

General Course Information

Course Name: Astronomy	
Department: Science	Grade Level(s): 11-12
Duration/Credits: 1 Semester (0.5 Credits)	Prerequisites: Successful completion of a high school level science course which will allow students to: • Interpret and display data. • Draw and defend conclusions. • Comprehend scientific reading. • Complete and communicate research.
BOE Approval Date: December 2022	Course Code: H3160
Course Description:	
This introductory Astronomy course offers the student an opportunity to explore the basics of celestial bodies and phenomena, such as planets, moons, stars, nebulae, galaxies, light, and comets. This course includes a wide variety of hands-on learning experiences with technology, models, and posters to gain an understanding of the large-scale structure of the universe. This course also includes career exploration in Astronomy, in addition to presenting current event topics in this quickly changing field. Additional enhancement topics covered are: Space travel, the Hubble Telescope, The International Space Station, dark matter, and cosmology.	
Course Rationale:	
Astronomy promotes rational thinking, and an understanding of the nature of science, through examples drawn from the history of science and from current event issues. Astronomy is an interdisciplinary course which can be used to illustrate many concepts of physics, such as gravitation, light, and spectra. The challenges of space exploration have sparked new scientific and technological knowledge of inherent value to humankind.	
Course Objectives:	
1. Using a model of the Earth, sun, and moon, the student will demonstrate the phases of the moon and construct a drawing illustrating the cycle of the lunar phases indicating the time period in which they would occur.	

2. Using a model of the Earth, sun, and moon, the student will illustrate the types of solar and lunar eclipses and how they are viewed from the Earth.
3. Using the altazimuth system, declination/right ascension, the student will locate, measure, and discuss the positions of constellations, planets and other celestial objects in the night sky.
4. The student will analyze the celestial sphere to distinguish between Earth's real and apparent motion.
5. The student will investigate the atomic structure relating to the electromagnetic spectrum and construct bright-line spectra to determine temperature and composition of stars.
6. The student will construct ellipses and calculate their eccentricities to relate to Kepler's and Newton's Laws of motion.
7. The student will read about and construct models of each planet to compare size and the distance of each planet from the sun.
8. The student will identify and classify the structure and composition of galaxies, and outline their origins and formation.

Standards Alignment:

History:

9-12.ESS1.A.2 Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.

9-12.ESS1.C.2 Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history.

Light/ Telescopes:

9-12.PS3.A.2 Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative position of particles (objects).

9-12.PS1.B.1 Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.

Solar System:

9-12.PS2.B.1 Use mathematical representations of Newton's Law of Gravitation to describe and predict the gravitational forces between objects.