

KS3 Astronomy: Solar System Test

Priority Learning

Test

Name: _____ Date: _____

Question:	1	2	3	4	5	6	7	8	Total
Marks:	7	5	7	5	5	9	8	12	58
Score:									

Aims of this test:

- Practicing answering questions about the solar system.
- Reciting knowledge learned about the planets and moons of the solar system.
- Getting used to tests and exams.
- Getting used to revising.
- Getting used to answering questions in timed conditions.

TIME ALLOWED - 1 HOUR

1. Match the moon to its description.

(7 marks)

Satellite Name	Description
Ganymede	Highly volcanic, has the least amount of water molecules in the solar system.
Triton	Known as the doomed moon.
Io	Tidally locked to its parent planet, the appenine mountain range is located on this moon.
Europa	The only moon in the solar system with a permanent, dense atmosphere.
Phobos	Thought to be a Kuiper belt object, orbits its parent planet in the opposite direction to the planets rotation.
Titan	Thought to have a liquid water ocean beneath its icy surface.
The Moon	The largest moon in the solar system.

Solution:

- **Ganymede** - The largest moon in the solar system.
- **Triton** - Thought to be a Kuiper belt object, orbits its parent planet in the oppositedirection to the planets rotation.
- **Io** - Highly volcanic, has the least amount of water molecules in the solar system.
- **Europa** - Thought to have a liquid water ocean beneath its icy surface.
- **Phobos** - Known as the doomed moon.
- **Titan** - The only moon in the solar system with a permanent, dense atmosphere.
- **The Moon** - Tidally locked to its parent planet, the appenine mountain range islocated on this moon.

2. The region beyond Neptune is called the Kuiper belt.

(a) There are 2 regions beyond this, what are they called?

(2 marks)

Solution: Scattered disc and oort cloud.

(b) The moon deimos is thought to be a captured object from the asteroid belt.

(1 mark)

(c) The dwarf planet Pluto is an object in the kuiper belt. (1 mark)

(d) The dwarf planet Ceres is thought to be an object in the asteroid belt. (1 mark)

3. Give the name of a space probe that has visited the following planets. Bonus marks available here if you can give more information about the probes and/or their missions.

(a) Mercury. (1 mark)

Solution: Messenger. Mariner 10.

(b) Venus (1 mark)

Solution: Any probe that has visited or flown by accepted, notable answers Mariner (1,2,5,10). Pioneer (1,2). Magellan. Galileo. Cassini.

(c) Mars (1 mark)

Solution: Mars rover. Viking (1,2). Spirit. Opportunity. Mariner (3,4,6,7,8,9).

(d) Jupiter (1 mark)

Solution: Pioneer (11,12), Voyager (1,2), Galileo, Cassini.

(e) Saturn (1 mark)

Solution: Cassini.

(f) Uranus (1 mark)

Solution: Voyager 2

(g) Neptune (1 mark)

Solution: Voyager 2

4. Which planet or moon do you think is most likely to have life on it? Justify your answer with comprehensive scientific arguments and facts. Imagine you are pitching to the government that this planet or moon should be explored. What would you say? (5 marks)

Solution: Sensible answer (Europa, Titan, Ganymede, Mars or any other sensible answer) **1 mark.** Each different justification scores 1 mark each.

5. Fill in the diagram below. There is 5 marks for this, if you can name more than 5 regions then they will count as bonus marks! (5 marks)

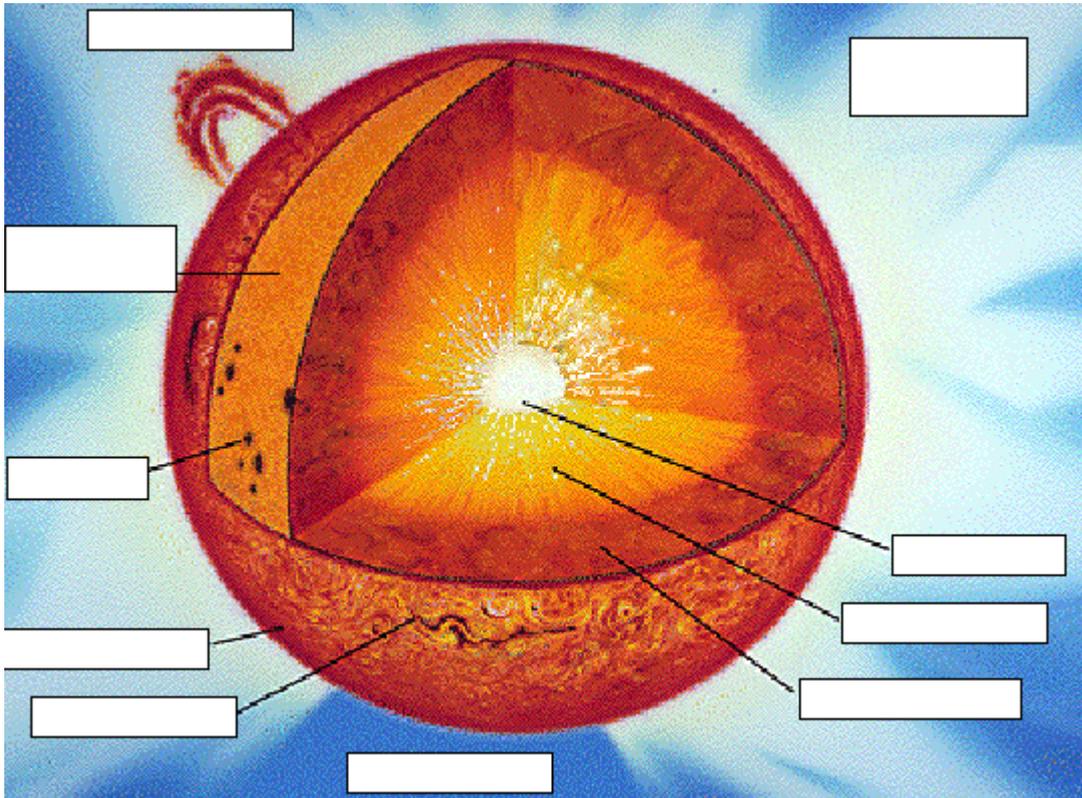


Figure 1: Image courtesy of <http://www.cornwallastro.info/m2u2a1.htm>

Solution: From the top, clockwise (starting at 1 o'clock.

- Corona.
- Core.
- Radiative zone.
- Convective zone.
- Coronal hole.
- Cool region (sunspots allowed).
- Chromosphere.
- Sunspot.
- Photosphere.
- Prominence (allow flare).

6. (a) Name the 3 conditions that must be satisfied for a celestial object to be a planet. (1 mark)
- i.

Solution: Orbits the parent star independently.

ii. (1 mark)

Solution: Roughly spherical in shape.

iii. (1 mark)

Solution: Has cleared it's orbital path of debris/other celestial objects.

(b) Use the above conditions to argue that Pluto is not a planet.

Solution: Pluto has not cleared it's orbital path (1 mark) as there are other Kuiper belt objects there (1 mark).

(c) Use the above conditions to argue that Mercury is a planet. (2 marks)

Solution: It is roughly spherical in shape, it has cleared it's orbital radius and it orbits the sun independently of any other celestial object.

(d) Use the above conditions to argue that Ganymede is not a planet. (2 marks)

Solution: It orbits Jupiter (1 mark) so does not orbit the sun independently (1 mark).

7. (a) i. What is the main component of Venus' atmosphere? (1 mark)

Solution: Carbon dioxide.

ii. Why is Venus hotter than Mercury despite the fact it is further away from the sun? (2 marks)

Solution: The carbon dioxide traps the heat in (1 mark) causing a run away greenhouse effect (1 mark).

(b) i. What are the main components of Saturn's atmosphere? (1 mark)

Solution: Hydrogen and helium.

ii. What shape is the cloud pattern on Saturn's north pole? (1 mark)

Solution: Hexagon.

(c) i. Which chemical gives Uranus it's blue/green colour? (1 mark)

Solution: Methane

ii. What is the name of Pluto's largest moon? What part of Roman mythology was it named after? (2 marks)

Solution: Charon and the ferryman of the underworld.

8. (a) What is the most popular theory for the beginning of the universe? Briefly explain it. (3 marks)

Solution: The big bang theory (1 mark). The theory that the universe started from a single point (1 mark) and exploded 13.8 billion years ago (1 mark) and expanded very quickly (1 mark) and still is rapidly expanding to this day (1 mark). Any 3 of the above scores full marks.

(b) State and explain in good detail three pieces of evidence supporting this theory.

i. (3 marks)

Solution: Cosmic microwave background. The CMB is visible at a distance of 13.8 billion light years in all directions from Earth, leading scientists to determine that this is the true age of the Universe, which the big bang model predicts is the case. Given that space has been in a state of expansion ever since the early Universe (and is expanding faster than the speed of light), the CMB is merely the farthest back in time we are capable of seeing.

ii. (3 marks)

Solution: Quasars - the most distant quasars are seen at a time when the universe was one tenth its present age, roughly a billion years after the Big Bang. It would take them around this long to form which supports the big bang model.

iii. (3 marks)

Solution: Hubble Deep Field - shows us the first ever galaxies formed, around 800 million years after the big bang.

