

## Physics 11th Grade

### Unit 2: Astronomy

#### Enduring Understanding:

- The principles of Physics can be applied both on Earth and throughout the universe.
- The same laws of Physics which govern Earth, govern other planets, and galaxies.
- The Earth orbits the sun due to the sun's gravitational force, caused by the sun's mass.
- Students have confidence in applying and manipulating algebraic equations to describe and predict relationships.

#### Essential Questions:

- Why and how do objects orbit? (i.e. Moon and Earth, Earth and Sun, etc.)
- What is the sun's role in our galaxy?
- What are stars?

Time Frame	Student Learning Expectations: Students will know:	Standard(s):	Key Terminology	Activities & Assessments	Resources & Materials:
4 weeks	<p>SWBAT manipulate algebraic equations to explain a relationship between variables.</p> <p>SWBAT explain the role of gravity both on Earth and in the Universe.</p> <p>SWBAT develop scale models of large systems.</p> <p>SWBAT use scientific notation to make sense of large numbers.</p>	<p>P-PS1-2AR Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.</p> <p>P-PS2-1 Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a</p>	<p>Gravity, Rotational Motion, Radians, Degrees, Rotational Motion, Ellipses, Kepler's Law, Gravitational Constant, Centripetal Motion, Constellations, Stars.</p>	<p>Sample Week Plan:</p> <p><b>Monday-</b> Textbook and lecture</p> <p><b>Tuesday-</b> Read an article from Newsela, or ACS linked below</p> <p><b>Wednesday-</b> Conduct a lab</p> <p><b>Thursday-</b> Have students discuss, create graphs, and analyze their data from lab</p> <p><b>Friday-</b> Review</p>	<p><b>Lab Materials:</b></p> <p>String, balls, tables, times, sand paper, graph paper, various objects to roll, cardboard, pipe cleaners, pom-poms, hot glue guns, toothpicks, general art materials</p> <p><b>Online</b></p>

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		<p>macroscopic object, its mass, and its acceleration.</p> <p>P-ESS1-2 Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.</p> <p>P-ESS1-4 Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.</p> <p>P-PS2-4AR Analyze data to demonstrate the relationship between rotational and linear motion, energy, and momentum.</p> <p>P-PS4-3AR Develop and use models to describe the interaction of light with matter.</p>		<p>using concept maps, graphic organizers, flash cards, Quizlet, and have students complete an assessment/quiz on topics covered</p> <p><a href="#">Intro to Gravity Pt.1</a></p> <p><a href="#">Intro to Gravity Pt. 2</a></p> <p><a href="#">Kepler's Laws</a></p> <p><a href="#">Constellation Project</a></p> <p>Have students make a scale model of the Solar System either in the classroom, on the football field, or personal diagrams. Can be coupled with Kepler's Law Assignment</p> <p><a href="#">Drake Equation</a></p>	<p><b>Resources:</b></p> <p>Google Sheets</p> <p><a href="#">Physics Aviary-- Online Games and Simulations</a></p>
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