St Ninian's HS

S2 Physics

Space

Self-Checks

Contents:

Discovery

Self-Check 1 - Terminology

1. **Copy and complete** the table below:

Object	Definition
Moon	A natural satellite of a planet
Sun	
	A large body in orbit around a star
Star	A large body of matter undergoing nuclear fusion.
Solar System	
Galaxy	A large cluster of many hundreds of thousand of stars.
Universe	

2. Starting with the planet closest to the Sun **list** the planets of our Solar System in order.

3. The earth orbits a star. **State** the name of this star.

4. **State** what is meant by an exoplanet:

5. **Estimate** how many exoplanets have been confirmed to date:

A less than 8

B 8

C 23

D more than 1000

Self-Check 2 - Orbits

1. **State** what is meant by one orbit.

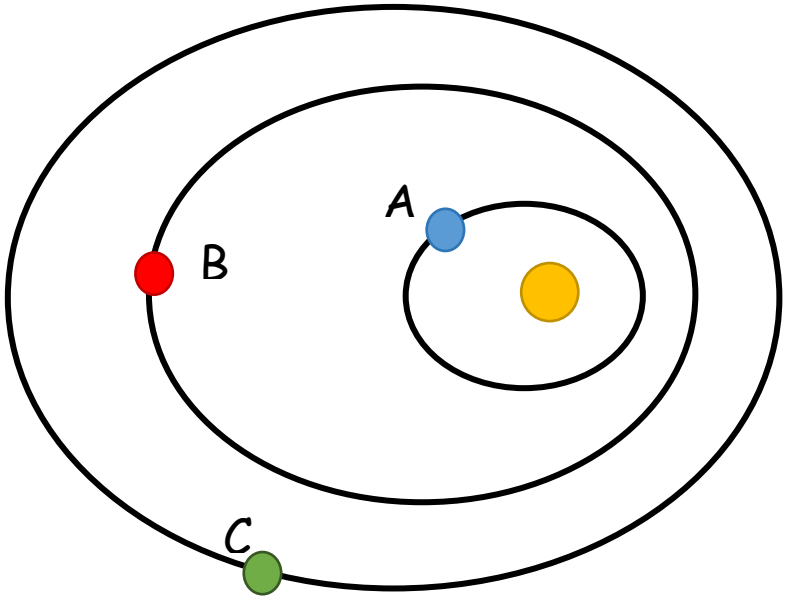
2. **State** the orbital period of the Earth.

3. A teacher states the following facts:

   "On Earth a day lasts 24 hours. On Mercury a day last 1,408 hours."

   Explain why this statement is true.

4. Using the diagram below:



   (a) **Determine** which planet would have the largest orbital period.

   (b) **Determine** which planet would have the shortest orbital period.

Self-Check 3 – Life-cycle of Stars

1. Although there are different types of Stars they do have some things in common.

   (a) **State** what all stars are made from.

   (b) **State** the type of reaction that takes place in all stars.

2. **Describe** what happens to stars as they age.

3. **Describe** how a star, around the size of our own Sun, will end.

4. **Describe** what may be formed when a star that is very massive is dying.

5. A student makes the following statements:

   I All stars eventually become Black-holes.

   II All stars are formed in Nebulas.

   III Compared to other Stars our Sun is among the biggest.

Which of the statement(s) are true:

A I only

B II only

C III only

D I and II

E I, II and III

Self-Check 4 – Habitable Zones

1. **Describe** what is mean by a Habitable Zone.

2. **State** which planet(s) are in our Sun's Habitable Zone.

3. **Explain** why a planet out width the Habitable Zone would be less likely to support life.

4. **Draw a diagram** of a solar-system showing the habitable zone, 1 planet orbiting within the habitable zone, 1 planet orbiting before the habitable zone and 1 planets orbiting after the habitable zone.

Self-Check 5 – Light-years

1. Read the passage bellow:

> The Dragonfish nebula may contain the Milky Way's most massive cluster of young stars. Scientists from the University of Toronto found the first hint of the cluster in 2010 in the form of a big cloud of ionised gas 30 000 light years from Earth. They detected the gas from its microwave emissions, suspecting that radiation from massive stars nearby had ionised the gas.

(a) **Identify** the units of distance mentioned in the passage above.

(b) **Name** the galaxy mentioned in the passage above.

2. (a) **State** what is meant by is a "light year"

(b) **Explain** why "light-years are used to measure distances in space

3. How long does it take light to travel from the earth to the sun?

(a) 8 seconds

(b) 8 minutes

(c) 8 hours

(d) 8 days

4. How long does it take light to travel from Proxima Centurai, the nearest star (after the sun)?

(a) 43 hours

(b) 4.3 days

(c) 43 days

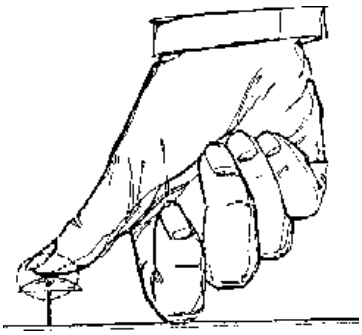
(d) 4.3 years

Travel

Self-Check 6 – Rocket Science

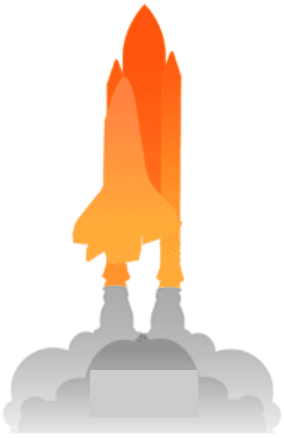
1. **Identify** the following Newton Pairs:

(a)

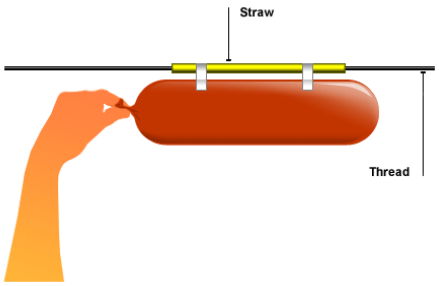


(b)

(c)



(d)



2. During a class discussion a student says:

> "When a rocket takes off the rocket pushes down on the ground and the ground pushes on the rocket."

Explain why the student is incorrect.

3. **Copy and complete** the following:

Sir Isaac Newton noticed that forces always come in _____and that the two forces where always _____in size BUT _____in direction.

He called the two forces ACTION and _____. .

Self-Check 7 – Re-entry

1. Re-entry is one of the most dangerous parts of space exploration.

   (a) **Explain** why during re-entry the Shuttles temperature increases.

   (b) **State** the energy change involved in re-entry.

   (c) **Describe** two methods used to prevent the shuttle from becoming too warm during re-entry.

2. Graph question

Extras

Extra - Self-Check 1

1. Read the following extract and answer the questions which follow:

The Earth is 4.5 billion years old (approximately!) and humans have only existed for a very small percentage of that time due to the time it takes to evolve. With a huge number of planets discovered outside our solar system there is much discussion of extra-terrestrial life.

Planetary Conditions for Extraterrestrial Life?

What conditions would be required on another planet to allow life to be created? (Consider the Earth's position in the solar system, the conditions on Earth when life developed.) There is no right or wrong answer, but your answer must have solid logical ground.

Evidence for UFO and Extraterrestrials

On Earth there are some people who claim to have seen strange objects flying through the sky at great speeds with bright lights. These so called Unidentified Flying Objects (UFOs) are often later found to be objects such as weather balloons or new fighter jet aircraft being developed by the military.

Some people also claim to have been abducted and used in experiments conducted by aliens. Other people claim to have seen "little green men". Sometimes there are alternative explanations. Sometimes people are seeking attention and find ways to alter photographs to fake something that appears difficult to explain.

Even so, there are some cases that nobody can give a logical explanation for and there is no evidence of fabrication (faking evidence).

(a) What do the letters UFO stand for?

(b) What do some UFO sightings get confused with?

(c) Why do some people claim to have seen aliens or been abducted by aliens?

(d) Have all sightings of aliens being explained?

(e) Is it possible to make definite conclusions about the existence or not of aliens by reading the paragraph above?

Extra - Self-Check 2

1. The table below gives information about planets that orbit the Sun.

Planet	*Distance from the Sun (Gm)*	*Period (days)*	*Mass (Earth Masses)*
Earth	150	365	1
Jupiter	780		318
Mars	228	687	0.11
	58	88	0.06
Saturn	1430	10760	95
Venus		225	0.82

The distance from the Sun is measured in Gigametres, Gm.

(1Gm = 1 000 000 000 m)

(a) One of the planets names have been left blank. Name this planet.

(b) Give an approximate value, **in days,** for the period of Jupiter.

(c) How many days are in a year on Saturn?

2. Scientists often use graphs to estimate a particular value.

(a) Using the information from the table above, plot a graph of *Distance from the Sun* against *Period.*

(b) From your graph, estimate how far away, in Gm, Venus is from the Sun.

(Hint: you will have to know the order of the planets in the Solar System.)

Extra - Self-Check 3

1. The first manned space flights took place over 50 years ago. Spacecraft were launched into space using powerful rockets.

The operation of a rocket can be explained using Newton's Third Law of Motion.

(a) State Newton's Third Law of Motion.

(b) What happens the mass of the rocket during take off. Explain your answer.

2. A diver standing on a high diving board holds a mass with a set of scales. The reading on the scales show that the object has a weight of 35 N.

(a) What is the reading on the scales when the diver falls off the board?

(b) Explain your answer to part (a).