



**Year: 11**

**Topic: 6.4 stars and planets**

**Knowledge and Understanding to be developed:**

This topic covers the main features of our solar system and the circular orbits of planets, their moons and artificial satellites. It looks at the main observable stages in the life cycle of stars of different masses and discusses the stability of stars and explains the origin of the solar system as being due to the collapse of a cloud of gas and dust.

There are opportunities within this topic for learners to understand how scientific methods and theories develop over time. There are opportunities within this topic for learners to use theories, models and ideas to develop scientific questions, define scientific problems, present scientific arguments and ideas; to know that scientific knowledge and understanding develops over time; to communicate information and ideas in appropriate ways using appropriate terminology. Learners can be given the opportunity to understand how scientific knowledge and understanding developed over time and how the theory that the origin of the solar system from the collapse of a cloud of gas and dust was accepted.

**Key Terms to be learned this topic:**

|                 |             |
|-----------------|-------------|
| sun             | stars       |
| galaxies        | aerodynamic |
| Force extension | protostar   |
|                 | mass        |
| Giant stars     | supernova   |

**Learning Objectives and Outcomes:  
Students should be able to :**

- (a) the main features of our solar system: their order, size, orbits and composition to include the Sun, terrestrial planets and gaseous giant planets, dwarf planets, comets, moons and asteroids
- (b) the features of the observable universe (planets, planetary systems, stars and galaxies) and the use of appropriate units of distance: kilometres, astronomical units (AU) and light years (l-y)
- (c) the main observable stages in the life cycle of stars of different masses, using the terms: protostar, main sequence star, red giant, supergiant, white dwarf, supernova, neutron star and black hole
- (d) the fact that the stability of stars depends upon a balance between gravitational force and a combination of gas and radiation pressure and that stars generate their energy by the fusion of increasingly heavier elements
- (e) the return of material, including heavy elements, into space during the final stages in the life cycle of giant stars
- (f) the origin of the solar system from the collapse of a cloud of gas and dust, including elements ejected in supernovae
- (g) the Hertzsprung-Russell (H-R) diagram as a means of displaying the properties of stars, depicting the evolutionary path of a star**