

8th grade Astronomy
2017 Science P.L.U.S. Institute
 Roper Mountain Science Center
 Greenville, South Carolina

Academic Course Description:

Hands-on, inquiry-based activities emphasizing science process skills will provide the vehicles for studying astronomy and space science concepts that correlate to the 8th grade South Carolina Science Academic Standards. Typically, space science and astronomy are included as a part of the middle school earth science curriculum. This course takes that view, but also shows the connections to other science disciplines, particularly physical science, technology, and science process skills. The earth, its relationship to the sun and other members of our solar system and its place in the Universe, are studied through a variety of activities, models, and devices. By gaining a better understanding of basic concepts, participating teachers will be able to help their students understand these same principles. Participants receive materials and supplies for performing the activities in their classrooms.

Outline of Course Content:

Astronomy 8.E.4 The student will demonstrate an understanding of the universe and the predictable patterns caused by Earth's movement in the Solar System.

	Topics	Activities or Assignments	Correlation to SC Science Standards
Day 1	Introduction Earth Motions	<ul style="list-style-type: none"> • Discuss possible explanations of the universe GEMS: Earth, Moon and Stars • Examine ancient models of the Earth and solar system Ideas about Earth and Universe • Ancient Astronomers: Galileo • Pocket Solar System • Astronomy Apps 	8.E.4A.1 Obtain and communicate information to model the position of the Sun in the universe, the shapes and composition of galaxies, and the measurement unit needed to identify star and galaxy locations. 8.E.4A.2 Construct and analyze scientific arguments to support claims that the universe began with a period of extreme and rapid expansion using evidence from the composition of stars and gases and the motion of galaxies in the universe. 8.S.1A.2 Develop and Use Models
Day 2	Solar System Galaxy Stars Constellation s	<ul style="list-style-type: none"> • Ancient Astronomers: Tycho Brahe • Solar System Walk • Galaxy Walk • Learn to use the Star Clock, Star Finder, Make Star Frames • Tablet Apps + Astronomy • Visit the Planetarium • TOPS 41 For Teachers: Planets and Stars activities • TOPS 40 For Teachers: Earth, Moon, and Sun activities 	8.E.4A.1 8.E.4B.1 Obtain and communicate information to model and compare the characteristics and movements of objects in the solar system (including planets, moons, asteroids, comets, and meteors). 8.E.4B.2 Construct explanations for how gravity affects the motion of objects in the solar system and tides on Earth. 8.E.4B.3 Develop and use models to explain how seasons, caused by the tilt of Earth's axis as it orbits the Sun, affects the length of the day and the amount of heating on Earth's surface. 8.S.1A.2 Develop and Use Models

Day 3	<p>The Sun</p> <p>Shadows</p> <p>Meteors</p> <p>Comets</p> <p>Craters</p>	<ul style="list-style-type: none"> • Ancient Astronomers: Johannes Kepler • Construct and demonstrate the use of the Solar Motion Demonstrator • Construct and demonstrate the use of the Solar Viewer • Comets-NASA missions and Cooking Up a Comet Activity • Visit observatory for solar viewing Conduct night observations in the Daniel Observatory, weather permitting • Discuss meteors - impact theory • Construct a crater-making activity • Splat! Crater Activity • Radio Telescope (Goldstone or PARI) • Skynet Junior Scholars Academy • NITARP, Spitzer Infrared Telescope 	<p>8.E.4B.4 Develop and use models to explain how motions within the Sun-Earth-Moon system cause Earth phenomena (including day and year, moon phases, solar and lunar eclipses, and tides)</p> <p>8.E.4B.1</p> <p>8.E.4B.5 Obtain and communicate information to describe how data from technologies including telescopes, spectroscopes, satellites, and space probes</p> <p>8.S.1A.2 Develop and Use Models</p>
Day 4	<p>The Moon</p> <p>Moon Phases</p> <p>The Solar System</p>	<ul style="list-style-type: none"> • Ancient Astronomers: Isaac Newton • Phases of the Moon Activities • Demonstrate how to use a Moon Phaser • Lunar Reconnaissance Orbiter • Explain the difference in mass in weight using gravitational force • Solar System Walk: Earth as a Peppercorn • Construct Solar System/Season Model • Moons of Jupiter Engineering Challenge 	<p>8.E.4B.5 Obtain and communicate information to describe how data from technologies (including telescopes, spectroscopes, satellites, space probes) provide information about objects in the solar system and the universe.</p> <p>8.E.4B.2</p> <p>8.E.4B.3</p> <p>8.E.4B.6 Analyze and interpret data from the surface features of the Sun (including photosphere, corona, sunspots, prominences, and solar flares) to predict how these features may affect Earth.</p> <p>8.S.1A.2 Develop and Use Models</p> <p>8.S.1A.2 Develop, use, and refine models to (1) understand or represent phenomena, processes, and relationships, (2) test devices or solutions, or (3) communicate ideas to others.</p>
Day 5	<p>Review</p> <p>Teacher Activities</p> <p>Final Assessment</p>	<ul style="list-style-type: none"> • Questions & discussion • Review of course material • Each Participant Shares a Space Science Activity • Review and Final Assessment • Assessment of program and instructors <p>Final assessment</p>	<p>Review of all standards covered this week.</p>

Inquiry standards for 8th grade are incorporated throughout the week in class activities.