

**Long
Term Plan**

In Year 10 students begin by studying Earth and as the year progresses, move further away from our home planet, through the night sky, to the Moon and then the Solar System. The topics covered focus mainly on the observation of and features of astronomical bodies and phenomena that can be seen from Earth, as well as the history of astronomy as a discipline, the development of key theories and the role of astronomy in ancient civilisations.

	Learning Cycle	Key Concepts and Themes	Vocabulary
HT1	Planet Earth	<ul style="list-style-type: none"> • Earth's size, shape and internal divisions • Coordinate systems and divisions of the surface 	Oblate spheroid, core, mantle, longitude, latitude, equator, tropic, prime meridian, skyglow, zenith, seeing
	Celestial navigation	<ul style="list-style-type: none"> • The celestial sphere and coordinate systems • Visible astronomical objects and phenomena 	Constellation, IAU, asterism, nebulae, galaxy, supernova, celestial sphere, right ascension, declination, altitude, azimuth
HT2	Celestial navigation cont.	<ul style="list-style-type: none"> • Motion of the stars. 	Meridian, culmination, circumpolar, transit, dark adaptation, seeing conditions, Bortle/Antoniadi Scales
	The lunar disc	<ul style="list-style-type: none"> • Size, shape and features of the Moon, including their origins. • The Moon's orbit and visibility 	Crater, maria, terrae, rille, synchronous, tidal locking, libration,
	Exploring the Moon	<ul style="list-style-type: none"> • Internal divisions of the Moon. Theories of its origin. Lunar exploration. The Apollo programme 	Far Side, escape velocity, Giant Impact Hypothesis, Capture Theory, Co-accretion Theory
HT3	Exploring the Solar System	<ul style="list-style-type: none"> • Names and locations of astronomical bodies. • Characteristics of planets, comets and meteoroids. • The role of comets in meteor showers and the origin of water on Earth. • Size of the solar system and the astronomical unit. • Types of telescopes, their features, advantages and disadvantages. • Space probes 	Planet, dwarf planet, SSSO, asteroid, meteoroid, comet, radiant, Kuiper belt, Oort cloud, heliosphere, gas giant, satellites, ecliptic, zodiacal band, fly-by, impactor, lander, orbiter refracting telescope, reflecting telescope, concave, convex, Galilean/ Newtonian/ Schmidt-Cassegrain/ Keplerian telescopes, objective, eyepiece, focal length, magnification, resolution, heliocentric, chromatic aberration, aperture,
HT4	Solar System Observation	<ul style="list-style-type: none"> • The changing position of the sun, moons and planets in the sky; the motion within the zodiacal band and retrograde motion • Positions of planets and their observational impact 	Retrograde, superior, inferior conjunction, opposition, greatest elongation, transit, occultation
HT5	The Earth-Moon-Sun System	<ul style="list-style-type: none"> • Relative distances and sizes. • The observations of Eratosthenes and Aristarchus • Precession of the Earth's axis • Tides, solar and lunar eclipses. 	Precession, neap tide, spring tide, eclipse, totality, umbra, umbral contacts, annular eclipse, syzygy
	Early Models of the Solar System	<ul style="list-style-type: none"> • The use of solar and lunar cycles by ancient civilisations • The geocentric model, Ptolemy and epicycles 	Archeoastronomy, alignment, precession, geocentric, epicycle, Ptolemy, AU, parsec
	Planetary Motion and gravity	<ul style="list-style-type: none"> • Galileo's observations and impact on the heliocentric model • Impact of the work of Tycho Brahe, Copernicus and Kepler 	Tycho Brahe, Copernicus, Kepler, elliptical orbit,

Year 10: Astronomy

HT6	Planetary Motion and gravity cont.	<ul style="list-style-type: none"> The role of gravity in stable orbits Kepler's Laws of Planetary motion and Newton's Law of Universal Gravitation, including the role of mass and orbit radius. 	Aphelion, perihelion, apogee, perigee
	Solar astronomy	<ul style="list-style-type: none"> Methods for solar observation Division of the Sun and their features Energy production and transfer within the sun, including the proton-proton cycle for nuclear fusion Sun spots; the solar cycle and the solar wind Appearance of the sun in different electromagnetic wavelength 	H-alpha, radiative zone, core, convective zone, photosphere, chromosphere, corona, plasma, sunspot, solar wind, magnetosphere, Van Allen belts

Skill Development	<ul style="list-style-type: none"> Observation skills: How to plan and prepare for an astronomical observation. Use of star charts, planispheres and computer software to navigate the sky. Mathematical skills: Use geometrical arguments for astronomical measurements, graphing skills for the presentation and analysis of data, use of formulae and equations. Study skills: Development of strategies for learning knowledge, selecting appropriate knowledge. Evaluation skills: Evaluating and improving observational designs. Scientific/cultural awareness: Understand the development of and in the field of astronomy, its theories and its importance to human civilisation.
	<ul style="list-style-type: none">

Potential observational tasks: (These may be fully or partially planned as a class, or done independently depending on the task).

Year 10: Astronomy	HT1	Introduction to Observational Tasks: Navigating the night sky: Finding and drawing constellations
	HT2	A5: Estimating levels of light pollution
	HT3	A2/B2: Finding the radiant point of a meteor shower
	HT4	B1: Demonstrate the changing appearance of lunar features
	HT5	B4: Measure a celestial property using telescopic drawings or photographs of a suitable event
	HT6	A6: Estimate the solar rotation period using drawings of sunspots