Information for Course Syllabus

Name of Course: Astronomy Honors

Grade Level: 11-12

School: ORHS

Major Assignments: Star Watching Logs, Star Project

Field Trips: Possible public viewing evening

How can parents access instructional materials? Canvas

Astronomy Honors
2021-2022

Term 1

Observing the Sky	**ESS.ESS1.5** Analyze and compare image data from instruments used to study deep space (e.g., visible, infrared, radio, refracting and reflecting telescopes, and spectrophotometer). Evaluate the strengths and weaknesses of the instrumentation.
	PHYS.PS4.5 Evaluate the characteristics of the electromagnetic spectrum by communicating the similarities and differences among the different bands. Research and determine methods and devices used to measure these characteristics.
	ESS.ESS1.6 Recognize how advances in deep space research instrumentation over the last 30 years have led to new understandings of Earth's place in the universe and how these advances have benefitted society.

Our Solar System	**ESS.ESS1.7** Analyze and interpret data to compare, contrast, and explain the characteristics of objects in the solar system including the sun, planets and their satellites, planetoids, asteroids, and comets. Characteristics include: mass, gravitational attraction, diameter, and composition.
	ESS.ESS1.8 Use mathematical or computational representations to predict motions of the various kinds of objects in our solar system, including planets, satellites, comets, and asteroids, and the influence of gravity, inertia, and collisions on these motions.
	ESS.ESS1.9 Evaluate the evidence for the role of gravitational force and heat production in theories about the origin and formation of Earth. Design a research study to confirm or refute one aspect of such evidence.
	ESS.ESS1.10 Summarize available sources of data within the solar system which provide clues about Earth's formation. Using engineering principles, design a means to gather more data.

The Sun	**ESS.ESS1.3** Analyze and interpret data about the mass of a star to predict its composition, luminosity, and temperature across its life cycle, including an explanation for how and why it undergoes changes at each stage.
	ESS.ESS1.4 Communicate scientific ideas to explain the nuclear fusion process and how elements with an atomic number greater than helium have been formed in stars, supernova explosions, or exposure to cosmic rays.
	ESS.ESS1.7 Analyze and interpret data to compare, contrast, and explain the characteristics of objects in the solar system including the sun, planets and their satellites, planetoids, asteroids, and comets. Characteristics include: mass, gravitational attraction, diameter, and composition.

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Term 2

Starlight and Star Evolution	**PHYS.PS4.3** Understand that the reflection, refraction, and transmission of waves at an interface between two media can be modeled on the basis of characteristics of specific wave parameters and parameters of the medium.
	PHYS.PS4.5 Evaluate the characteristics of the electromagnetic spectrum by communicating the similarities and differences among the different bands. Research and determine methods and devices used to measure these characteristics.
	PHYS.PS4.7 Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model.
	ESS.ESS1.3 Analyze and interpret data about the mass of a star to predict its composition, luminosity, and temperature across its life cycle, including an explanation for how and why it undergoes changes at each stage.
	ESS.ESS1.4 Communicate scientific ideas to explain the nuclear fusion process and how elements with an atomic number greater than helium have been formed in stars, supernova explosions, or exposure to cosmic rays.

Galaxies and Black Holes	**ESS.ESS1.2** Construct a model using astronomical distances to explain the spatial relationships and physical interactions among planetary systems, stars, multiple-star systems, star clusters, galaxies, and galactic groups in the universe.
	ESS.ESS1.3 Analyze and interpret data about the mass of a star to predict its composition, luminosity, and temperature across its life cycle, including an explanation for how and why it undergoes changes at each stage.
	ESS.ESS1.4 Communicate scientific ideas to explain the nuclear fusion process and how elements with an atomic number greater than helium have been formed in stars, supernova explosions, or exposure to cosmic rays.
	ESS.ESS1.1 Construct an explanation regarding the rapid expansion of the universe based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.

Review and Final Exam