# Forces

# 2. Gravity

## CONCEPT 3

## GRAVITY AROUND THE SOLAR SYSTEM

### NOTES

An object with a mass will experience a force called weight because it is in the gravitational field of a large object.

We use the following equation to calculate the weight of an object:

**weight = mass x gravitational field strength**

We can write this using letters instead of words:

**W = m x g** Weight is measured in newtons (N); mass is measured in kilograms (kg); and gravitational field strength is measured in newtons per kilogram (N/kg)

Earth's gravitational field strength is 10 N/kg. If we know the mass of an object on the surface of the Earth then we multiply the number of kilograms by 10 to find its weight in newtons.

We can rearrange this equation to find the mass of an object on Earth if we know its weight. We would divide the number of newtons by 10 to find the number of kilograms.

Different bodies in the Solar System have a different size and mass to Earth and will therefore have difference values for their respective gravitational field strengths.

The Moon has a gravitational field strength, g = 1.6 N/kg; for Mars g = 3.8 N/kg; for Venus, g = 9 N/kg; and for Neptune, g = 11 N/kg. Jupiter is the largest planet in the Solar System and its g = 25 N/kg.

If we could survive on the surface of the Sun then gravitational field strength, g = 274 N/kg. This huge pull of gravity can help us understand why the Sun can influence objects very far away like Pluto.

**The same equation can still be used to calculate the weight of a mass, regardless of the planet of moon that it is on.**