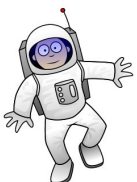
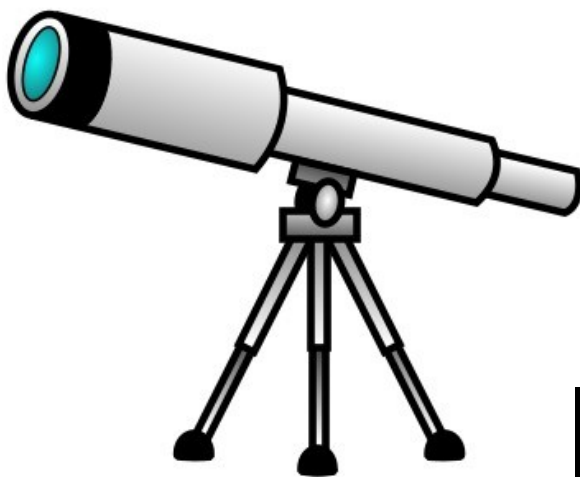




S2 Space Physics

Self Checks



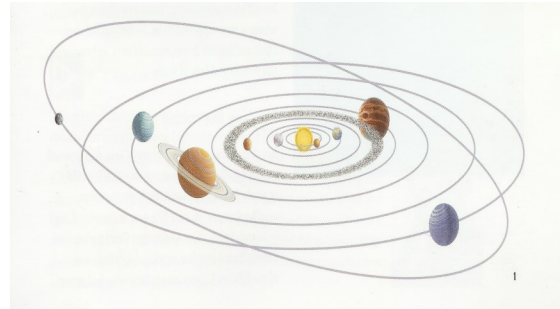
Self Check 1

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	

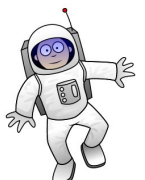
2. (a) What is a “light year?”
(b) Why are “light years” used to measure distances in space?

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



4. 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
5. 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



Self Check 2

1. Explain why on certain nights you can see a full moon and on other nights only a half moon is visible.

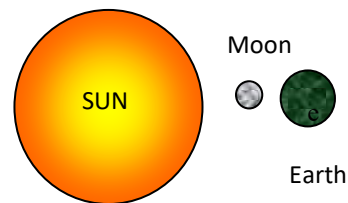
2. Which of the following arrangements show:

(a) A full moon.?

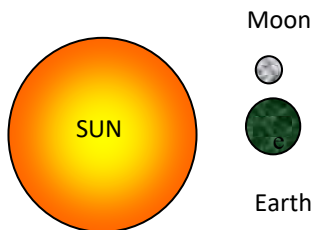
(b) A half moon.?

(c) A new moon.?

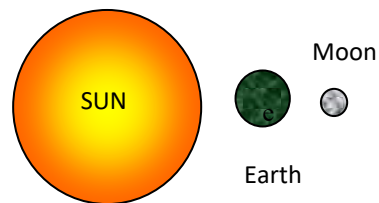
A.



B.

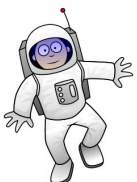


C.



3. Explain, using a diagram, what happens during a solar eclipse.

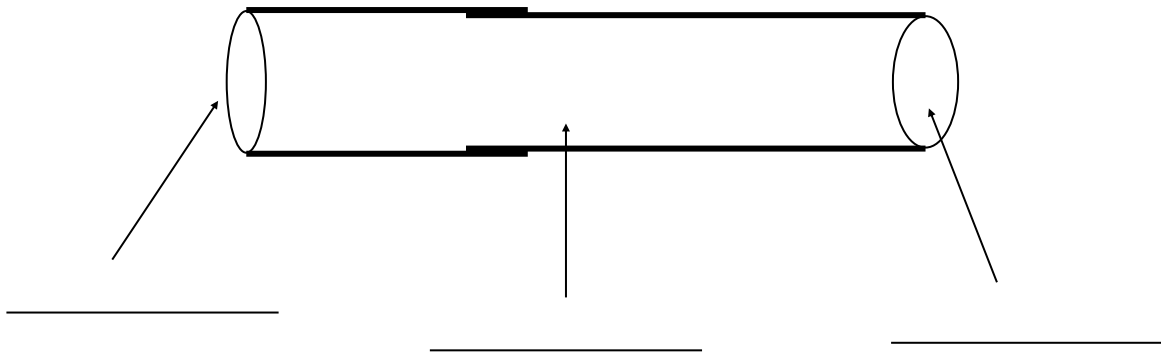
4. What is the difference between a solar eclipse and a lunar eclipse?



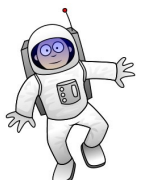
Self Check 3

1. Use the information in the passage below to copy and complete the diagram

A telescope has two lenses enclosed in a **light-tight tube** which also enables the telescope to be focused. The lens with the long focal length is called the **objective** lens and the lens with the short focal length, the **eyepiece** lens.

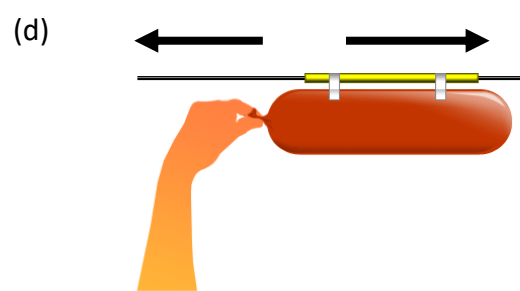
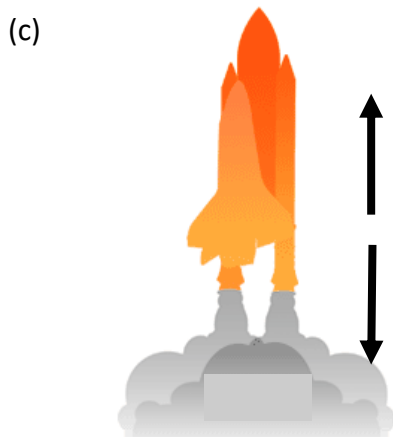
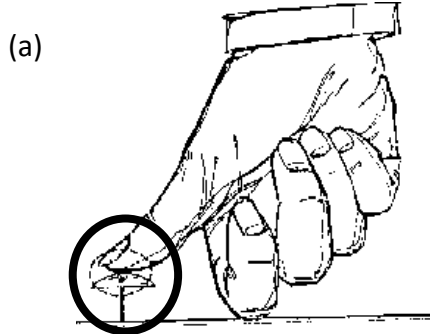


2. How can an image from a telescope be made brighter?
3. When using an optical telescope, what signals are we not detecting?
4. Give an advantage of using a radio telescope instead of an optical telescope.
5. Why are the images from the Hubble Space Telescope more detailed than the telescopes used on Earth?



Self Check 4

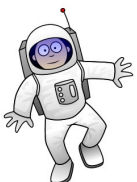
1. Identify the following Newton Pairs:



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.



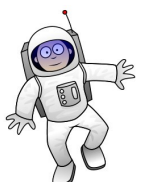
Self Check 5

1. What is the difference between mass and weight?
2. Copy and complete the table below:



Weight (N)	Mass (kg)	Gravitational field Strength (N/kg)
100	5	
	200	1.6
75		5
30	300	
870	35	
	35	2.7

3. The gravitational field strength on the moon is less than that on Earth.
 - (a) What happens to an objects mass if it is taken to the moon?
 - (b) Will the objects weight be greater or smaller on the moon than it is on the Earth?
4. Newton hypothesized that if a cannon ball could be fired from a high mountain then it would act like a projectile (i.e. its course would fall to Earth due to gravitational forces) and would travel a complete orbit of the Earth if it was fired fast enough.
 - (a) When inside an orbiting shuttle, what sensation do astronauts encounter?
 - (b) What holds a satellite in orbit?
 - (c) Why do astronauts need to wear “seatbelts” in the International Space Station when trying to lie down to sleep?

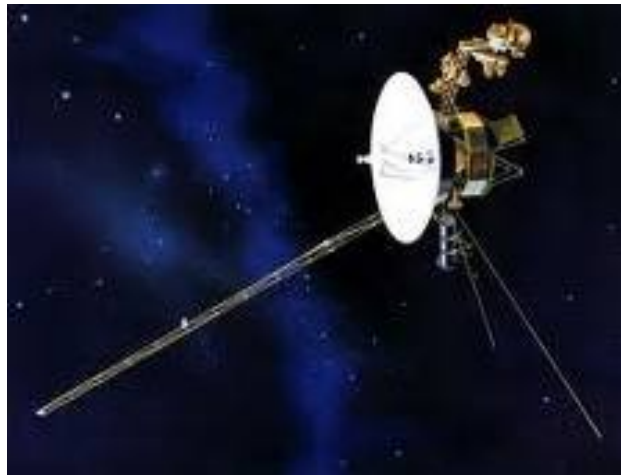


Self Check 5 Continued

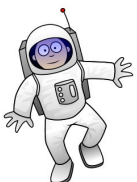
5. Space Shuttles are used to send people and objects into space.
- (a) Explain why Shuttles have solar panels on them.

During re-entry the Shuttles temperature increases due to the friction between the shuttle and the gas molecules in the atmosphere.

- (b) Describe two methods used to prevent the shuttle from becoming too warm during re-entry.
6. Voyager 1, a satellite space probe, was launched in September 1977. It is now outside of our solar system and at July 2010 was 0.002 of a light year from the Sun.



- (a) Given that it had taken Voyager 33 years to get to 0.002 light-years, how long will it be before it reaches the next nearest star? (4.5 light years)
- (b) Given this information, what are your conclusions about space travel using the same propulsion as Voyager to explore the solar system and beyond?



Self Check 6

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

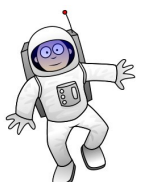


On Earth there are some people who claim to have seen strange objects flying through the sky at great speeds with bright lights. These so called Unidentified Flying Objects (UFOs) are often later found to be objects such as weather balloons or new fighter jet aircraft being developed by the military.

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).

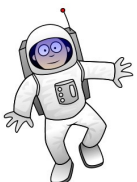
- What do the letters UFO stand for?
- What do some UFO sightings get confused with?
- Why do some people claim to have seen aliens or been abducted by aliens?
- Have all sightings of aliens being explained?
- Is it possible to make definite conclusions about the existence or not of aliens by reading the paragraph above?



Self Check 7



1. (a) What are stars made from?
(b) Why are stars so hot?
2. What happens to stars as they age?
3. Describe how a star, around the size of our own Sun, will end.
4. What may be formed when a star that is very massive is dying?
5. Cosmologists have several theories on how the Universe will end.
 - (a) What is meant by the term "*The Big Freeze*"?
 - (b) If the Universe does have a large enough mass, then it will stop expanding and it will begin to collapse. What is the name given to this scenario and what does it describe?
 - (c) (i) What have the cosmologists recently discovered about the expanding Universe?
(ii) How could this affect the way in which the Universe ends?



Extra Work Self Check 1

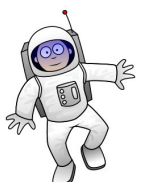
1. The table below gives information about planets that orbit the Sun.

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

(1Gm = 1 000 000 000 m)

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

- (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.)

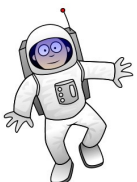


Extra Work Self Check 2

1. Astronomers use refracting telescopes to observe other planets. A refracting telescope has an objective lens and an eyepiece lens.



- (a) How does the diameter of the objective lens affect the image seen through the telescope?
 - (b) Apart from a refracting telescope, name two other types of telescope.
2. The Hubble space telescope orbits the Earth and takes photographs of planets and galaxies far away.
 - (a) Explain why the images from the Hubble Space Telescope are much clearer than images gained from telescopes on the Earth's surface.
 - (b) Objects that are orbiting a planet are called satellites. Using the fact that planets are spherical, explain how the Hubble Space Telescope stays in orbit around the Earth.



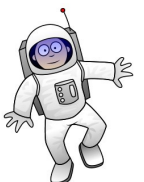
Extra Work Self Check 3

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



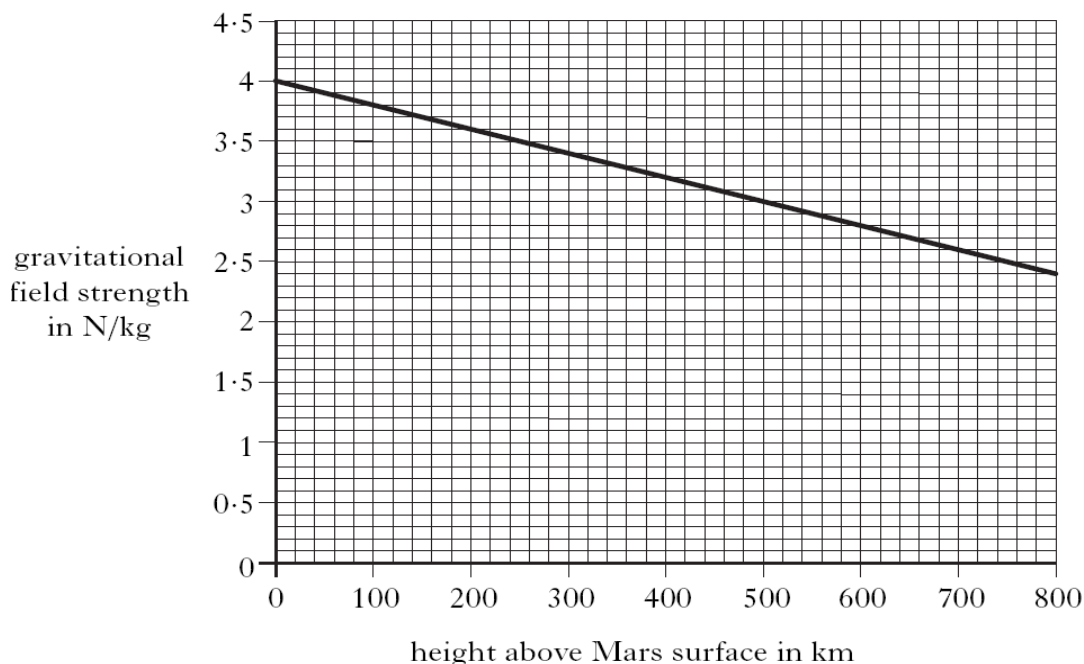
The operation of a rocket can be explained using Newton's Third Law of Motion.

- (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).



Extra Work Self Check 4

1. In June 2005, a space vehicle called Mars Lander was sent to the planet Mars.
- (a) The graph shows the gravitational field strength at different heights above the surface of Mars.



- (i) The Mars Lander orbited Mars at a height of 200 km above the planets surface.
What is the value of the gravitational field strength at this height?
- (ii) The Mars Lander, of mass 530 kg, then landed.
Calculate the weight of the Mars Lander on the surface.
2. There has been recent discussion about the possibility of sending astronauts to Mars.
- (a) Give two reasons why Mars would be the best planet to try and visit.
- (b) Why is sending an astronaut to Mars much more difficult than sending a man to the Moon?

