

Science Lesson 2 - Friction

What is Friction?

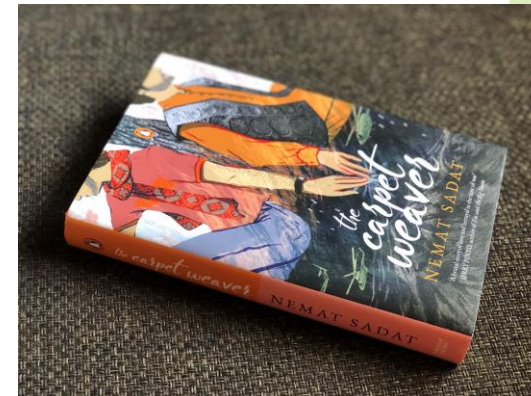
- ▶ We mentioned friction briefly in our last lesson but today we are going to go into more detail and also have a look at an experiment.
- ▶ Friction is a force between two surfaces which are moving against each other. This means it is a contact force as the two objects have to be touching.

An example of two objects moving against each other might be..

A book moving across a table



- Try and move the book across a table and then try and move it across a carpet. What do you notice? On which surface does it move across easier?



What is Friction?

- ▶ Friction always works in the direction **opposite** to the direction in which the object is moving, or trying to move. Friction always **slows** a moving object down.
- ▶ Friction also produces **heat**. If you rub your hands together quickly, you will feel them get warmer.
- ▶ Friction can be a useful force because it prevents our shoes slipping on the pavement when we walk and stops car tyres skidding on the road. When you walk, friction is caused between the tread on shoes and the ground. This friction acts to grip the ground and prevent sliding.
- ▶ Sometimes we want to reduce friction. For example, we use oil to reduce the friction between the moving parts inside a car engine. The oil holds the surfaces apart and can flow between them. The reduced friction means there is less wear on the car's moving parts and less heat produced.

Watch the video which will help to explain what friction is

<https://www.bbc.co.uk/bitesize/topics/zsxxsbk/articles/zxqrdxs>

We are going to investigate how things move on different surfaces.



- ▶ First, you need to make a ramp. You could do this by leaning a piece of cardboard up against something.
- ▶ Then, you need to find something that will roll easily. This might be a toy car, or a small ball or even a marble!
- ▶ Next, measure out 1 metre in front of the ramp and put an object there so you know where it is.
- ▶ Put your chosen object at the top of the ramp and time how long it takes to get to the end of the 1 metre. Do this 3 times and find the average score. You can do this by adding up your 3 times and dividing it by 3 (you can use a calculator to do this!)
- ▶ Then, find 3 different materials to cover your ramp with. Some good ideas might be a tea-towel, bubble wrap, sandpaper, a t-shirt. You can use anything you have around your house! Remember to ask an adult first. You might want to secure your material onto the ramp with Sellotape.
- ▶ You are then going to time how long it takes your object that rolls to get to the end of the 1 metre. Do this 3 times with each material and write down your timings. Once you have done this, you can find the average score. You might want to use the recording sheet on the Heymann website.

What were your results?

- ▶ Which of your materials caused the least friction? (This means that your object will have travelled to the end of the 1m the fastest)
- ▶ Which of your materials caused the most friction? (This means that your object will have travelled to the end of the 1m the slowest)
- ▶ Why do you think this happened? Were your materials bumpy/smooth/rough?

What did you find out about friction?

- ▶ Your Teams assignment this week is to write up what you have learnt about friction from this lesson/experiment.
- ▶ Think about what type of materials cause the most friction and what type of materials cause the least friction.