



# 11 Pushes and pulls

Date: 7/4/20

Name

Class

While studying this topic, tick off each item after you have covered it.

## What I should know:

- Pushes and pulls are forces.
- Forces can:
  - change the speed of an object
  - change the direction of movement of an object
  - change the size or shape of an object.
- Weight is a force. It is the force of gravity due to the pull of the Earth. It varies from place to place.
- Objects weigh less on the Moon.
- The extension of a spring (or a thin wire) is directly proportional to the stretching force (Hooke's Law).  
Half the force gives half the extension.  
If a spring is stretched beyond its elastic limit, it does not return to its old shape.
- A spring balance (or force-meter) measures a force, in newtons.
- A mass of 1 kg here on Earth weighs almost 10 N (9.8 newtons).
- An object with a mass has an inertia. This is a reluctance to start moving, or to stop moving.
- Newton's First Law of Motion:  
If the forces on a mass are balanced (no resultant force) then:
  - if it is at rest, it stays at rest,
  - if it is moving, it keeps on moving at a constant speed in a straight line.
- For an object to travel in a circle, there must be a force acting on it. This centripetal force must pull towards the centre of the circle.
- The size of the centripetal force that is needed depends on:
  - the mass of the object,
  - the speed of the object,
  - the radius of the circle.
- The centripetal force is often provided by a gravitational force (eg. Earth in orbit round the Sun).

## What I should be able to do:

- Identify the forces acting on objects.
- Investigate how the extension of a spring (or a wire, or an elastic band) depends on the stretching force, and plot a graph of my results.
- Understand and explain a graph of extension plotted against stretching force (load).
- Measure forces using a spring balance.
- Calculate the weight of an object here on Earth, if I am told its mass.
- Explain why the weight of an object varies from place to place, while the mass of the object is constant.
- Explain how a spin-drier works.

