

DEPARTMENT: SCIENCE	COURSE TITLE: ASTRONOMY COURSE NUMBER: 250A
GRADE(S): 11-12	PRE-REQUISITES (IF ANY): ALGEBRA

UNIT	LENGTH	CONTENT	SKILLS	METHODS OF ASSESSMENT	FRAMEWORK STRAND(S) & STANDARD(S)
Unit 1: Celestial Sphere Model	13 days	<ul style="list-style-type: none"> Locate objects in the sky History of astronomy Celestial Sphere Model Daily and annual motions of the sun and stars Sunrise and sunset positions Reasons for the seasons Retrograde motion of planets Phases of the Moon Observational relationships between planets 	Students will: <ul style="list-style-type: none"> Use a variety of coordinate systems. Construct and present a historical time line. Build a Celestial Sphere Model. Interpret a Celestial Sphere Model. Understand relative motion of objects in the Solar System. Read star maps. Understand directional orientation. Analyze horizon diagrams for the northern hemisphere. Define and understand terms. Analyze data. Apply order of magnitude concepts to sizes of celestial objects. Observe, record, and report on real phenomena. Draw diagrams. Demonstrate understanding of scale modeling. Take measurements. Extract information from computer sources. 	<ul style="list-style-type: none"> Pre and post tests Locating objects in the sky lab Plotting the daily motion of the sun lab Building and using a celestial sphere lab Modeling the sun's motion on the celestial sphere lab Plotting the Distance from the Earth to the Sun lab Modeling the Reasons for the Seasons lab Worksheets Observational project Quiz Unit exam (CP) Unit notebook check For labs and tests: (Honors extensions are available for extra credit) 	Earth Science: Matter and Energy in the Earth System: 1.8, 1.9., 1.14 The origin and Evolution of the Universe: 4.2, 4.4
Unit 2.: Planetary Motion	12 days	<ul style="list-style-type: none"> Ptolemaic and Copernican systems Development of modern model of planetary motion Copernican equations for planetary distances Kepler's Laws of planetary motion Phases of Venus Newton's Three Laws of Motion Universal gravitation Mass and weight Orbital velocities Surface gravity Escape velocities 	Students will: <ul style="list-style-type: none"> Differentiate between earth-centered and sun-centered models. Use and analyze historical data. Solve equations. Draw diagrams. Practice modeling. Draw scale diagrams. Relate equations to observational phenomena. Construct computer models. 	<ul style="list-style-type: none"> Mars orbit lab Explorer 35 orbit lab Computer orbit simulations lab Worksheets Problem sets Quiz Unit notebook check Unit exam Kepler's Third Law activity 	Earth Science: Matter and Energy in the Earth System: 1.14 The Origin and Evolution of the Universe: 4.5, 4.6 Physics: Motion and Forces: 1.5, 1.6, 1.7, 1.10, 1.11, 1.12
Unit 3: The Solar	13 days	<ul style="list-style-type: none"> Components of the solar system Characteristics of terrestrial planets 	Students will: <ul style="list-style-type: none"> Describe models for the formation of the 	<ul style="list-style-type: none"> Quiz Unit notebook check 	Earth Science: Matter and Energy in the

System		<ul style="list-style-type: none"> • Characteristics of Jovian planets • Solar nebulae theory • Origins of planetary atmospheres • Types and origins of asteroids • Oort cloud and comets • Formation of the solar system • Planetary moons and rings • Earth's moon: composition, origin, motion • Seasons • Solar and lunar eclipses • Synchronous rotation 	<p>solar system.</p> <ul style="list-style-type: none"> • Describe differences between terrestrial and Jovian planets. • Relate differences in planets to validate models for formation of the solar system. • Extract material from videos and textbook. • Diagram and model eclipses. • Model seasons on Earth. 	<ul style="list-style-type: none"> • Unit exam • Video-based worksheets • Relative position and motion using the Earth, Sun, Moon models • Oral summaries about an object in the solar system • Peer evaluation of oral presentations • Lab practical 	<p>Earth System: 1.6, 1.8, 1.9, 1.14</p> <p>Earth Processes and Cycles: 3.4, 3.14</p> <p>The Origin and Evolution of the Universe: 4.5, 4.8</p> <p>Physics: Conservation of Energy and Momentum: 2.5</p>
Unit 4: Measuring Properties of Stars	10 days	<ul style="list-style-type: none"> • Properties of the Sun • Properties of stars • Astronomical distances • Methods of measurement • Inverse square law • Relative and absolute magnitude of stars • Electromagnetic spectrum • Production of electromagnetic radiation • Speed of light • Spectral analysis and classes of stars • Doppler shift • Wien's Law • H-R diagrams • Proper motion 	<p>Students will:</p> <ul style="list-style-type: none"> • Solve equations. • Draw and analyze diagrams. • Categorize properties. • Analyze relative motions. • Analyze H-R diagrams. • Analyze actual star data. • Use a spectroscope. 	<ul style="list-style-type: none"> • Parallax of a star lab • Distances to a star lab • Proper motion of a star lab • Plotting an H-R diagram lab • Spectra of seven elements lab • Measuring the universe with color lab • Quiz • Unit notebook check • Unit exam • Lab practical 	<p>Earth Science: Matter and Energy in the Earth System: 1.2, 1.4, 1.14</p> <p>The Origin and Evolution of the Universe: 4.2, 4.3, 4.7</p> <p>Chemistry: Atomic Structure: 2.3, 2.5, 2.6</p> <p>Physics: Waves: 4.6</p> <p>Electromagnetic Radiation: 6.1, 6.2</p>
Unit 5: Stellar Evolution	12 days	<ul style="list-style-type: none"> • Life history of stars • Properties of a main sequence star • Properties of black holes • Factors affecting lifetime of a star • Death of stars • Red giants, white dwarfs, neutron stars, pulsars, black holes • Nucleosynthesis • Supernovas • Hubble's Law and the Hubble Constant • Big bang theory • Galaxies • Variety of cosmological topics presented as student projects 	<p>Students will:</p> <ul style="list-style-type: none"> • Present a project orally. • Research a topic. • Write a 2-3 page topic summary. • Develop openness to new ideas. • Extend collectable data to theory formation. • Analyze H-R diagrams. • Predict the evolutionary path of a star. • Use really BIG numbers. • Classify and identify galaxies from Hubble photographs. • Draw analogies. 	<ul style="list-style-type: none"> • Classifying and identifying galaxies lab • Stellar evolution lab • Project report • Oral presentation • Unit exam • Unit notebook check 	<p>Earth Science: Matter and Energy in the Earth System: 1.14</p> <p>The Origin and the Evolution of the Universe: 4.1, 4.3, 4.4,</p> <p>Chemistry: Atomic Structure: 2.9</p> <p>Physics: Motion and Forces: 1.11</p> <p>Electromagnetic Radiation: 6.2</p>