Year 7

Physics Friend

Space

ANSWERS

Our Cosmic Address

Page 4 questions

1. What is the name of the galaxy our solar system is part of? [1]
   Answer: Milky Way

2. List two cosmic structures larger than a galaxy. [2]
   Answer: Galaxy cluster, supercluster (accept any two from: galaxy cluster, supercluster, observable universe)

3. What is the name of our star? [1]
   Answer: The Sun (or Sol)

4. What is a planetary system? [2]
   Answer: A group of objects which orbit a star

5. Why is it called the 'observable universe'? [2]
   Answer: We can only see parts of the universe where light has had time to reach us (up to ~13.7 billion light years)

The Solar System

Page 6 questions

1. Name the four terrestrial planets. [2]
   Answer: Mercury, Venus, Earth, Mars (any four for 2 marks)

2. What are artificial satellites? [1]
   Answer: Man-made objects that orbit a planet or star

3. State two criteria an object must meet to be called a planet. [2]
   Answer: Orbit a star; be spherical; clear their orbit (any two)

4. Why is Pluto no longer considered a planet? [1]
   Answer: It doesn't clear its orbit; shares its path with other objects

5. Name the gas giant planets in the correct order from the Sun. [2]
   Answer: Jupiter, Saturn, Uranus, Neptune (1 mark for correct order, 1 for correct planets)

Earth and the Sun

Page 8 questions

1. How long does the Earth take to orbit the Sun once? [1 mark(s)]
   Answer: About $365\frac{1}{4}$ days

2. What causes day and night on Earth? [2 mark(s)]
   Answer: Earth's rotation causes day and night

3. How many hours are there in a day? [1 mark(s)]
   Answer: 24

4. Why is it warmer in summer than in winter? [2 mark(s)]
   Answer: Because the tilt of the Earth changes the angle of sunlight and the length of day

5. What is the tilt of the Earth's axis? [1 mark(s)]
   Answer: 23.5°

Earth and the Moon

Page 11 questions

1. Why does the Moon appear to shine? [1 mark(s)]
   Answer: It reflects light from the Sun

2. What is a natural satellite? [2 mark(s)]
   Answer: An object that orbits a planet and is not man-made

3. Explain why we see different phases of the Moon. [2 mark(s)]
   Answer: We see different amounts of the lit side from Earth as the Moon orbits

4. What causes tides on Earth? [2 mark(s)]
   Answer: Gravitational pull of the Moon and Sun

5. Name one phase of the Moon. [1 mark(s)]
   Answer: Any one of: Full Moon, New Moon, Waxing Crescent, etc.

Origin of the Solar System

Page 17 questions

1. What is a nebula? [1 mark(s)]
   Answer: A large cloud of gas and dust in space

2. What is the force that pulls gas together to form stars? [1 mark(s)]
   Answer: Gravity

3. What is a protostar? [2 mark(s)]
   Answer: A hot, dense region in a nebula that is forming into a star

4. What happens when nuclear fusion begins? [2 mark(s)]
   Answer: Fusion releases energy, forming a star

5. What are the two main types of planets and what are they made from? [2 mark(s)]
   Answer: Terrestrial: metal/rock; Jovian: gas/ice

Life Cycle of Stars

Page 22 questions

1. What will the Sun become after a Red Giant? [1 mark(s)]
   Answer: White Dwarf (then a Black Dwarf)

2. What causes a star to explode as a supernova? [2 mark(s)]
   Answer: When it becomes unstable after using up its fuel

3. What are two possible ends for massive stars? [2 mark(s)]
   Answer: Neutron Star or Black Hole

4. What balances gravity in a main sequence star? [1 mark(s)]
   Answer: Nuclear fusion

5. Name the first and last stage of the Sun's life cycle. [2 mark(s)]
   Answer: Protostar, Black Dwarf

Exploring Space

Page 26 questions

1. What type of spacecraft stays in orbit around a planet? [1 mark(s)]
   Answer: Orbiter

2. Name one space observatory. [1 mark(s)]
   Answer: Hubble or James Webb

3. What type of spacecraft collects samples from the surface of a planet? [2 mark(s)]
   Answer: Landers and Rovers

4. Which spacecraft type is best for visiting many objects quickly? [1 mark(s)]
   Answer: Flyby

5. What is the main function of an observatory spacecraft? [2 mark(s)]
   Answer: To study stars, galaxies, and other distant space objects

Revision Questions

Page 30 questions

1. What is the correct order of cosmic objects from smallest to largest?
   Answer: Planet → Star → Planetary system → Galaxy → Galaxy cluster → Supercluster → Observable Universe

2. What is the name of our planet, planetary system, galaxy, galaxy group, and supercluster?
   Answer: Planet: Earth
   Planetary system: Solar System
   Galaxy: Milky Way (Orion Arm)
   Galaxy group: Local Group
   Supercluster: Laniakea Supercluster

3. What three criteria must an object meet to be called a planet?
   Answer:

   It must orbit a star
   It must be approximately spherical
   It must dominate its orbit (clear its neighbourhood)

4. What is the difference between terrestrial and Jovian planets?
   Answer: Terrestrial planets have rocky surfaces (Mercury, Venus, Earth, Mars)
   Jovian planets have gaseous surfaces (Jupiter, Saturn, Uranus, Neptune)

5. What is a satellite? Name two types.
   Answer: A satellite is an object that orbits a planet.
   Natural satellite: e.g. Moon
   Artificial satellite: e.g. Hubble Space Telescope

6. How long is: a day, a year, and an hour?
   Answer:

   A day: 24 hours (time for Earth to rotate once on its axis)
   A year: $365\frac{1}{4}$ days (time for Earth to orbit the Sun)
   An hour: 1/24th of a day

7. What causes the seasons on Earth?
   Answer: The tilt of Earth's axis (23.5°) means different parts of Earth receive more or less sunlight during its orbit

8. Why do we have day and night?
   Answer: Because the Earth spins on its axis — one side faces the Sun (day), while the other is in shadow (night)

9. Why does the Moon appear to 'shine' and change shape?
   Answer: It reflects sunlight
   The phases of the Moon are caused by how much of the Sun-lit side is visible from Earth

10. Name the main phases of the Moon in order starting with New Moon.
    Answer: New Moon → Waxing Crescent → First Quarter → Waxing Gibbous → Full Moon → Waning Gibbous → Last Quarter → Waning Crescent

11. What causes tides on Earth?
    Answer: The gravitational pull of the Moon and the Sun causes the water in the oceans to bulge, creating high and low tides

12. How did the Solar System form?
    Answer: It formed from a nebula (a cloud of gas and dust). Gravity pulled the particles together, forming a protostar (the Sun), and leftover material formed planets and other bodies

13. What keeps a main sequence star stable?
    Answer: A balance between the inward force of gravity and the outward pressure from nuclear fusion in the star's core

14. What are the stages in the life cycle of a star like our Sun?
    Answer:

    Nebula → Protostar → Main Sequence Star → Red Giant → White Dwarf → Black Dwarf

15. Name and describe the four main types of space mission spacecraft.
    Answer: Observatory: A telescope in space (e.g. Hubble)
    Flyby: Flies past objects (e.g. Voyager 2)
    Orbiter: Orbits an object (e.g. Cassini)
    Landers & Rovers: Land on a surface or move around it (e.g. Curiosity, Perseverance)