

What is Friction?



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Friction can be defined as the force that opposes motion. It occurs when two solid surfaces rub together.

To make an object move, you must apply force to it. This motion force has to overcome the force of friction, otherwise it will not move.

Friction can be affected by a range of factors.

Can you think what some of these might be? Discuss your ideas with the person beside you.

What factors affect friction?

Materials: some materials will create less friction due to their surface. A rough surface will create more friction than a smoother surface.

Weight: things that are heavy will be subject to more friction than things that are light.

Surface area: if the area of the two objects rubbing together is large, it will create more friction.

Liquids: the addition of a liquid can reduce friction by making the surface slippery. Dry surfaces tend to have more friction.

Are there different kinds of friction?

Yes! There are two other kinds of friction you should know about:

Air resistance is when a solid object moves through air or gases. Similarly, water resistance is when a solid object moves through water or liquids.

We experience these everyday – when you move you are constantly overcoming air resistance.



How can we use friction to our benefit?

Friction has many practical uses in the world.

With a partner discuss ways in which we might use friction to our advantage.

Some uses include:

- braking systems in vehicles;
- stringed musical instruments;
- door stops;
- writing.

Does friction cause problems?

While friction can be very helpful, it can also make things more challenging.

Friction makes movement harder.

Friction wastes energy.

Friction creates heat.

Friction wears things out.

Can you think of situations for each of these points? Discuss with the person beside you.

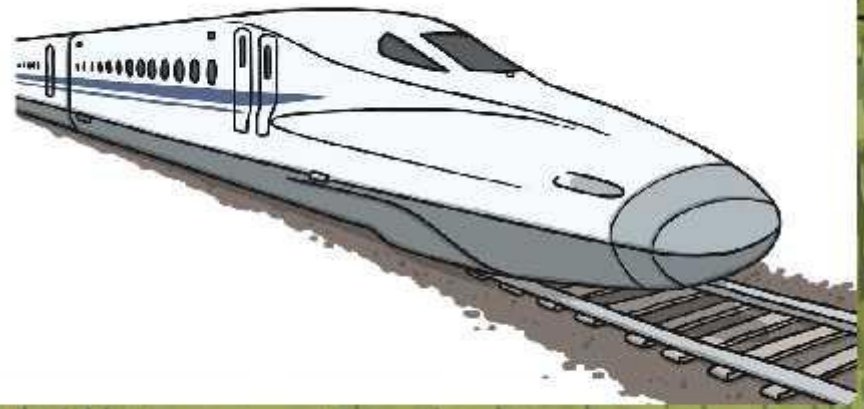
What can we do to reduce friction?

We know that friction can be useful. However, in many situations, we want to reduce friction to allow movement to be as efficient as possible by using the least amount of energy.

Streamlining is where actions are taken to reduce the amount of friction allowing things to move more easily.

One example of streamlining is the Shinkansen train, also known as the Japanese bullet train. It has been designed to move at very high speeds and its shape has been streamlined to make this easier.

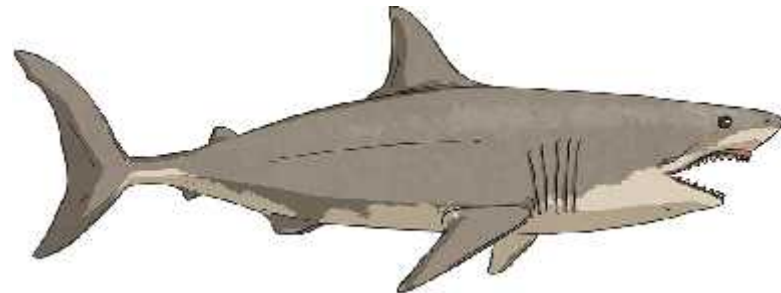
What do you notice about the shape of the train?



Examples of Streamlining

Thinking about the Shinkansen train, can you think of more examples of streamlining? Discuss with the person beside you and justify your answers.

Think about sports, vehicles and nature.



What have we learnt?

Friction is a force that opposes movement.

Various factors affect friction, including type of material, weight of an object, the surface area of an object and the presence of lubricants.

Air resistance and water resistance are two special types of friction.

We can use friction to help us but it can also cause problems.

By reducing friction through streamlining, we can make efficient movement by using as little energy as possible.

