THE DUSTON SCHOOL
Knowledge itself is power
4-19

Year 7 Science Knowledge Booklet

Term 6

Name:	**Class:**
Homework 1 Due: 9th June	**Homework 2 Due: 23rd June**
Homework 3 Due: 7th July	

Science Homework 1

Read all of this knowledge organiser. The work covered will be in the first knowledge quiz of the term.

Forces at a distance

Big questions:

What is a magnet and what sort of materials are magnetic?

What is a magnetic field?

How can we make an electromagnet?

What is static electricity?

How do charges cause a force?

What is the difference between mass and weight?

How does gravity keep moons and planets in orbit?

Key vocabulary

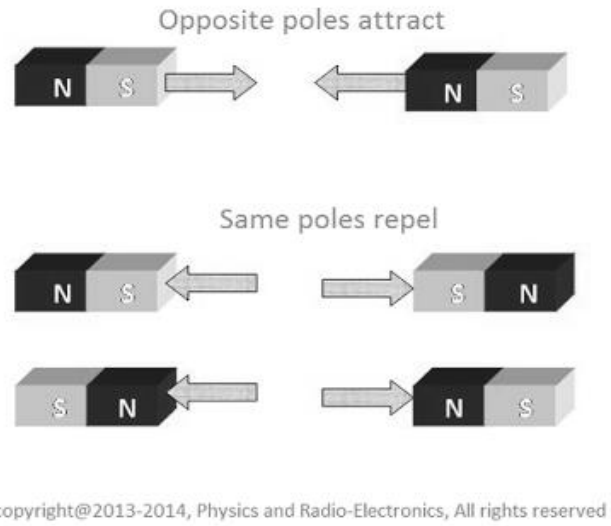
Force	**A push or a pull**
Force at a distance	**A force that exerts a push or pull on objects without touching them.**
Gravitational force	**A force that attracts all masses to all others. The force is weak and is only noticed if one of the mases is really big!**
Magnetic force	**The push or pull of one magnet on another or the pull of a magnet on a magnetic material.**
Magnetic field	**The region around a magnet where the magnetic force acts.**
Magnetic material	**A material attracted to magnets. Iron, nickel and cobalt are the strongest magnetic materials.**
Electromagnet	**A temporary magnet made by passing electric current through a coil of wire.**
Static electricity	**Unbalanced charge caused by friction.**
Mass	**The amount of matter an object contains - measured in kilograms, kg.**
Weight	**The force of gravity on a mass – measured in Newtons, N.**
Satellite	**An object in orbit around a planet. Can be natural (moons) or man-made.**

What is a magnet and what sort of materials are magnetic?

Magnets attract magnetic materials like iron, steel, cobalt and nickel.

Magnets attract and repel other magnets

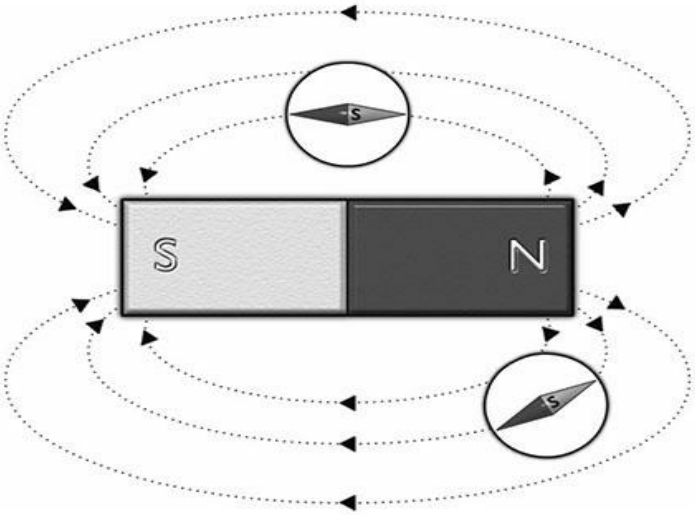
The magnetism is strongest at the poles. The poles are labelled north and south.



What is a magnetic field?

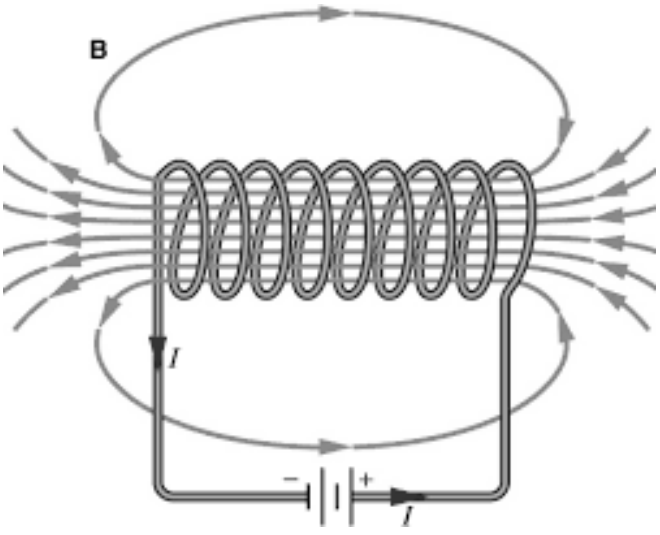
The region around a magnet where the magnetic force can be felt is called the magnetic field.

Plotting compasses can be used to show the pattern of a magnetic field



How can we make an electromagnet?

An electromagnet can be made from a long, straight coil of wire. It is called a solenoid.



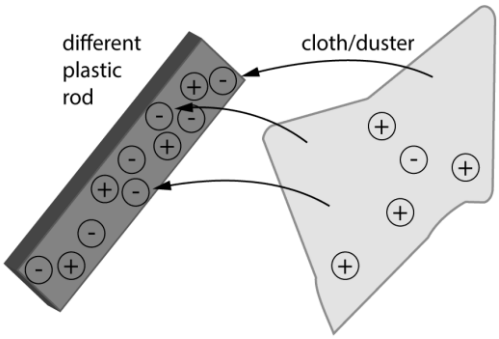
Science Homework 2

Try to answer all of these key knowledge questions. Then check your answers using the last page. These are some of the questions that will be in the knowledge quizzes and the end of term tests.

Key knowledge question	Your answer
A magnet can attract another magnet, what else can it attract?	
If you travelled to the moon which would change, your mass or your weight?	
Name four magnetic materials	
The force of gravity on a mass is called it's?	
What combination of electrostatic charges attract each other?	
What combination of magnetic poles attract each other?	
What do we call an unbalanced charge caused by friction?	
What do we call the pull of one mass on another?	
What equation links gravitational field strength, mass and weight?	
What is mass?	
What is the unit of mass?	
What is the unit of weight?	

What is static electricity?

All atoms contain electrically charged particles called electrons. Friction can transfer electrons and create unbalanced charges. This is called static electricity.



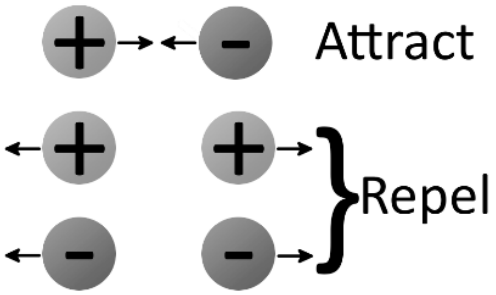
How do charges cause a force?

Electric charges attract or repel with the electrostatic force.

Like charges repel.

Opposite charges attract.

The electrostatic force is responsible for the effects of static electricity.



What is the difference between mass and weight?

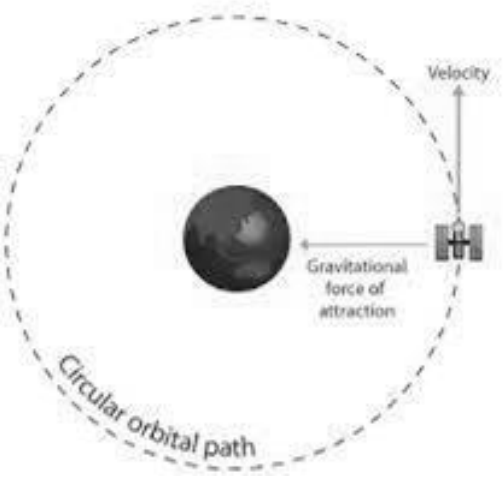
Mass is the amount of substance that something is made of. Mass is measured in kg. The mass of an object is the same wherever it is.

Weight is the force of gravity on an object. An object's weight depends on the gravitational field strength of the planet it is on. Weight is a force and is measured in newtons.

Weight = mass x gravitational field strength

How does gravity keep moons and planets in orbit?

Gravity attracts all masses together. Moons and satellites are attracted to planets by the force of gravity. This keeps them in orbit.



Key knowledge question	**Answer**
A magnet can attract another magnet, what else can it attract?	A magnetic material
If you travelled to the moon which would change, your mass or your weight?	Weight
Name four magnetic materials	Iron, steel, cobalt and nickel
The force of gravity on a mass is called it's?	Weight
What combination of electrostatic charges attract each other?	A positive and a negative (unlike or opposite charges)
What combination of magnetic poles attract each other?	North and South (unlike poles)
What do we call an unbalanced charge caused by friction?	Static electricity
What do we call the pull of one mass on another?	Gravitational force
What equation links gravitational field strength, mass and weight?	weight (N) = mass (kg) x gravitational field strength (N/kg), w=mg
What is mass?	The amount of matter an object contains
What is the unit of mass?	Kilograms (kg)
What is the unit of weight?	Newtons (N)

Space

Big questions:

Where is the Earth in Space?

What is the scale of objects in the Solar System?

What is the scale of objects outside the Solar System?

What causes day and night?

What causes the seasons?

Key vocabulary

The Big Bang	The Big Bang theory is the prevailing cosmological description of the development of the universe
Circular motion	The movement of an object along the circumference of a circle or rotation along a circular path.
Galaxy	A system of millions or billions of stars, together with gas and dust, held together by gravitational attraction.
Gravity	The force that attracts a body towards the centre of any other physical body having mass.
Light year	A unit of astronomical distance equivalent to the distance that light travels in one year, which is 9.4607×10^{12} km (nearly 6 million million miles).
Moon	A natural satellite orbiting a planet.
Orbit	The curved path of a celestial object or spacecraft round a star, planet, or moon.
Planet	A celestial body that is in orbit around the Sun.
Satellite	Something orbiting the earth or another planet.
Solar system	The Solar System is the gravitationally bound system of the Sun and the objects that orbit it.
Universe	The universe is all of space and time and their contents, including planets, stars, galaxies, and all other forms of matter and energy.

Where is the Earth in Space?

The Solar System consists of the Sun, with planets and smaller objects such as asteroids and comets in orbit around it. The planets in our solar system are:

Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune

Other than the planets, what other objects are in the Solar System?

- The Sun
- The Moon
- Moons orbiting other planets (e.g. Europa, Titan)
- Dwarf planets (Pluto, Ceres)
- Asteroids
- Comets
-

What is the scale of objects in the Solar System?

Jupiter and Saturn are more than 1000 times the size of Earth.
Uranus and Neptune are more than 400 times the size of Earth.
Venus is approximately the same size as Earth.
Mars is approximately 1/2 the size of Earth.
Mercury is approximately 1/3 the size of Earth.

Planet	**Distance from Sun (million km)**	**Atmosphere**	**Weather**	**Mean Temperature (°C)**
Mercury	58	Very thin	Moon-like, no weather	167
Venus	108	Very thick	Extreme global warming	464
Earth	150	Thick	Temporal/good balance	15
Mars	228	Very thin	Dust storms	-20
Jupiter	779	Very thick	Stormy	-110
Saturn	1434	Very thick	Stormy	-167
Uranus	2873	Thick	Extremely cold	-195
Neptune	4495	Thick	Cold, dark, windy	-200

Science Homework 3

Try to answer all of these key knowledge questions. Then check your answers using the last page. These are some of the questions that will be in the knowledge quizzes and the end of term tests.

Key knowledge question	
Earth is in which galaxy?	
Put these in size order, largest first - galaxy, planet, star, universe	
Roughly how far away is the Sun?	
What equation links mass, gravity and weight?	
What is a light year?	
What is the unit of gravitational field strength?	
What is the unit of mass	
What is the unit of weight?	
Which force keeps the planets in orbit?	
Which planets are called the inner rocky planets?	

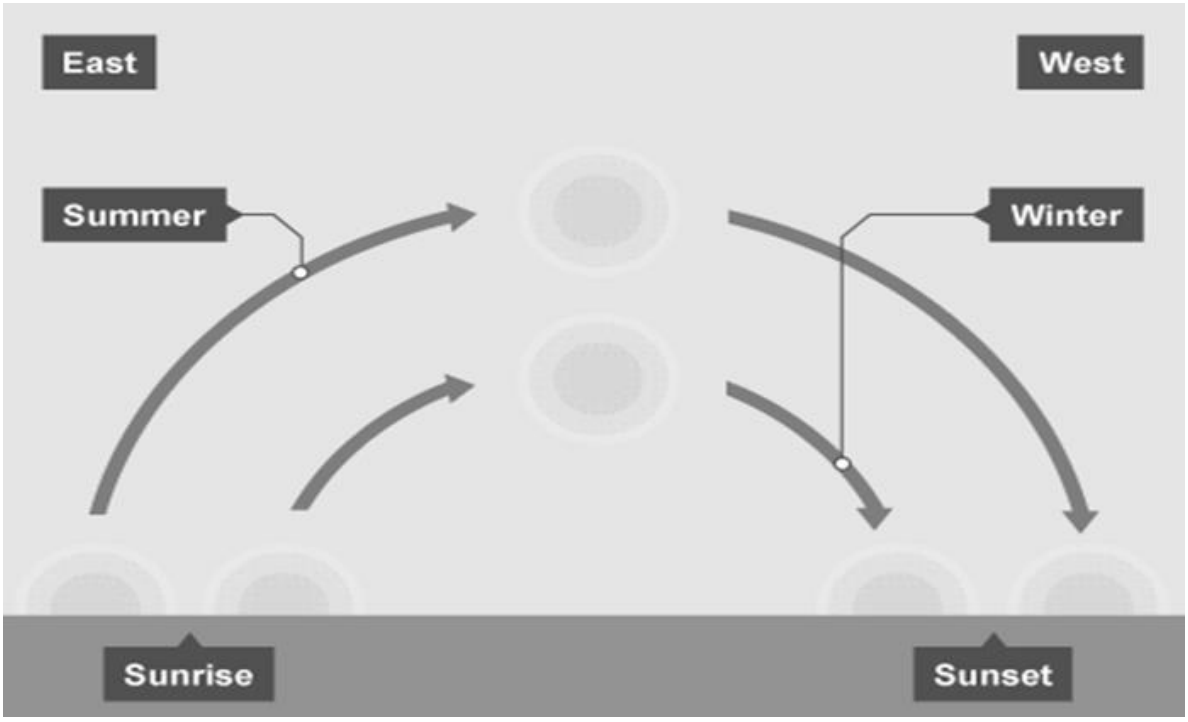
What is the scale of objects outside the Solar System?

Light years

- The distances between objects in space are huge:
- The distance from one star to another in a galaxy is millions of times more than the distance between the planets in the solar system.
- The distance from one galaxy to another is millions of times more than the distance between the stars in a galaxy.
- This means that the numbers used to describe distances in space become very difficult to understand and to write down.
- To get around this problem, scientists use the light year as the unit of astronomical distance. It is the distance travelled by light in one year.

What causes day and night?

- The half of the Earth facing the Sun is in daylight.
- During the day, the Sun appears to move through the sky.
- Remember that this happens because the Earth is spinning on its axis.
- The half facing away from the Sun has no sunlight and so becomes night-time.

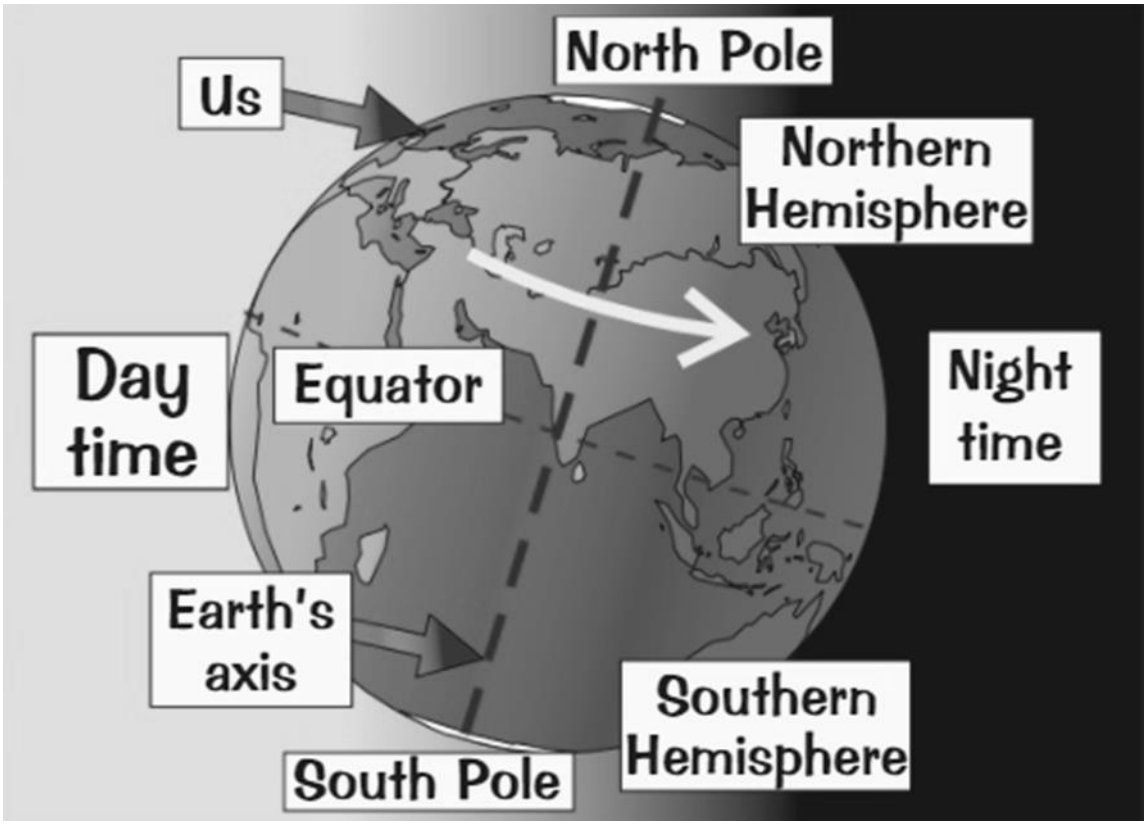


What causes the seasons?

What is a year?

- A planet's year is the time it takes to make one complete orbit around the Sun.
- The Earth goes once round the Sun in one Earth year, which takes 365 Earth days*.

* Its actually 365¼ days. The extra ¼ day is sorted out every leap year.



Due to Earth’s tilted axis, we get different seasons (winter, spring, summer and autumn).

Summer

When it is summer in the UK, the northern hemisphere is tilted towards the Sun

The northern hemisphere spends more time in sunlight than it does in darkness (longer days), so the surface heats up.

The Sun’s rays cover a smaller area of land, so energy transferred is focused on that area.

Winter

When it is winter in the UK, the northern hemisphere is tilted away from the Sun

The northern hemisphere spends less time in sunlight than it does in darkness (shorter days)

The Sun’s rays cover a larger area of land, so energy transferred is spread out over that area

Key knowledge question	Answer
Earth is in which galaxy?	The Milky Way
Put these in size order, largest first - galaxy, planet, star, universe	Universe, galaxy, star, planet
Roughly how far away is the Sun?	150 million kilometres
What equation links mass, gravity and weight?	Weight = mass x gravitational field strength
What is a light year?	A measure of distance, it is the distance travelled by light in one year.
What is the unit of gravitational field strength?	Newtons per kilogram (N/kg)
What is the unit of mass	Kilograms (kg)
What is the unit of weight?	Newtons (N)
Which force keeps the planets in orbit?	Gravity
Which planets are called the inner rocky planets?	Mercury, Venus, Earth and Mars