



Excellence/Exceptional Pathway

End of Topic Assessment

Space

Analysis and Targets

No.	Score	Below/On/Above	Target for next Assessment. How will you achieve it?
1	___/4		
2	___/6		
3	___/6		
4	___/4		
5	___/10		

Now complete the "Next Step" sheet you've been given and when finished attach it to the back of the paper.

Q1. Each of the observations shown below has one explanation.

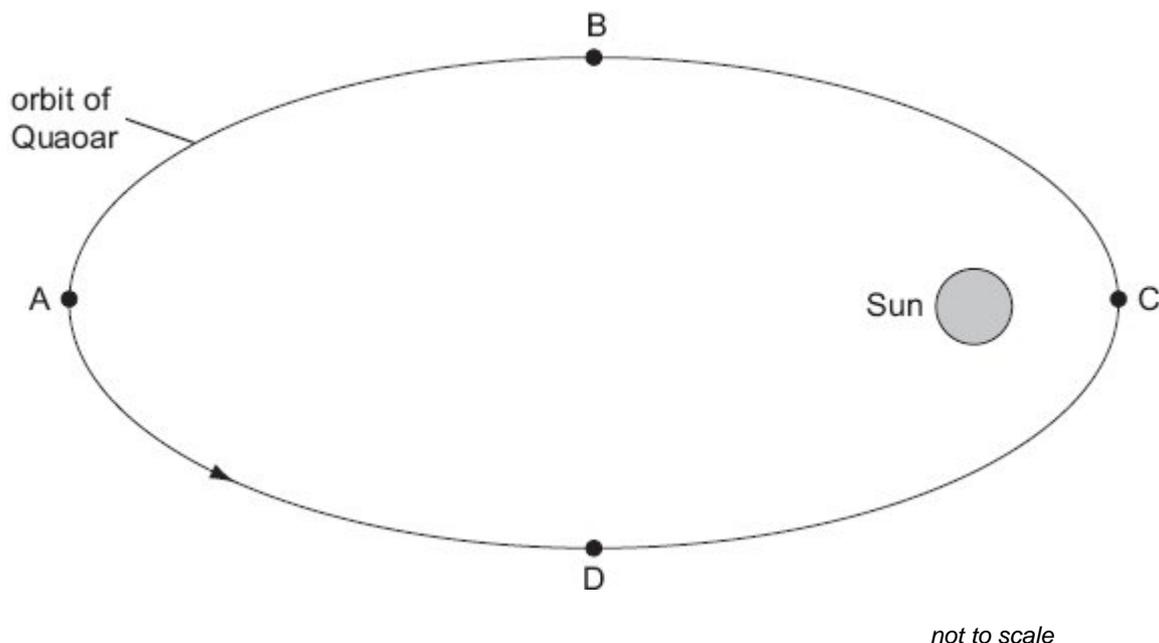
Draw a line from each observation to the correct explanation.

observation	explanation
A ship going out to sea goes out of sight.	The Earth spins on its axis.
We have day and night.	The Earth is a sphere.
We have summer and winter.	The Earth orbits the Sun and the Earth's axis is tilted.
One year on Earth is 365 days.	Gravity attracts objects towards the Earth.
	The Earth orbits the Sun.

maximum 4 marks

Q2. (a) In 2002 a large asteroid was discovered orbiting the Sun. It was named Quaoar.

The diagram below shows Quaoar in four positions in its orbit.



(i) In which of the four positions, A, B, C or D, is the effect of the Sun's gravity on Quaoar the greatest?

.....

Explain your answer.

.....
.....

1 mark

(ii) **On the diagram above**, draw arrows to show the direction of the Sun's gravity on Quaoar in each of the positions A, B, C and D.

1 mark

(iii) At which position, A, B, C or D, is Quaoar travelling most slowly?

.....

Explain your answer.

.....
.....

1 mark

- (b) The table below gives information about three of the planets in our solar system.

planet	average distance from Sun (millions of km)	time for one orbit (Earth years)	Average surface temperature of planet (°C)
Saturn	1427	30	-180
Uranus	2870	84	-210
Pluto	5900	248	-230

- (i) The time for one orbit of the planet Neptune is 165 Earth years.

Estimate the average distance of Neptune from the Sun.
Use information in the table to help you.

..... millions of km

1 mark

- (ii) How does the surface temperature of these planets vary with distance from the Sun?
Use information in the table to help you.

.....
.....

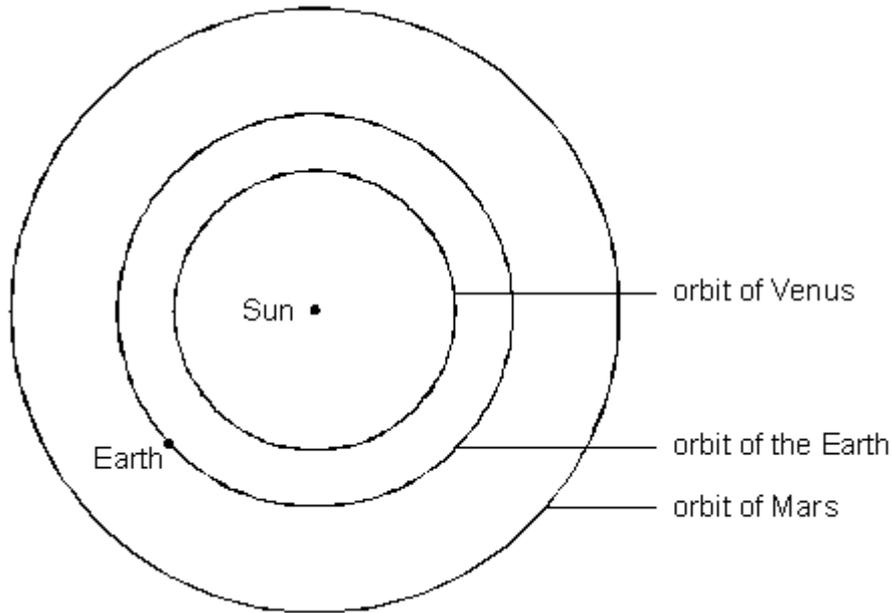
1 mark

- (iii) Explain why the temperature varies with distance from the Sun in this way.

.....
.....

1 mark
maximum 6 marks

Q3. The diagram shows the orbits of the Earth, Mars and Venus.
The position of the Earth is shown.



not to scale

A person on the Earth observes Mars and Venus.

- (a) (i) On the diagram above, draw **two** more dots to show the positions of Mars and Venus when they are closest to the Earth.

Label the dot for Mars with a letter M and the dot for Venus with a letter V.

1 mark

- (ii) Why is it easiest to see Mars when it is closest to the Earth?

.....
.....

1 mark

- (b) What force keeps the Earth in its orbit and stops it flying off into space?

.....

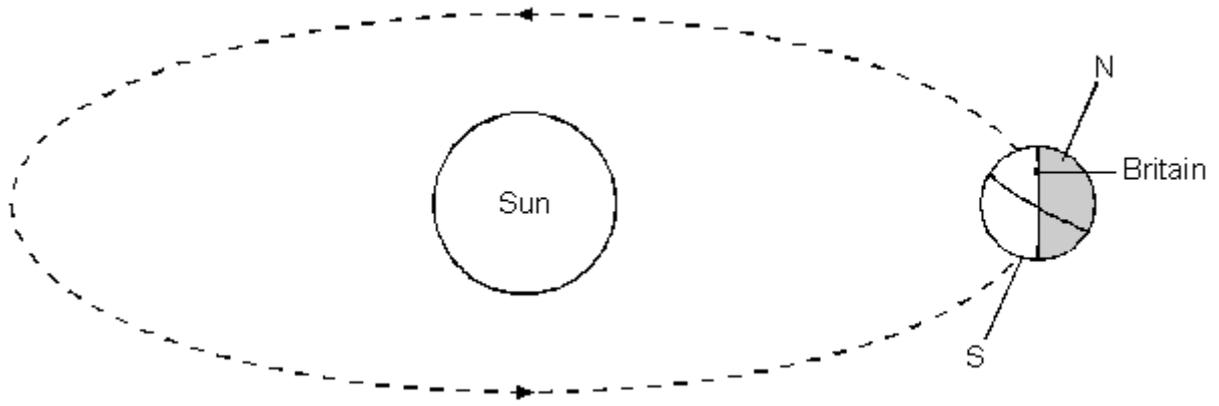
1 mark

- (c) From the Earth, the Moon always looks approximately the same size.
What can you conclude from this about the orbit of the Moon around the Earth?

.....
.....

1 mark

(d) The diagram shows the Earth in its orbit around the Sun.



not to scale

What season is it in Britain? Explain your answer.

.....

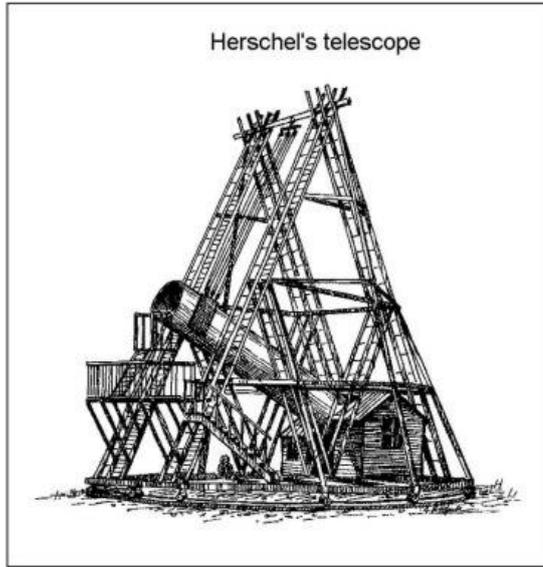
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2 marks
Maximum 6 marks

Q4. Until 1781 scientists thought there were only six planets in the solar system. Then a scientist called Herschel looked through a very large telescope that could turn to follow objects in space. He watched a bright object in the night sky for a few months and made drawings of what he saw. He concluded it was a planet.



(a) What method did Herschel use to discover the new planet? Tick the correct box.

He carried out practical tests in the laboratory.

He asked scientists' opinions.

He observed the environment.

He gathered data from books.

1 mark

(b) Scientists today use satellites as well as telescopes to observe the universe.

Suggest **one** way that developments in equipment have changed the information scientists collect about planets.

.....
.....

1 mark

(c) Before 1781, scientists believed there were 6 planets in our solar system. Now scientists believe there are 10 planets. What do these ideas suggest about our knowledge of our solar system?

.....
.....

1 mark

(d) What causes scientists to reject an idea and replace it with a new one?

.....
.....

1 mark
maximum 4 marks

Q5 Exploring space

(a) The photograph shows an Apollo 12 astronaut walking on the Moon.



Complete the sentence by putting a cross (X) in the box next to your answer.

Manned space crafts have landed on the Moon but have not yet landed on Mars.

One of the reasons is because

(1)

- A** the Moon is closer to Earth than Mars
- B** the Moon is closer to the Sun than Mars
- C** Mars is closer to the Earth than the Moon
- D** Mars is closer to the Sun than the Moon

(b) A scientist compares the sizes of some objects in space.

Which of these is the smallest? Put a cross (X) in the box next to your answer.

(1)

- A** Jupiter
- B** the Milky Way galaxy
- C** the Moon
- D** the Sun

(c) Some scientists look for signs of water on other planets. Suggest why they do this.

(1)

.....
.....

(d) The Earth is 150 000 000 km from the Sun.

It takes light 500 s to reach the Earth from the Sun. Calculate the speed of light in km/s.

(3)

speed = km/s

(e) The photograph was taken using a powerful telescope on Earth.

It shows a nebula and many stars.



(i) Explain why photographs from telescopes in space show the nebula more clearly.

(2)

.....
.....

(ii) A nebula is a cloud of gas and dust where stars are formed.

A hot object forms when gas and dust in a nebula come together.

Explain why the gas and dust come together and form a hot object.

(2)

.....
.....