Friction

What is friction?

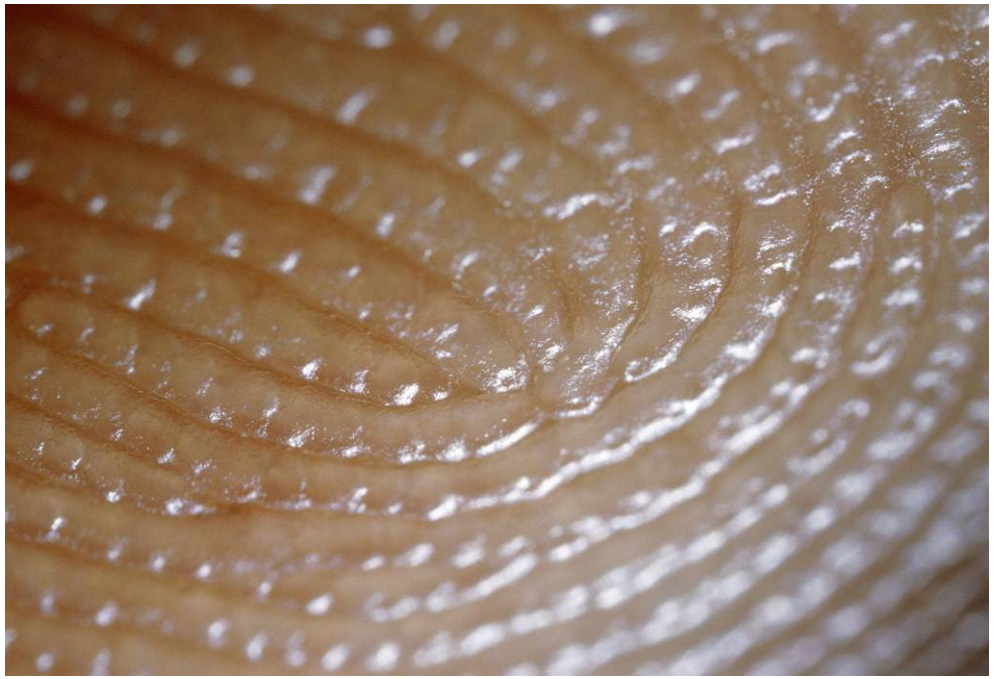
If you rub your hands together, they get warm because there is resistance to the rubbing motion.

What is the name of this resistive force?

It is called **friction**.

What causes this force?

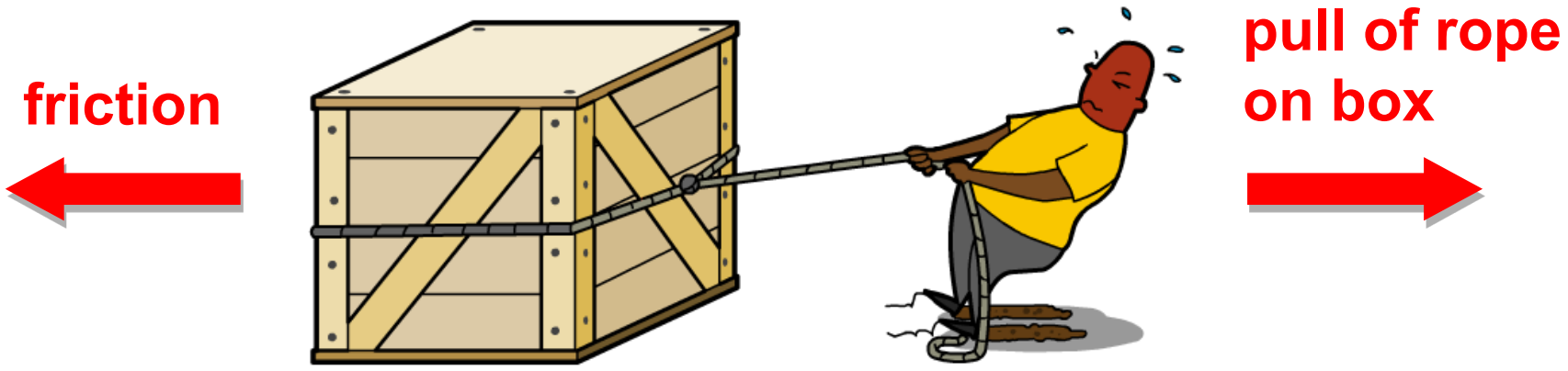
Your hands might look smooth, but on a microscopic level they have rough surfaces, as shown in the photograph.



When you rub your hands together you feel the resistive force of friction.

Friction and motion

Friction always tries to slow moving objects down – it opposes motion. Frictional forces occur when two touching surfaces move past each other, in this case the box moving across the ground.



Friction also occurs when things move through air. This is called **air resistance**.

What are the sources of friction?

Label all sources of friction acting on this bike.

pedal bearing

air resistance

links in chain

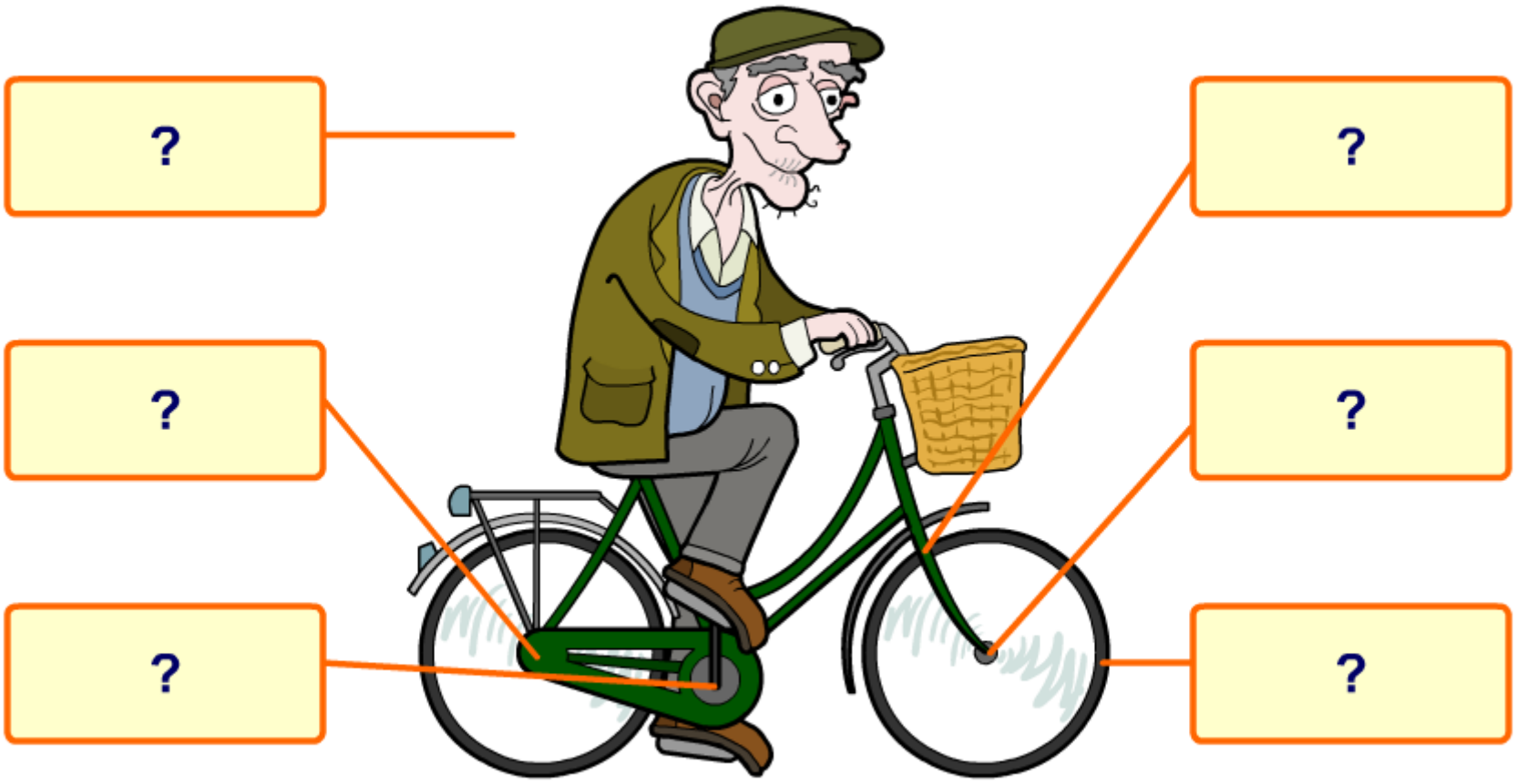
brake pad

tire and road

wheel bearing

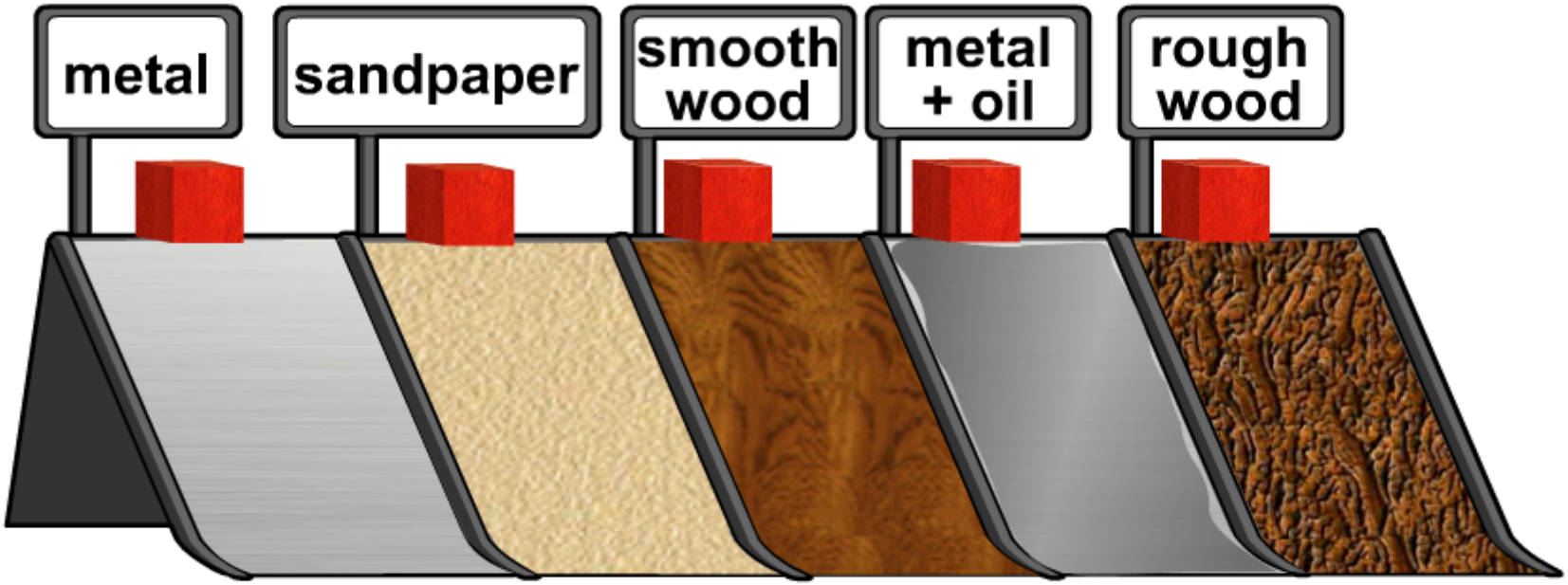
Sources of friction

What are the sources of friction on this bicycle?



Friction experiment

What will the order of results be in the 'Friction Challenge'?



predictions: ? ? ? ? ?

1st 2nd 3rd 4th 5th

Cars stopping

Friction is a very important force for the movement of cars. It acts in the opposite direction to the movement of the car.

The time it takes for a car to brake is affected by the frictional forces between the car's tires and the road surface.

Factors affecting stopping distance

One of the most important sources of friction in cars is that between the tires and the road.

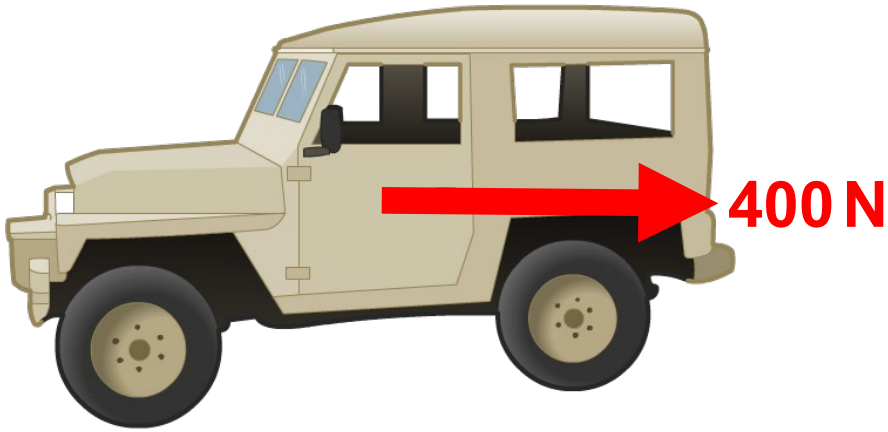
When the car brakes, it's important to have as much friction as possible so that the car does not skid.

The friction between the tires and road is affected by the:

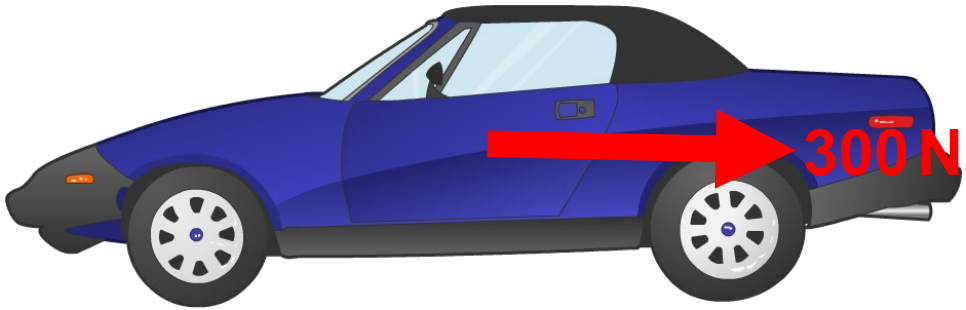
- road surface
- inflation pressure of the tires
- surface condition caused by the weather (rain, ice, etc).

Explaining air resistance

Air resistance is a type of friction that occurs whenever an object moves through the air, and is caused by the frictional forces acting between the air and the object.



If the area of contact between the air and object is reduced, the object is said to be streamlined.

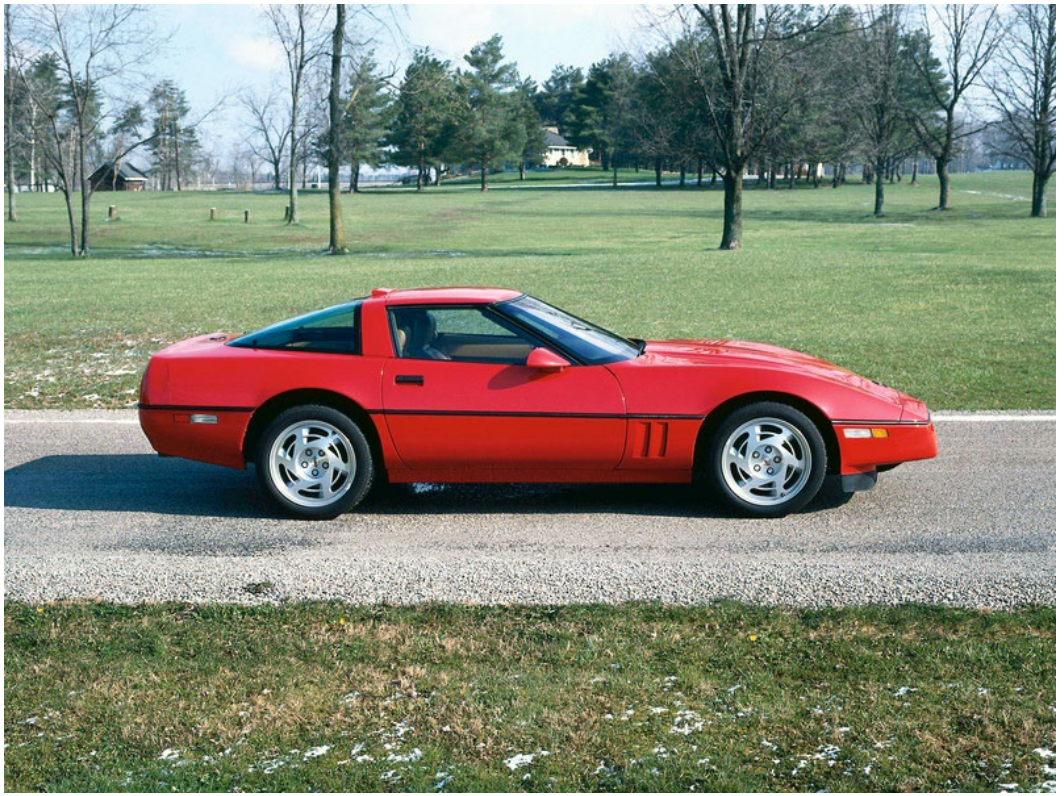


Which of these cars is more streamlined?

Air resistance and drag

The photo shows a streamlined car which has been shaped so that the flow of air around the body is made as smooth as possible. This minimizes the air resistance.

If you looked at the car from the front, how much surface area would you see?



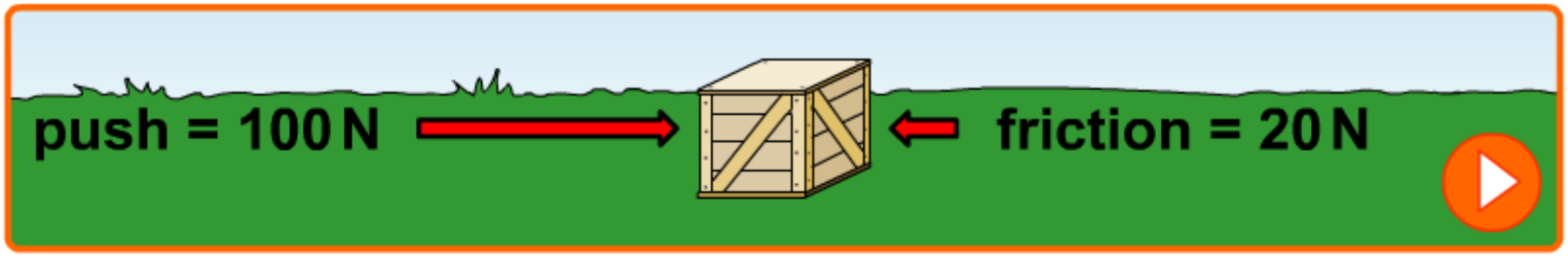
The air resistance is determined by:

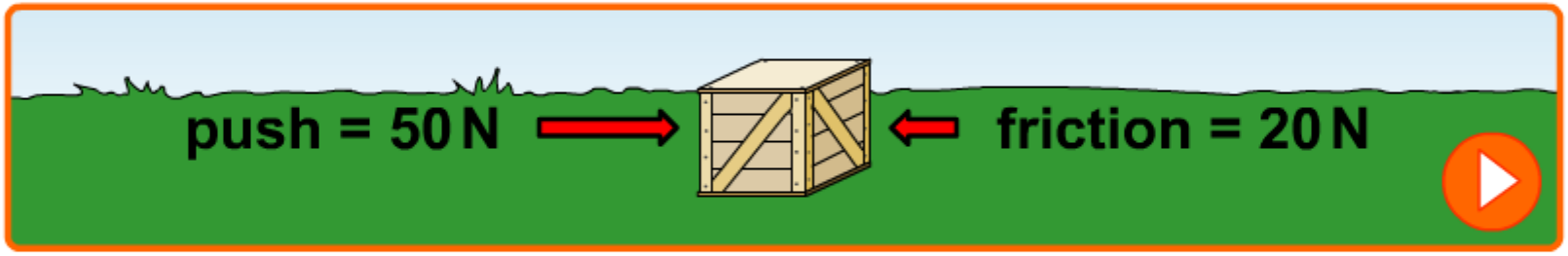
- the size of the car
- the speed of the car
- the shape of the car.

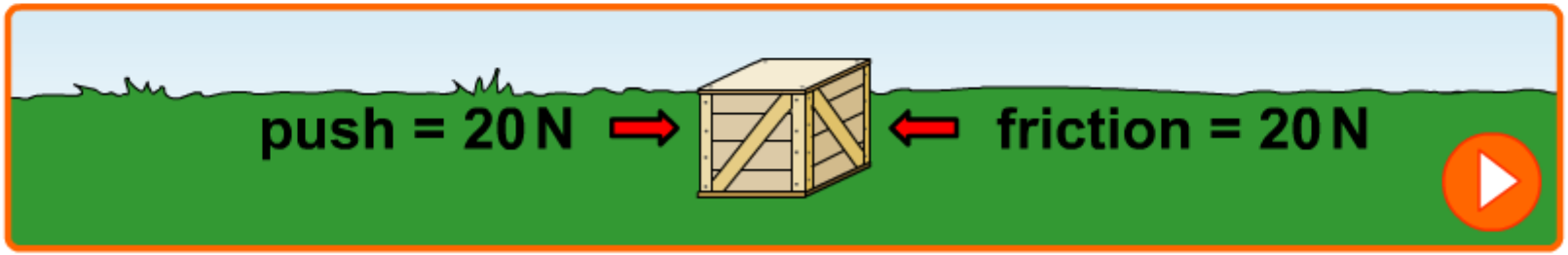
Falling objects on the moon

Effects of frictional forces

What is the effect of friction on each crate?







How does a plane take off?

Forces during take-off

What forces are involved during the take-off of an airplane?

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