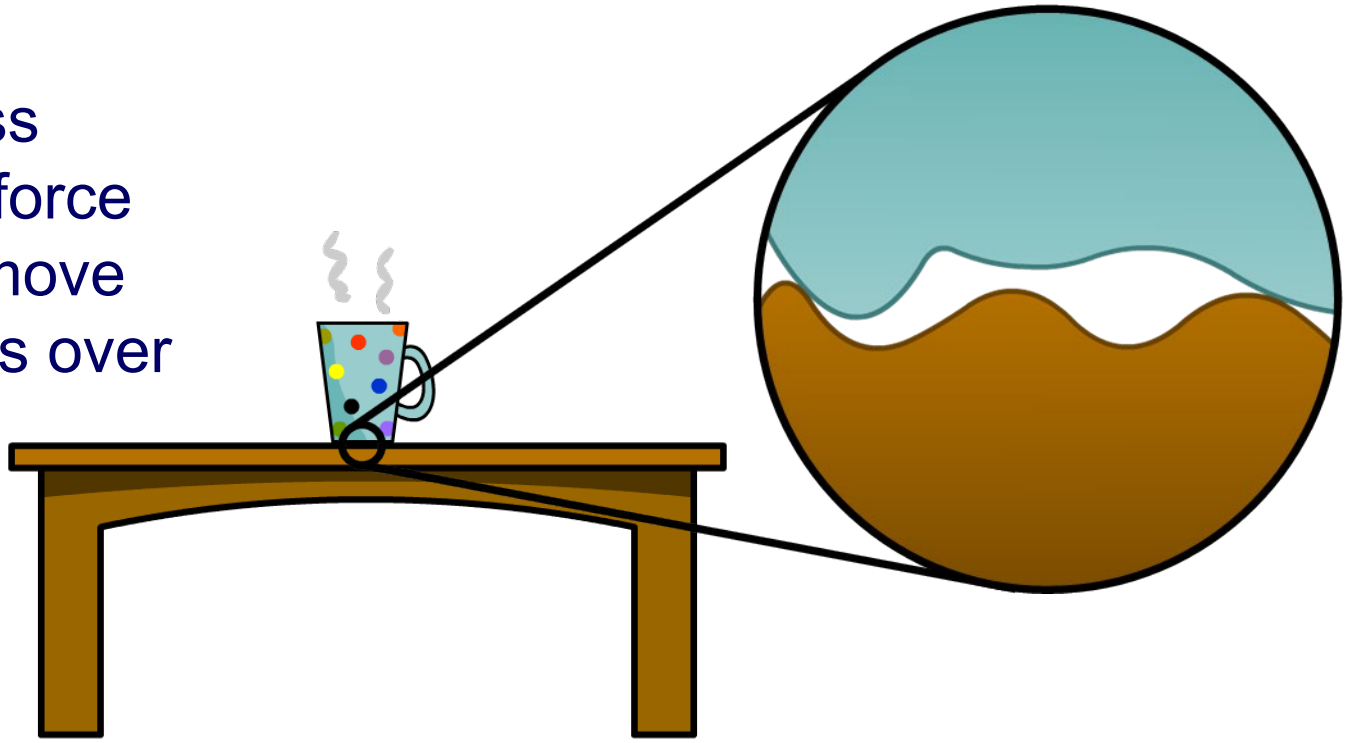
useful friction

problem friction

What causes friction?

Friction occurs between two objects because the surfaces of those objects are rough and contain bumps and hollows.

This roughness means that a force is needed to move the two objects over each other.



Even objects that appear very smooth, such as polished metal or ice, have a rough surface if viewed under a microscope.

Different types of friction

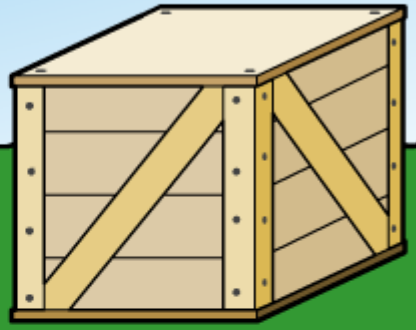
Friction is most obvious when it acts between two solid objects, but it also acts between solid objects and gases, and between solid objects and liquids.

- Friction caused by an object moving through air is called **air resistance**.

- Friction caused by an object moving through a liquid, such as water, is called **drag**.

How does friction change?

How does friction respond to other forces?



The size of a frictional force acting on an object is dependent on the size of other forces acting on the object.

Click "**start**" to find out more.

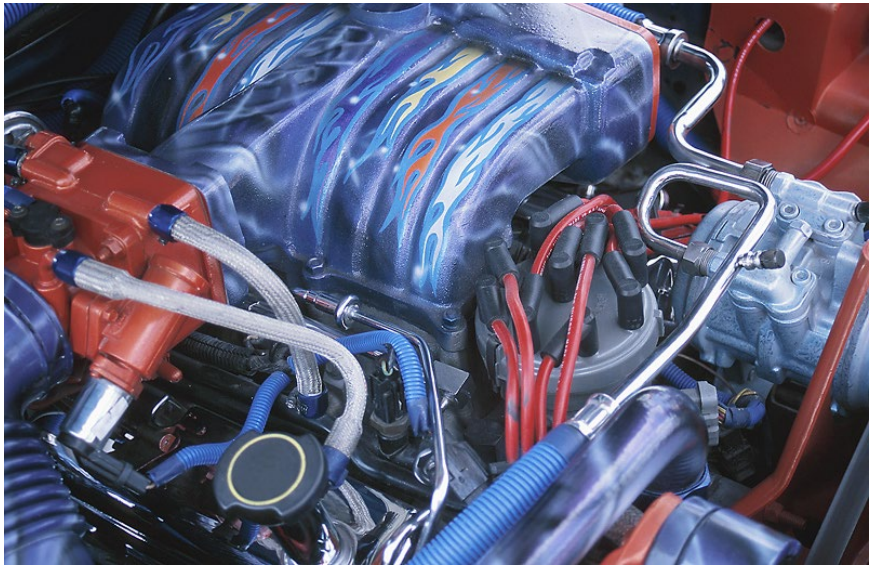
start

Reducing the effects of friction

Friction always tries to stop things from moving or slow things down. What effect does this have?

Friction creates heat and eventually wears down surfaces, which can be very damaging.

Lubricants are used to reduce friction in machinery and so help protect surfaces. In car engines, oil is used as a lubricant.



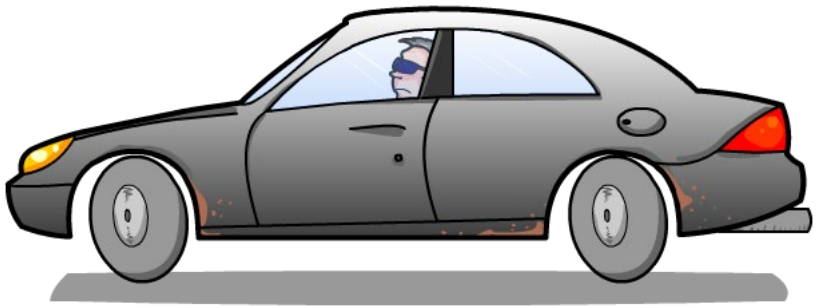
Bearings and rollers can also be used to reduce friction, for example, in wheels.

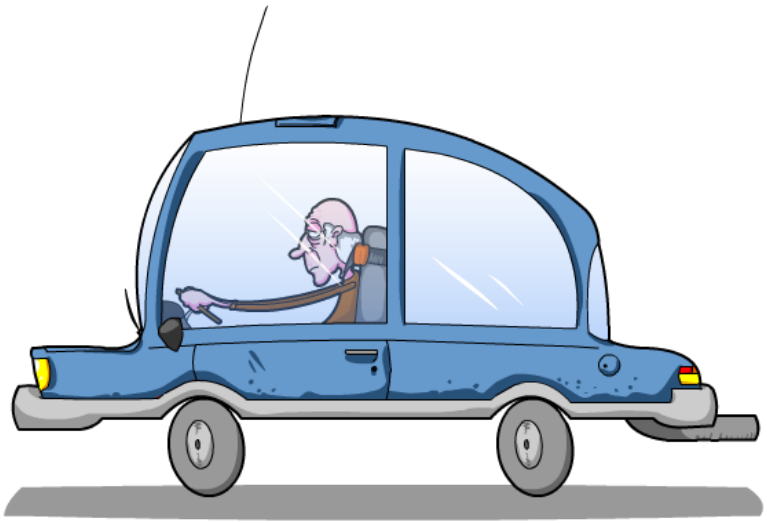
Reducing the impact of air resistance

Friction caused by air resistance affects the speed and fuel consumption of vehicles such as cars and airplanes.

Vehicles are specially shaped, or **streamlined**, to enable air to flow past them as easily as possible, therefore reducing air resistance.

Which of these cars is the most streamlined?





In a similar way, ships and boats have streamlined hulls to reduce the drag effects of water.