

4.1 Lessons on Forces

Lesson 1 Contact Forces

Review

What is a force?

What can forces do?

Contact Forces

The forces you studied in year two were contact forces. That is the object had to be touched by something to be pushed or pulled.

Some examples of contact forces are:

1. Friction – this is where two objects rub over the top of each other or an object is moving on the ground.

Q. Give an example of where friction is helpful.

Q. Give an example of where friction is a hindrance.

2. Air Resistance – this is where objects move through the air and the air pushes against them.

Q. Give an example where something has to push against air resistance.

3. Water resistance – this is where objects move through water and it pushes against them.

Q. Give an example where something has to push against water resistance.

4. Hitting, throwing, kicking etc. – this is where you use your body to push against something so it moves.

5. Catching, holding, stopping - this is where you use your body to stop something moving.

6. Tugging, pulling, lifting – this is where you are pulling something towards you.

Q. can you think of any other actions that might cause something to start or stop? Do you have to touch it?



Class Throwing Activity: Go outside with a tennis ball each.

Question to Investigate

What is the best way to throw a ball so it goes the biggest distance ?

Explore: What ways can you throw a ball?

1. Try throwing high.
2. Try throwing flat.
3. Try underarm throwing along the ground.
4. Try two hands.

Evaluate Questions:

What was the best way to throw for you?

What about your partner?

What other factors affected how far the ball went?

What contact forces tried to stop your ball?

Lesson 2 Non Contact Force - Gravity

Some forces can work without anything touching the object.

One well known one is **gravity**.

Demonstrate Gravity with some balls falling. Ask kids to predict what will happen.

Observe it bouncing and explain why it gradually stops.

Q. can I drop something that won't fall?

Isaac Newton discovered gravity in the 1600's when supposedly an apple fell on his head when he was sitting under the tree.

Q. What do you think he said?

After he said Ow, He said that the earth pulls down on all things and he called it gravity.

Q. In fact have you heard that what goes up must come down?

Q. Is this always true today?

In fact Newton went further and said that not just the earth pulls down on things but everything pulls on everything else. It's just that the force is really weak unless the object is really big like the earth.



So this pulling force of gravity does not need two objects to be touching to work.

In fact when the two objects touch they stop moving but they are stuck to each other. This is why we are stuck to the earth unless we jump or fly in a plane or rocket to have a force that is big enough to get us off the earth.

Do Investigation:

4.2 Investigating the speed of rolling cars.

Lesson 3 Non Contact Force - Magnetism

Another Non contact force is **magnetism**.

Q. Have you played with magnets before? What did you notice?

Demonstrate magnets coming together (attracting) and pushing apart (repelling).

So magnetism is a force that can do two things (attract or repel).

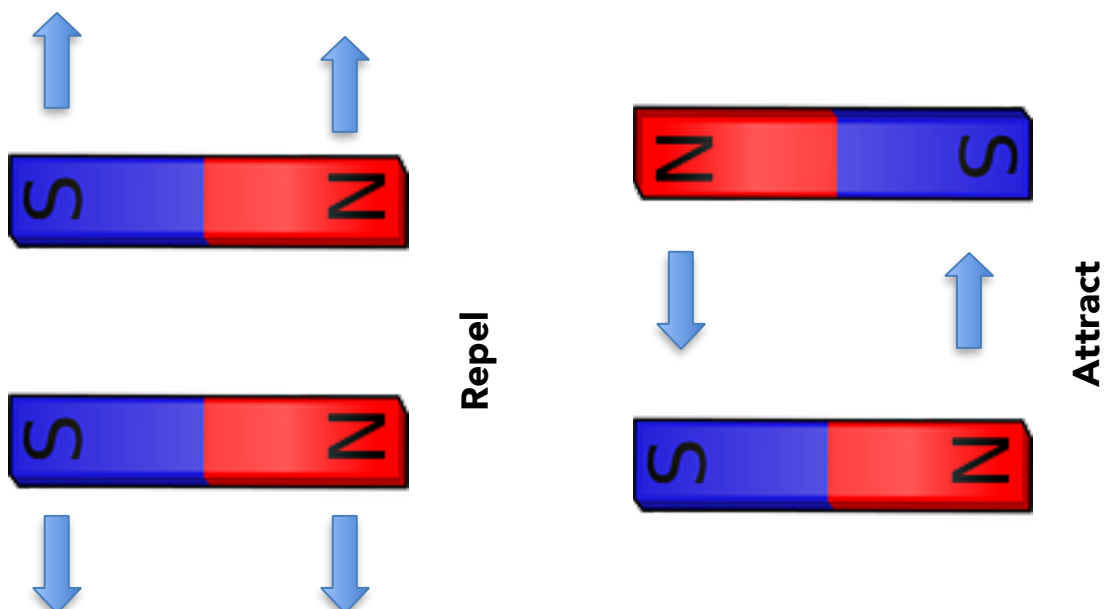
Magnet will attract anything that has certain metals in it particularly iron. This is handy for picking up pins or even large magnet that pick up wrecked cars in an old car yard.

Magnets can also be used as a compass because they attract to the earth, because the earth is like a giant magnet.



Magnets have two different ends called North pole and South pole. If you have two magnets, the North pole ends repel each other and so do the south pole ends.

However if you bring the opposite ends together they attract.



Magnets are very handy for many things because this force lasts a very long time and magnets take a long time to get weaker and eventually go flat.

These days magnets are being used in superfast suspension trains, in medical scanners to look inside your body, on credit cards, memory storage disks, fridge magnets, speakers and microphones and many other electrical devices.

Do 4.3 Investigating the Strength of a Magnet