



The Sutton Academy

Knowledge Rich Curriculum Plan

SCIENCE- Physics Year 10

Lesson/Learning Sequence	Intended Knowledge: <i>Students will know that...</i>	Prior Knowledge: <i>In order to know this, students need to already know that...</i>	Working Scientifically	Tiered Vocabulary and Reading Activity
Lesson: Our Solar System	- Students will know that the Sun is the star of our Solar System. - Students will know that our Solar system contains planets, dwarf planets, asteroids moons and comets.	<i>Students need to already know the order of the planets in our Solar system is Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus</i> <i>Students need to already know that planets within our Solar System orbit the Sun</i>	Interpreting data	<i>Tier 2:</i> <i>Celestial: relating to space</i> <i>Tier 3:</i> <i>Satellite: an object that is in orbit around a planet</i>

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	- Students will know that our solar system is part of the Milky Way galaxy. - Students will know that galaxies contain billions of stars - Students will know that moons are natural satellites. - Students will know that moons orbit planets, and planets (and dwarf planets) orbit the Sun.			Comet: An icy celestial object that is part of a Solar System
Lesson: Life Cycle of Stars	- Students will know that a nebula is a cloud of dust and gas - Students will know that the cloud of dust and gas is pulled together by gravitational attraction. - Students will know that the dust and gas drawn together by gravity causes fusion reactions - Students will know that fusion reactions lead to an equilibrium between the gravitational collapse of a star and the expansion of a star due to fusion energy. - Students will know that the life cycle of a star depends on the size of the star. - Students will know that a star the same size of the Sun will go from nebula > protostar > main sequence star > red giant > white dwarf > black dwarf - Students will know that a star much bigger than the Sun will go from nebula > protostar > main sequence star > red super giant > supernova > neutron star/ black hole - Students will know that fusion in stars produce all of the naturally occurring elements.	Students need to already know that the Sun is a star - Students need to already know that nuclear fusion is where two small nuclei fuse together to form a larger nucleus.		Tier 3: Nebula: cloud of gas and dust Supernova: Explosion of a massive star Black hole: part of the life cycle of a star that has gravitational force so strong that light can't escape

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	- Students will know that elements heavier than iron are produced in a supernova - Students will know that a supernova is an explosion of a massive star - Students will know that the supernova distributes the elements throughout the universe.			
Lesson: Orbits and Satellites	- Students will know that gravity provides the force that allows planets and satellites to maintain their circular orbits. - Students will know that satellites can be natural (e.g. the moon) and artificial - Students will know that satellites can be either geostationary (position above Earth doesn't change) or orbital (also known as polar) - Students will know how to explain that velocity changes and speed stays constant - Students will know that as an orbiting object gets closer to the object its orbiting, its speed increases.	<i>Students need to already know that planets orbit the Sun.</i> <i>Students need to already know that moons orbit the planets</i> <i>Students need to already know that velocity is a vector quantity</i>	Interpreting data	Tier 2: <i>Artificial: man-made</i> Tier 3: <i>Satellite: object that orbits planets</i>
Lesson: Red-Shift and the Big Bang	- Students will know that an increase in wavelength of light is observed from most distant galaxies. This effect is called red-shift - Students will know that further away galaxies have bigger observed increases in wavelengths. This suggests that they are moving away faster. - Students will know that red-shift provides evidence that the universe is expanding. - Students will know that the Big Bang theory is supported by the	<i>Students need to already know that the Big Bang Theory is the accepted theory of the start of the Universe</i>	Interpreting graphs Evaluating data	Tier 3: <i>Big Bang theory: theory of the beginning of the Universe where it began as a hot dense area.</i>

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	<i>evidence of red shift and cosmic microwave background radiation</i> • <i>Students will know that the Big Bang theory suggests that the universe began from a very small region that was extremely hot and dense.</i> • <i>Students will know that observations of supernovae suggests that distant galaxies are moving faster.</i> • <i>Students will know how to explain that the change of each galaxy's speed with distance is evidence of an expanding universe</i> • <i>Students will know how to explain the evidence for the Big Bang model</i> • <i>Students will know how to explain how scientists are able to use observations to arrive at theories such as the Big Bang theory</i> • <i>Students will know that there is a large amount of the Universe that is still not understood, such as dark mass and dark energy.</i>			