S2 Physics

SPACE PHYSICS

Study Guide

The Solar System

At the end of the section I can :

- ❑ 1 Use correctly in context the following terms : moon, planet, Sun, star, solar system, galaxy, universe.
- ❑ 2 Name the planets of the Solar System.
- ❑ 3 Use correctly in context the term *light-year.*
- ❑ 4 State approximate values for the distance from the Earth to the Sun, to the next nearest star, and to the edge of our galaxy in terms of the time for light to cover these distances.
- ❑ 5 Explain that in a solar eclipse the Moon passes between the Earth and the Sun, blocking the Sun from view.
- ❑ 6 Explain that in a lunar eclipse the Earth's shadow falls on the Moon.

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Signals From Space

At the end of the section I can :

- ❑ 1 Draw a diagram showing the main features of a refracting telescope (objective, eyepiece, light-tight tube).

- ❑ 2 Explain why the brightness of an image depends on the diameter of the objective.

- ❑ 3 State that different kinds of telescope are used to detect different signals from space e.g. optical telescopes and radio telescopes.

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Space Travel

At the end of the section I can :

- ❑ 1. State that a rocket is *pushed forward* because the "propellant" is *pushed backward.*
- ❑ 2. Explain simple situations involving the rule: If A pushes B forward, then B pushes A backward.
- ❑ 3. State that the weight of an object on the Moon or on different planets is different from its weight on Earth.
- ❑ 4. State that the force of gravity near the Earth's surface gives all objects the same acceleration (ignoring the effects of air resistance)
- ❑ 5. State that objects in free fall appear weightless.
- ❑ 6. Explain satellite motion as an extension of projectile motion.
- ❑ 7. Explain why a rocket motor need not be kept on during interplanetary flight.
- ❑ 8. State that as a spacecraft re-enters the atmosphere both potential and kinetic energy are converted to heat.
- ❑ 9. State that it is possible that life exists, has existed, or will exist on other planets orbiting other stars, but we do not have any evidence that it does.
- ❑ 10. State that the extremely large distances across space present an enormous challenge to space travel.

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Origins & Endings

At the end of the section I can :

- ❑ 1. State that the physical evidence suggests that the universe began in a *Big-Bang* event.
- ❑ 2. State that stars are massive gaseous bodies undergoing nuclear reactions.
- ❑ 3. State that stars vary in size, brightness and mass.
- ❑ 4. State that large stars may eventually collapse, forming a *'Black Hole'*.
- ❑ 5. State that current models of the expanding universe suggest that it will either expand forever ending in a 'heat death'(*The Big Freeze*) or the expansion will reverse and the universe will collapse ending in *"The Big Crunch!"*
- ❑ 6. State that current observations of the universe suggest that it is not only expanding, but that the expansion also appears to be accelerating. Scientists suggest that if this acceleration continues the universe may end in "*The Great Rip."*