Year 10: Earth and Space- The Universe

Revise assumed knowledge: **SC4-12ES** describes the dynamic nature of models, theories and laws in developing scientific understanding of the Earth and solar system **SC4-13ES** explains how advances in scientific understanding of processes that occur within and on the Earth, influence the choices people make about resource use and management **SC51VA** appreciates the importance of science in their lives and the role of scientific inquiry in increasing understanding of the world around them	☐	
DESCRIBING THE UNIVERSE		
ES1 Scientific understanding, including models and theories, are contestable and are refined over time through a process of review by the scientific community (ACSHE157, ACSHE191)		
5ES1a. outline some of the major features contained in the universe, including galaxies, stars, solar systems and nebulae (ACSSU188) ***5ES1c. use appropriate scales to describe differences in sizes of and distances between structures making up the universe***		
Literacy activity (ESL focus): Key words. Universe, star, galaxy, solar system, big bang theory, model, light years, force, gravity, mass, weight, electromagnetic radiation, Doppler effect	☐	
Watch 'The Pale blue dot' by Carl Sagan (several minutes)	☐	
Numeracy: Compare unit used for measuring distance on earth (km), with solar system (AU) and space (LY) (Oxford pg249)	☐	
Research task: Sizes and distances in the Universe (Oxford pg248)	☐	
Articulate that light years are a unit of distance, not time	☐	
Identify the main element components of stars	☐	
Explain the difference between the apparent and absolute magnitude of a star	☐	
Describe the typical life cycle of a star	☐	
Explain that nuclear fusion powers the stars	☐	
CODE: 10ES1 First-hand Investigation: Calculating the distance to the Sun (Oxford pg253)	☐	
Explain how stellar parallax is used to calculate distance between Earth and stars	☐	
Numeracy: Calculating the distance of a the star using stellar parallax (Oxford pg252)	☐	
Describe the following; galaxies, nebulae and solar systems (Oxford pg245)	☐	
Recall the main features of our solar system	☐	

Numeracy: Convert distances using ratios to produce scale model of our Solar System	☐	
What defines a planet	☐	
Assessment: Describing the Universe checkpoint test	☐	
Assessment: Oxford online test- Describing the Universe Students to achieve 100% in Support and Consolidate **OR** Consolidate and Extend	☐	
INVESTIGATING THE UNIVERSE		
5ES1b. describe, using examples, some technological developments that have advanced scientific understanding about the universe		
Describe why different cultures have different constellations and different stories to accompany them	☐	
Discuss different cultural beliefs on the age and origin of the universe	☐	
Research task: Research Galileo's observation of Jupiter's moons and the significance of his conclusions	☐	
Identify the difference between astronomy and astrology and explain why astrology is a pseudo-science	☐	
Describe the importance of the invention of the telescope in investigating the universe	☐	
Research task: Process information from secondary sources to evaluate technologies (pros and cons) for obtaining information about the Universe; • Optical Telescope – discovery and accurate observations of planets in Solar System • Light, x-ray, gamma-ray, radio frequency telescopes (EM Spectrum) • Hubble – discovery of Galaxies • Space telescopes	☐	
Explain the limitations of Earth-bound telescopes	☐	
Provide some examples of Australian contribution to the study of the universe (Oxford pg259)	☐	
With reference to the oxygen, nitrogen and phosphorus cycles explain the difficulties associated with human attempts to inhabit the Moon or Mars (Oxford pg260)	☐	
CODE: 10ES2 First-hand Investigation: Student Design Task: Moon base (Oxford pg263)	☐	
Assessment: Investigating the Universe checkpoint test	☐	
Assessment: Oxford online test- Investigating the Universe Students to achieve 100% in Support and Consolidate **OR** Consolidate and Extend	☐	

HISTORY OF THE UNIVERSE		
5ES1e. use scientific evidence to outline how the Big Bang theory can be used to explain the origin of the universe and its age (ACSSU188) ***5ES1f. outline how scientific thinking about the origin of the universe is refined over time through a process of review by the scientific community***		
Explain the difference between emission and absorption spectra	☐	
Explain redshift and how it can be used to measure the movement of galaxies	☐	
CODE: 10ES3 First-hand Investigation: Investigating the emission spectra (Oxford pg267)	☐	
Explain the processes involved in developing a scientific theory (Oxford pg269)	☐	
CODE: 10ES4 First-hand Investigation: Model the expansion of the universe (Oxford pg270)	☐	
With reference to the Big Bang Theory explain why scientific theories are constantly being revised as new information is discovered	☐	
Numeracy: Investigating Hubble's Law (Oxford pg270)	☐	
Briefly explain the main events of the Big Bang	☐	
5ES1d. identify that all objects exert a force of gravity on all other objects in the universe		
Define mass, weight and gravity	☐	
Compare mass/weight due to gravity on Earth + Moon + other planets	☐	
Describe the role of gravity in the formation of the universe	☐	
List and briefly explain some of the evidence that supports the Big Bang Theory- eg. Doppler effect and Cosmic Background Radiation (CBR)	☐	
Use ICT animations to explain Doppler effect	☐	
Literacy: COSMOS. Students research a related article of their choice and then write a series of questions that MUST include 5 multiple choice, 2 identify, 2 describe, 1 explain and either 1 assess or evaluate.	☐	
Assessment: History of the Universe checkpoint test	☐	
Assessment: Oxford online test- History of the Universe Students to achieve 100% in Support and Consolidate **OR** Consolidate and Extend	☐	
Assessment: THE UNIVERSE CHAPTER TEST	☐	
Comments and Suggested improvements **Name:** **Signature:** **Date:**		

Additional Content: Extension/GATS

5ESadd1 relate colours of stars to their age, size and distance from the Earth		
relate colours of stars to their age, size and distance from the Earth	☐	
5ESadd2 describe evidence used to support estimates of time in the universe		
Research task(s): describe evidence used to support estimates of time in the universe	☐	