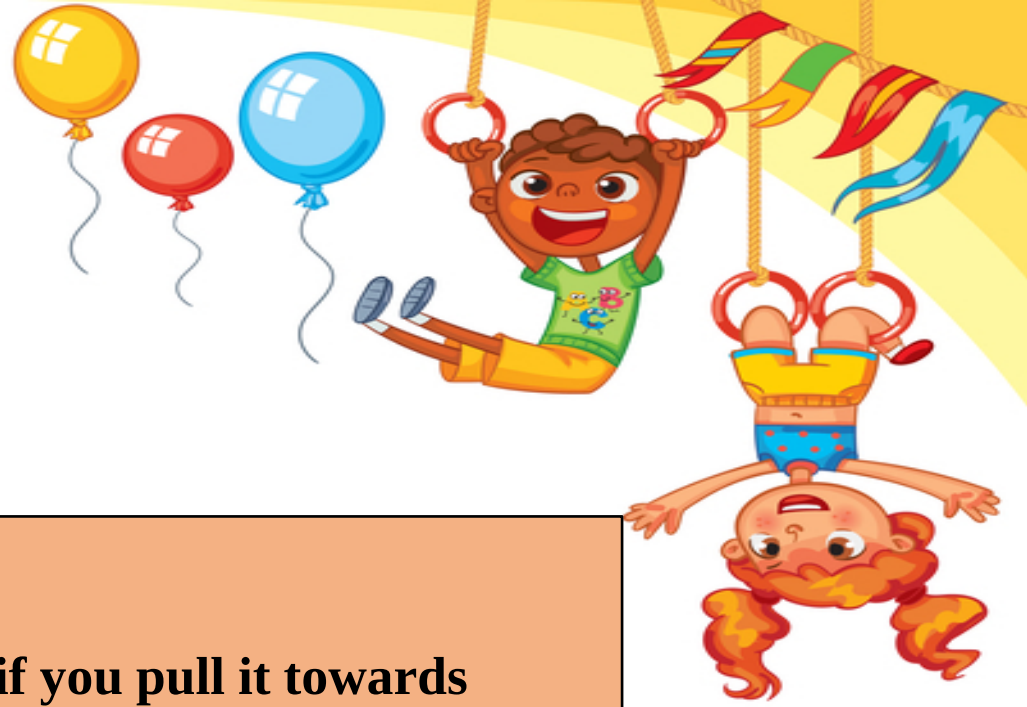
10 - Force, Work and Energy

Class – 4

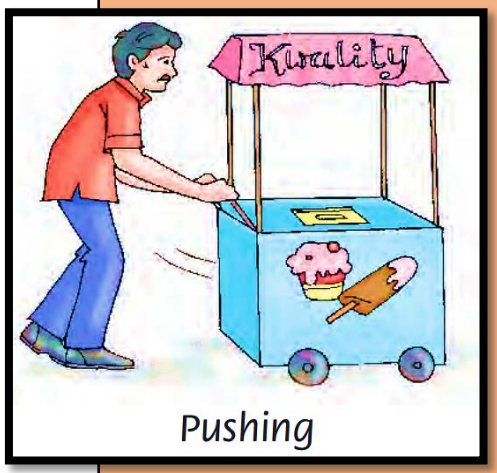
E.V.S



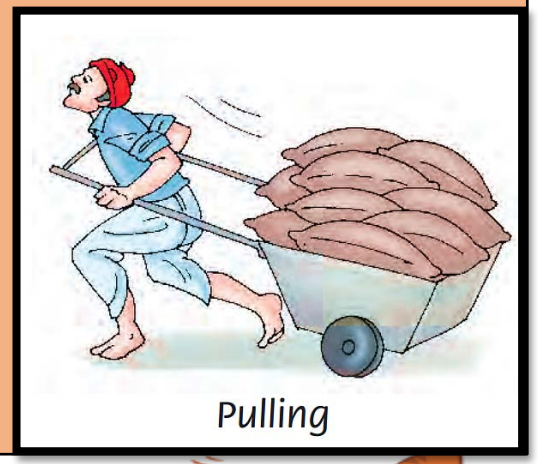
FORCE

When you push a cart, it moves. It also moves if you pull it towards yourself. What other things can you pull or push, to make them move? To move something, you either push or pull it.

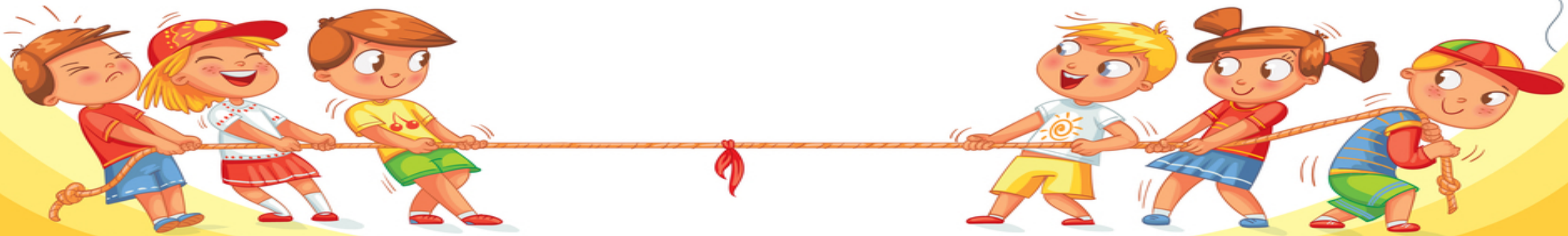
A push or pull is called **force** . What else can a force do besides moving an object? When we apply force to an object, the object moves in the direction of the force.

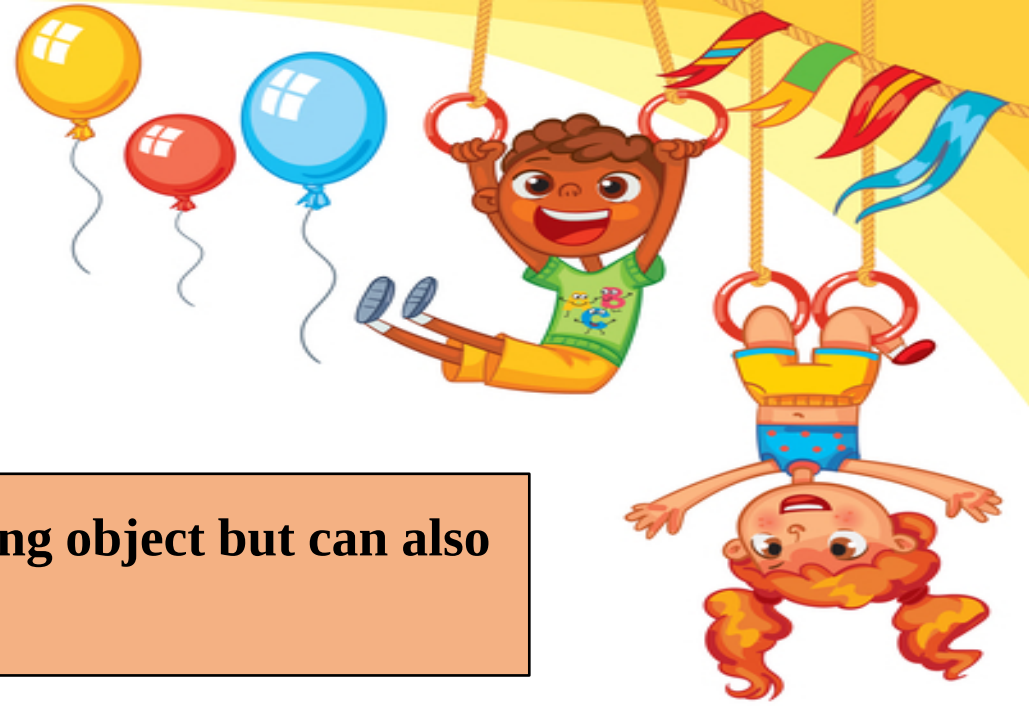


Pushing

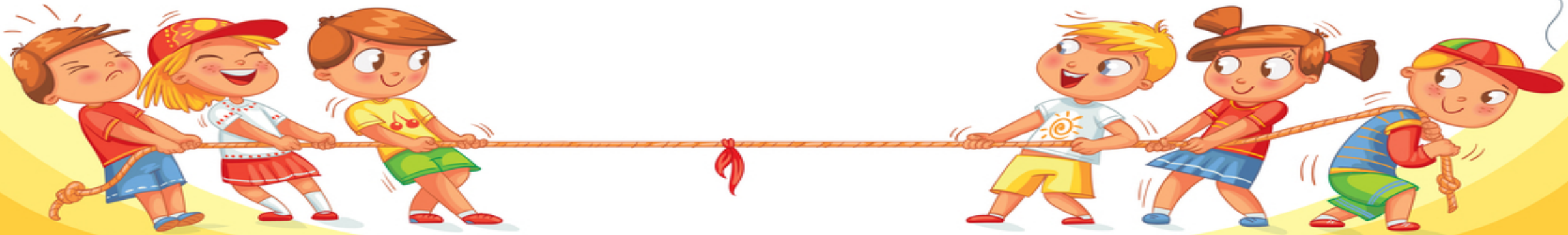

Pulling

To stop a moving object, we apply force in the opposite direction. It can stop a moving object.





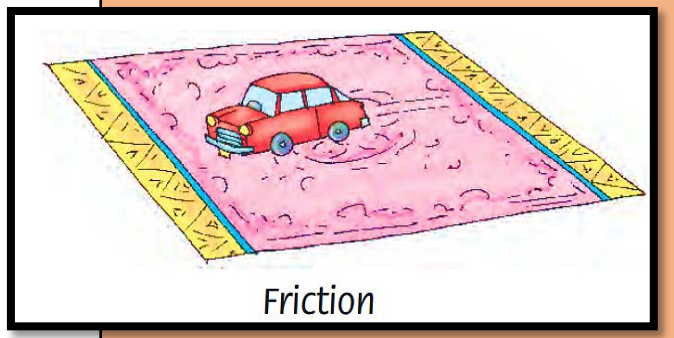
It not only changes the direction of a moving object but can also change the shape of an object.

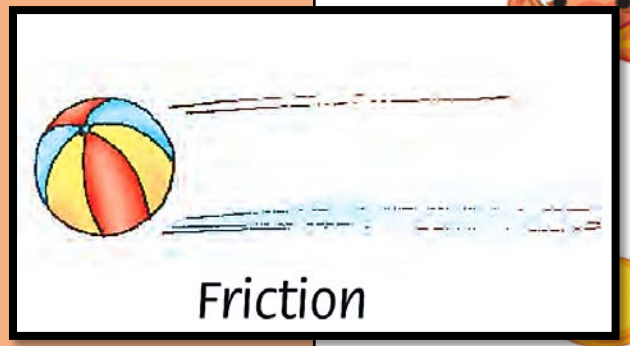


TYPES OF FORCE

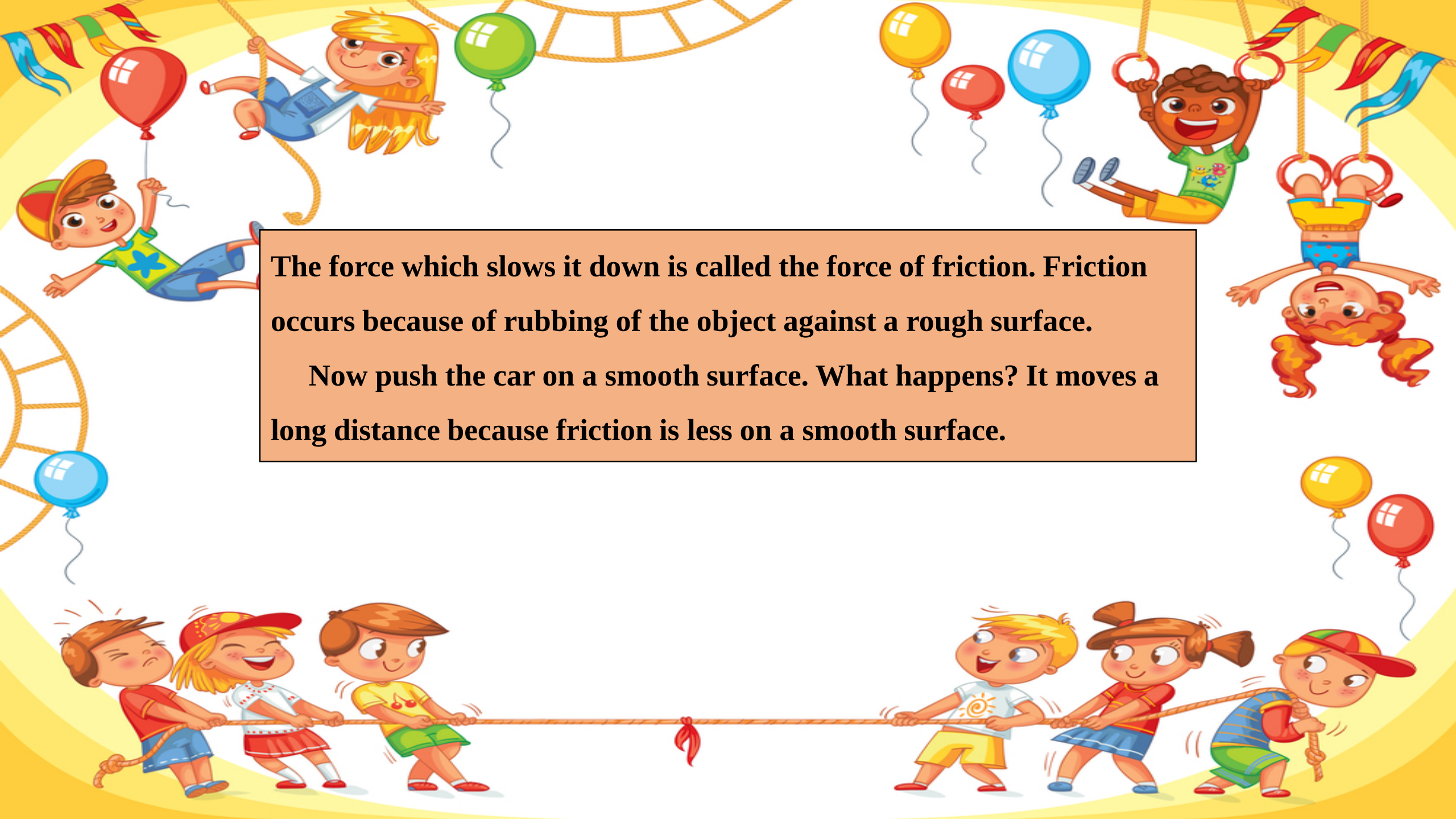
Force of Friction

Roll a ball on the ground. It moves some distance and then stops, due to friction.





When you push a toy car on a carpet it slows down and stops after sometime.

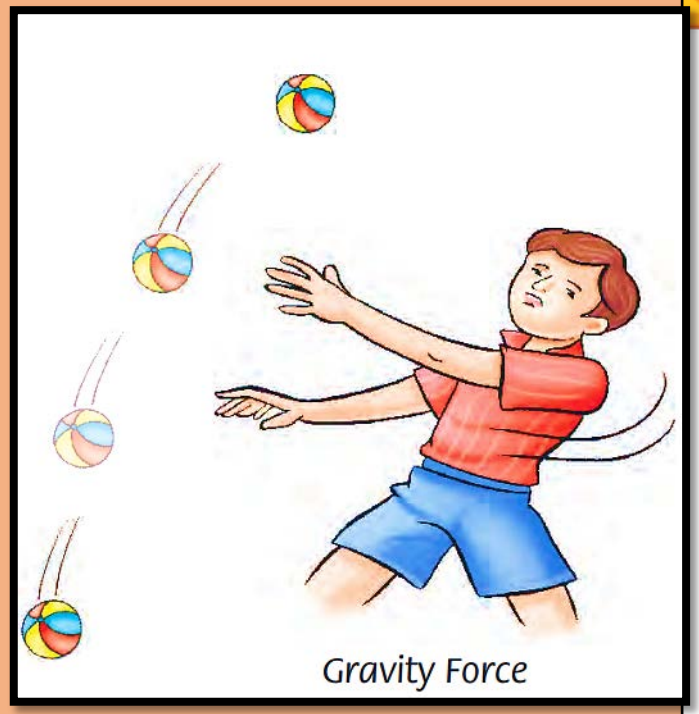


The force which slows it down is called the force of friction. Friction occurs because of rubbing of the object against a rough surface.

Now push the car on a smooth surface. What happens? It moves a long distance because friction is less on a smooth surface.

Force of Gravity (Gravitational Force)

When you throw a ball towards sky, it slows down, stops and then falls back on the earth. This is because of the force of gravity that acts on it. The force of gravity pulls it down. In fact the gravity acts on every object on the earth. This is the reason that whatever you throw up, comes back on the earth.



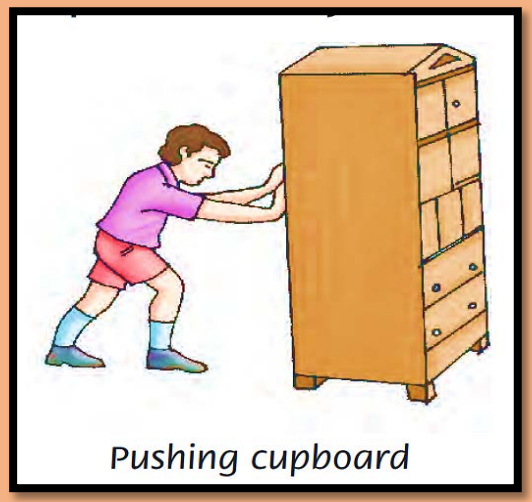
WORK

When you use force to move an object, you do work. Pushing a chair is easy, but pushing a cupboard is difficult. You need more force to move the

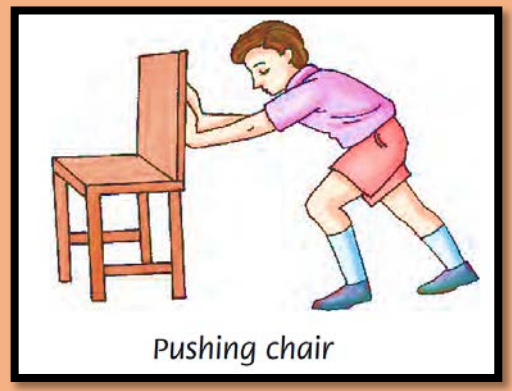
INTERESTING FACTS

- Sir Issac Newton, a British scientist gave the idea that gravity is the force that not only exists on the earth but throughout the universe.

cupboard. So you do more work to move a cupboard than moving a chair. The force required to stop or move the object, directly depends on the weight of the object.

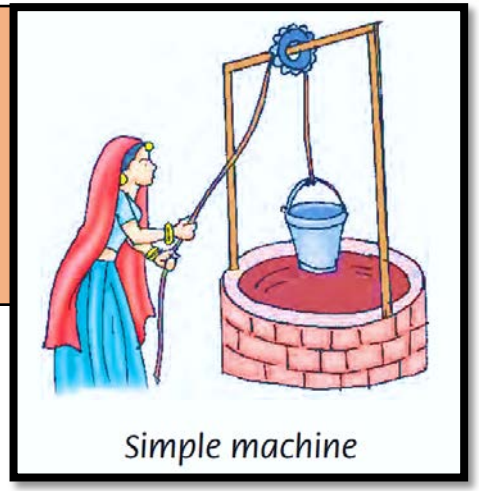


Pushing cupboard

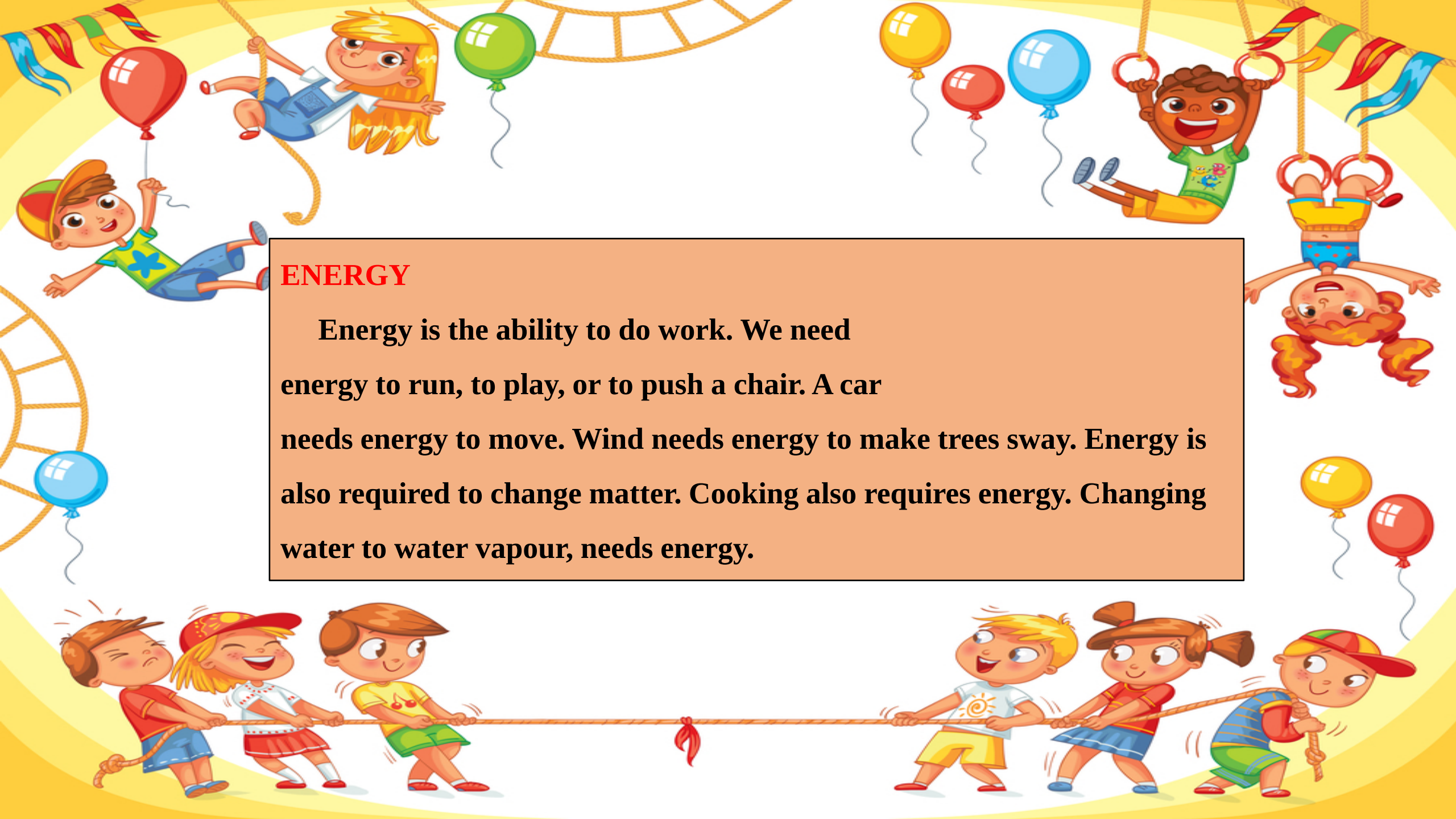


Pushing chair

A machine or tool which helps us to do work by applying a very less force is called simple machine. It increases the speed of work.

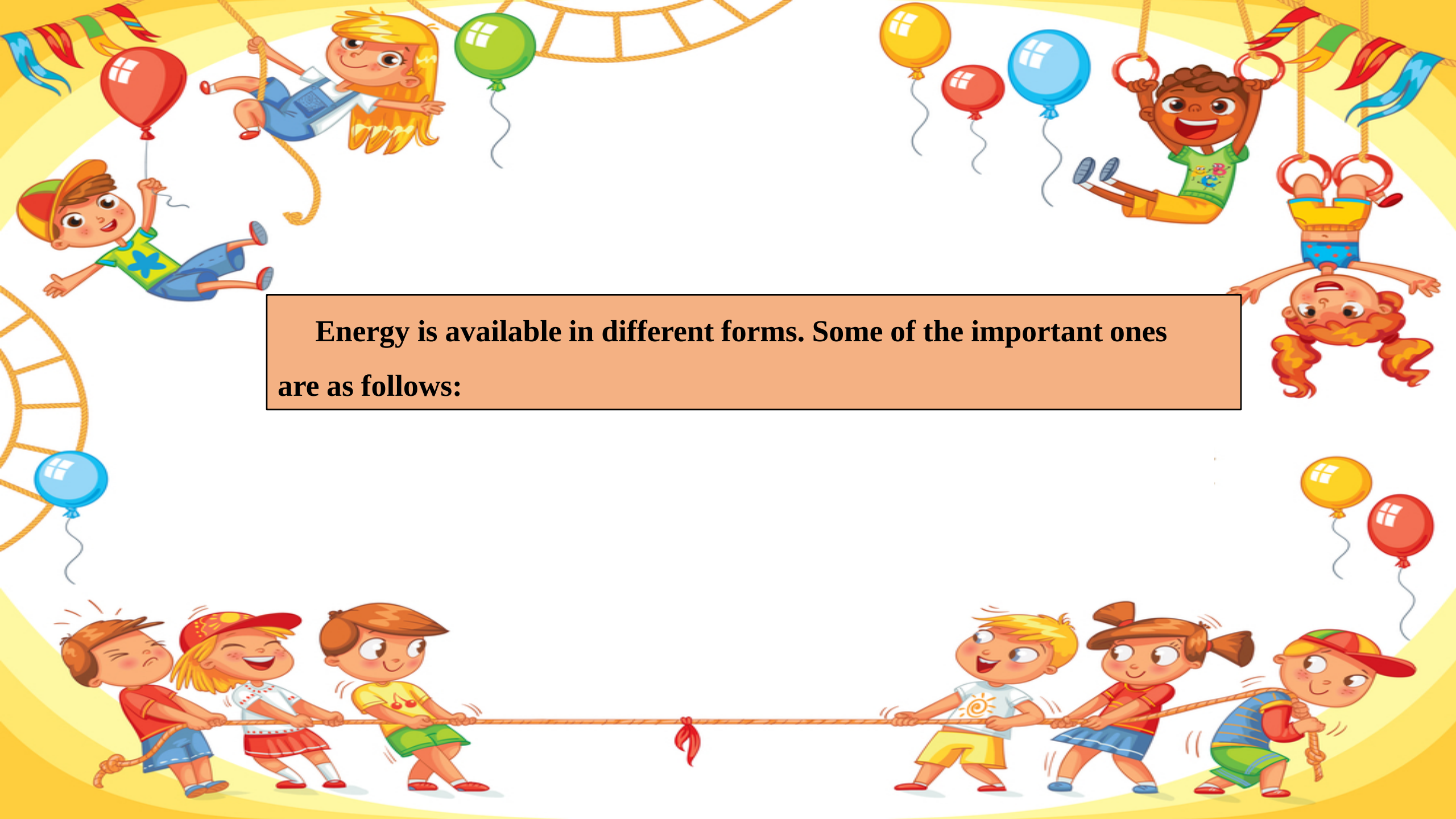


Simple machine



ENERGY

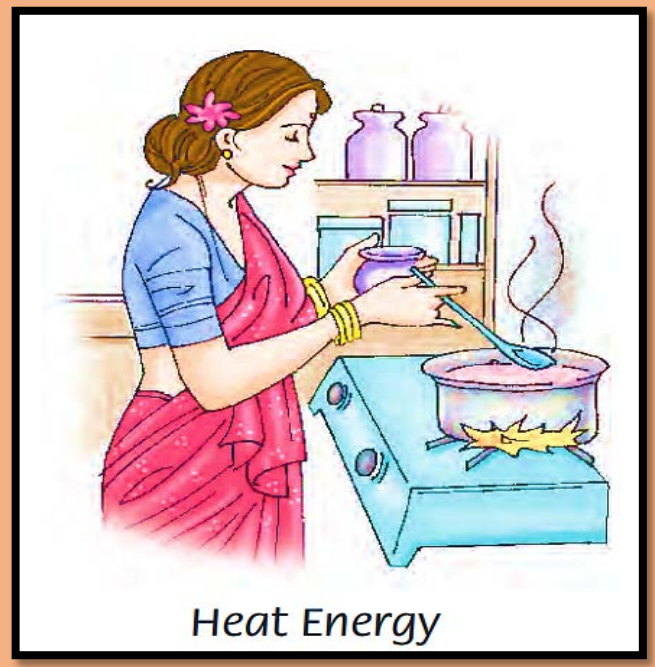
Energy is the ability to do work. We need energy to run, to play, or to push a chair. A car needs energy to move. Wind needs energy to make trees sway. Energy is also required to change matter. Cooking also requires energy. Changing water to water vapour, needs energy.



Energy is available in different forms. Some of the important ones are as follows:

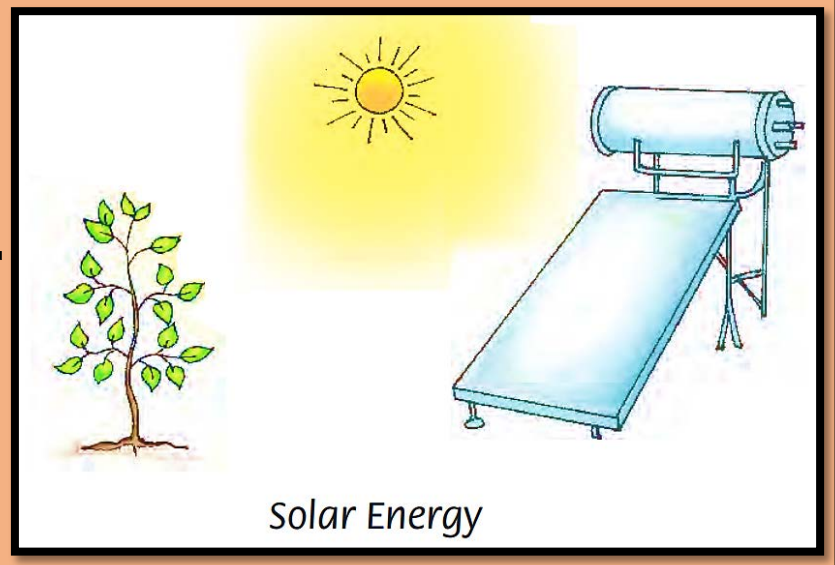
Heat Energy

Sun is the natural source of heat energy. We can get heat energy by burning fuel such as wood, gas, petrol and coal. Heat energy is used to cook food and to run vehicles and steam engines.



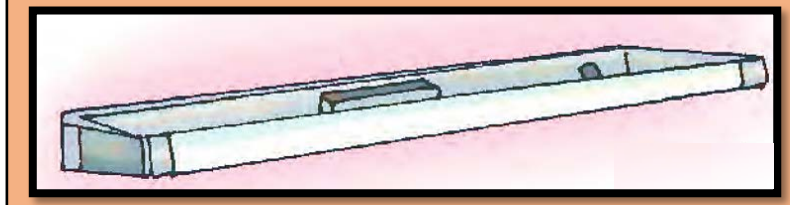
Solar Energy

The energy we get from sun is called the Solar Energy. Plants use sunlight to make their food. Our solar equipments like solar water heater, solar cooker, solar calculator etc. work by using the solar energy.



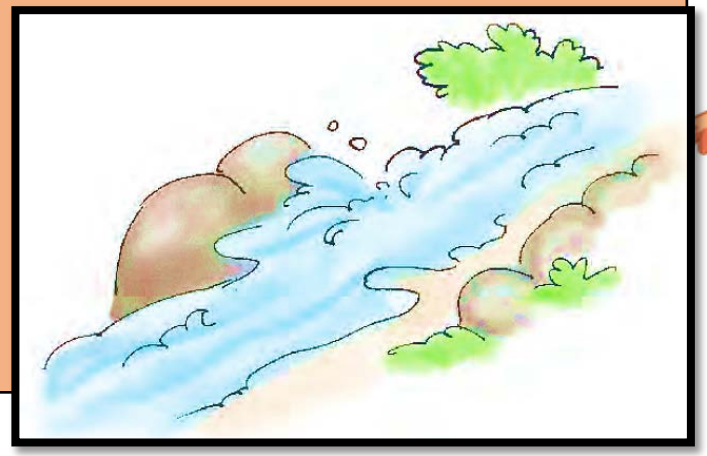
Electrical Energy

Electrical Energy is generated from water, coal and gas. All of our electronic gadgets such as computers, refrigerators, air conditioners etc. run by electric energy. Trains also run by electric energy.



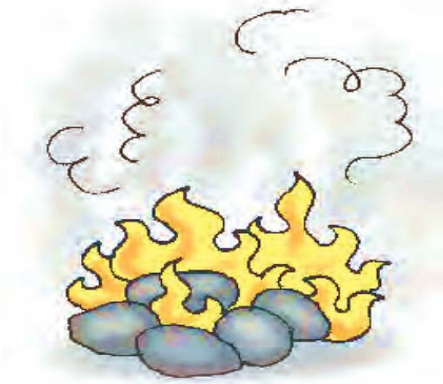
Mechanical Energy

This is the energy of the objects that can do work by moving. For example wind or flowing water.



Chemical Energy

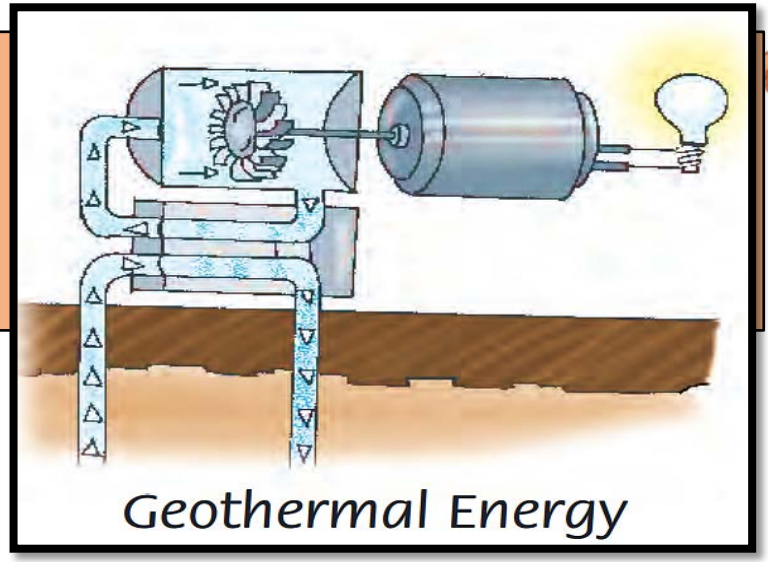
This energy is obtained by burning coal, wood etc. It is the energy stored in the matter, in chemical form.



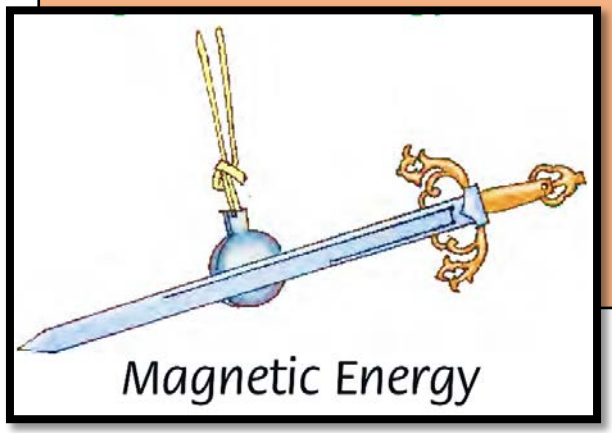
Chemical Energy

Geothermal Energy

This is the energy of the hot interior of the earth.



Magnetic Energy



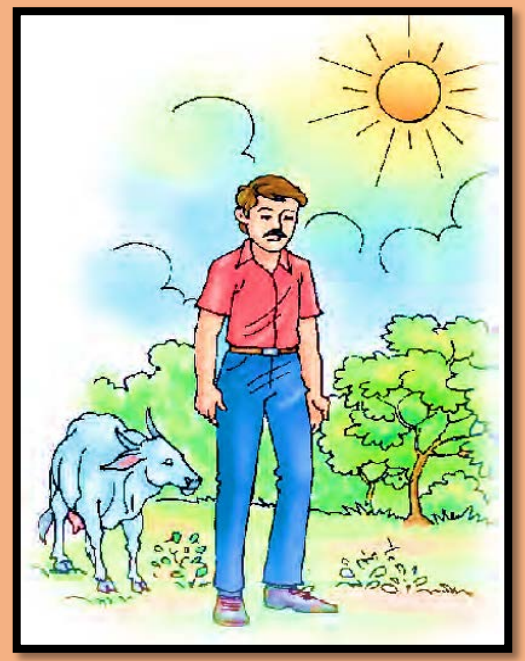
A magnet can easily pull the metal like iron towards itself. Thus the energy possessed by a magnet is called the magnetic energy.

SOURCES OF ENERGY

Some of the main sources of energy are:

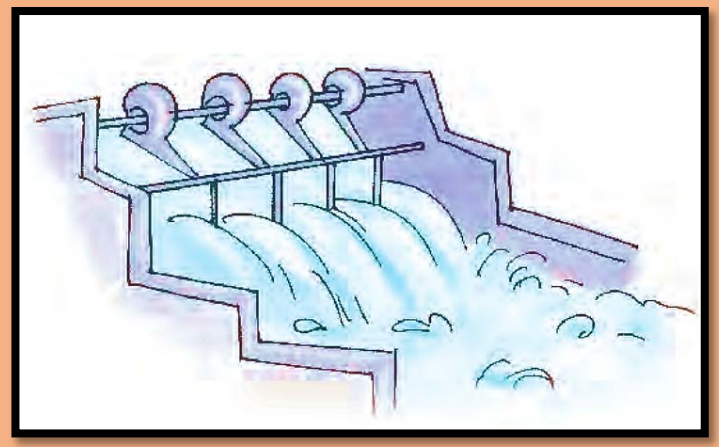
Sun

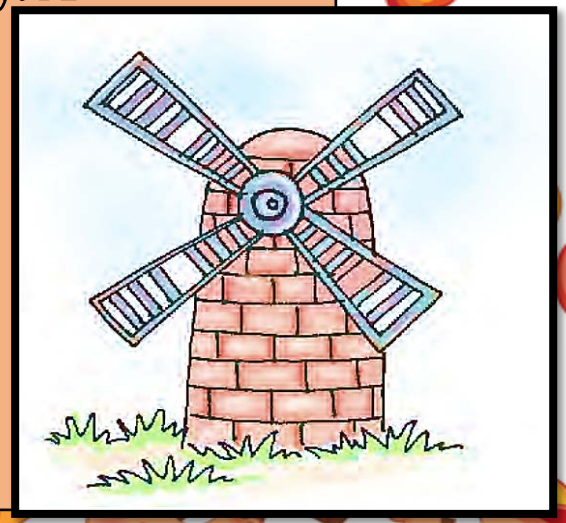
The sun is the main source of energy. It gives us heat and light that sustains life on earth. Plants use this light energy to make food. We are completely dependent on the sun for our energy needs.



Moving Water and Air

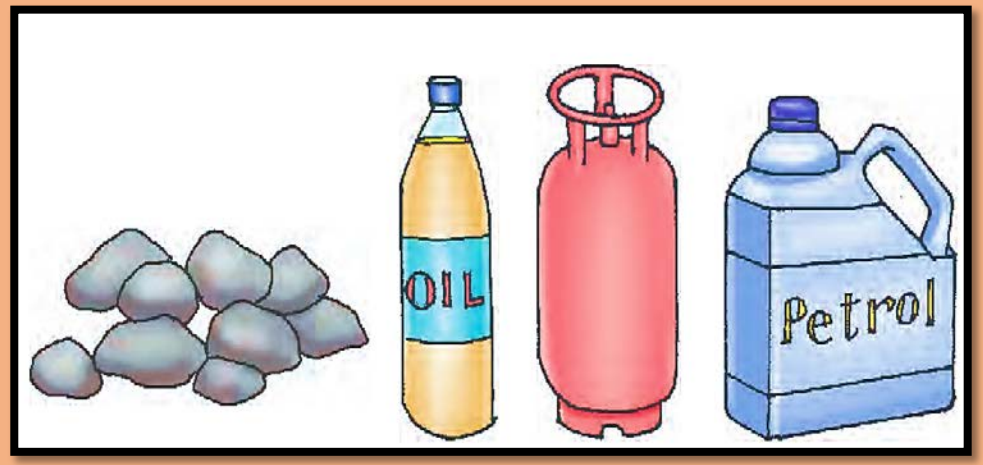
Moving water or air have energy. This energy is mostly used to generate electricity. A dam on a river uses the flowing water to generate electricity. The power of wind is used to generate electricity in a wind mill.





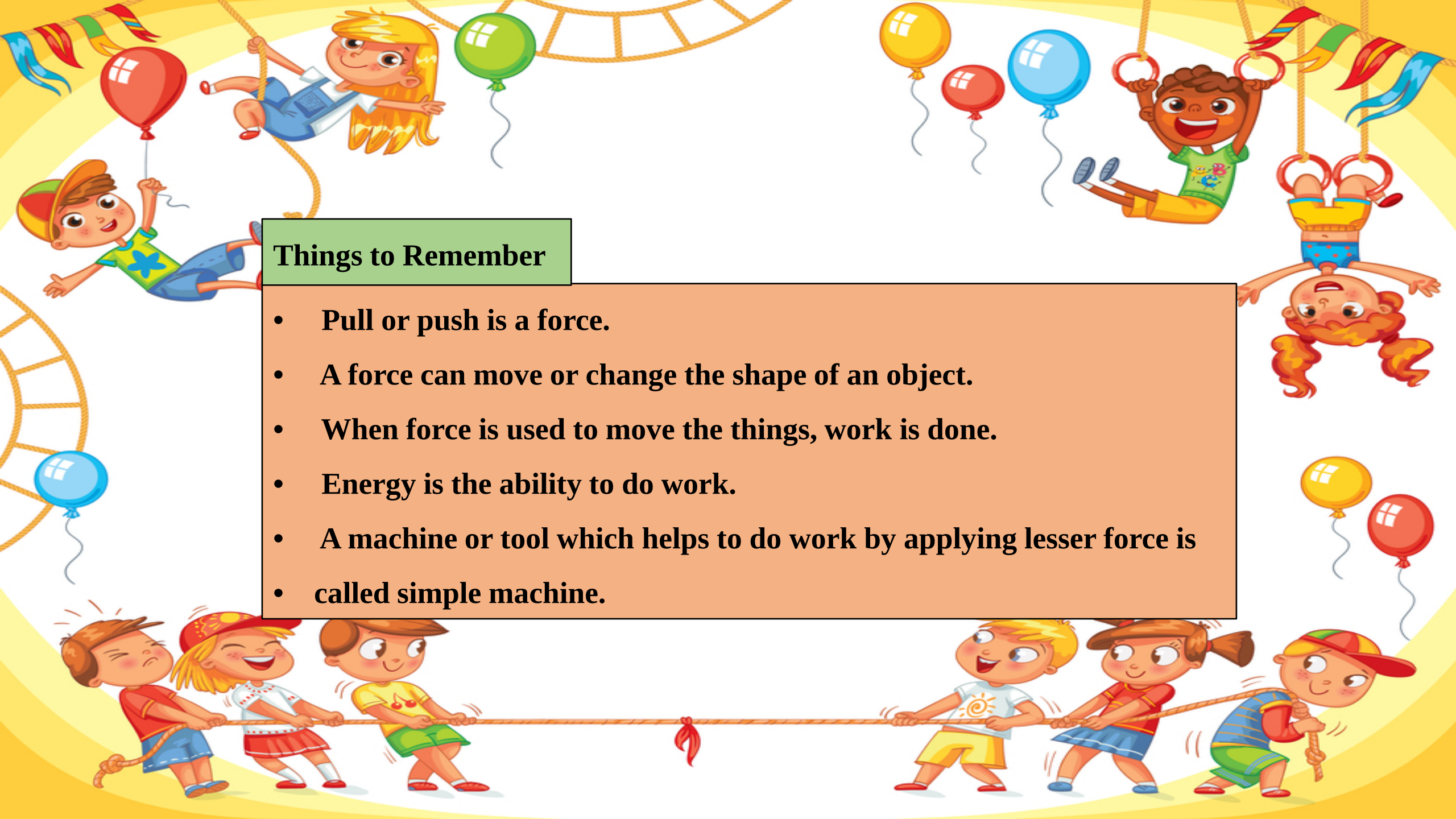
Natural Fuels

Fuels such as coal, oil, gas or petrol are also other sources of energy. They have energy stored in them. This energy can be released by burning them. It is used to run machines, cars, cooking and many other things. However, burning of fuels also pollute the air.



Fact File

- We can convert one form of energy into another.
- Archimedes screw was invented 2200 years ago by Archimedes to pump out water from a ship.



Things to Remember

- Pull or push is a force.
- A force can move or change the shape of an object.
- When force is used to move the things, work is done.
- Energy is the ability to do work.
- A machine or tool which helps to do work by applying lesser force is
- called simple machine.


THANK
YOU