

Science Standards: Earth Science

Any standard highlighted in yellow has been determined by our WCS D teachers, district and state content experts as essential for students to master.

Standard 1 Students will understand the scientific evidence that supports theories that explain how the universe and the solar system developed. They will compare Earth to other objects in the solar system.

Learning Targets	Academic Vocabulary	Questions Stems	Possible Assessments
<p>#1 I will be able to explain the Big Bang theory and provide evidence for it.</p> <p>#2 I will be able to explain the Nebular Theory and provide evidence for it.</p>	<p>Big Bang Theory Nebular Theory Background Radiation Red Shift Doppler Effect Heavy Element Nuclear Fusion Density Accretion</p>	<p>Question 1- How does the arrangement and <u>structure</u> of our solar system provide evidence for the Nebular Theory?</p> <p>Question 2- How does redshift provide evidence that the universe is still expanding today?</p> <p>Question 3 - Identify <u>patterns</u> of our solar system in relation to the Nebular Theory.</p>	<p>Sorting activity. Sort the images in their proper order showing the nebular theory from nebula to organized solar system.</p> <p>Element Flame Test/Demo</p> <p>Heavy Elements Game (Monopoly type) game- Demonstrate how nuclear fusion can form heavy elements.</p> <p>Create your own planet Capstone to include Nebular Theory and all other standards.</p> <p>Mapping the <u>life cycle</u> of a star poster. Including formation of elements both 1st and second generation stars.</p>

			Categorizing planets activity with cards that have planet characteristics.
Standard 2 Students will understand Earth's internal structure and the dynamic nature of the tectonic plates that form its surface.			
Learning Targets	Academic Vocabulary	Questions Stems	Possible Assessments
<p>#1 I will be able to model Continental Drift and cite evidence for the theory.</p> <p>#2 I will be able to model how convection currents in the mantle drive geologic processes.</p> <p>#3 I will be able to differentiate earth's internal layers based on composition and physical properties.</p>	<p>Crust</p> <p>Mantle</p> <p>Core</p> <p>Heat of Formation</p> <p>Radioactive Decay</p> <p>Divergent Boundary Convergent Boundary</p> <p>Transform Boundary Convection</p> <p>Seismic Waves</p> <p>Continental Drift</p> <p>Physical Properties (Layers)</p> <p>Composition (Layers)</p> <p>Density</p>	<p>Question 1- List possible evidences that support the idea that the continents of the earth were once one landmass(Pangaea)?</p> <p>Question 2 - How does convection within the mantle <u>cause</u> changes to the surface of the earth?</p> <p>Question 3 - What evidence do we have that the Earth is <u>structured</u> in layers based as a result of composition and physical properties?</p>	<p>You be the Engineer, students design a structure to withstand and earthquake.</p> <p>Layers of the Earth Diagram</p> <p>Tectonic Boundary Diagram</p> <p>Draw/model convection currents</p> <p>Connecting/piecing continent puzzle pieces using evidence for Continental Drift.</p>
Standard 3 Students will understand the atmospheric processes that support life and cause weather and climate.			
Learning Targets	Academic Vocabulary	Questions Stems	Possible Assessments
<p>#1 I will be able to model the transfer of matter and energy in Hadley Cells.</p> <p>#2 I will be able to model the transfer of matter and energy in high and low pressure systems.</p> <p>#3 I will be able to explain that weather is a result of energy from the sun causing different air masses to interact.</p>	<p>Hadley Cells</p> <p>High pressure system</p> <p>Low pressure system</p> <p>Convection</p> <p>Air Masses</p> <p>Draw a model of the greenhouse</p> <p>Weather Fronts</p> <p>Greenhouse Effect</p> <p>Greenhouse Gases</p> <p>Coriolis Effect</p>	<p>Question 1 - What are the conditions of a low/high pressure system?</p> <p>Question 2 - What causes wind?</p> <p>Question 3 - What are the benefits and or drawbacks of the greenhouse effect?</p> <p>Question 4 - How has the composition</p>	<p>Students model the greenhouse effect using different examples..</p> <p>Meteorology project- track and record weather across USA for one week.</p> <p>Just Where Do You Stand Classroom Debate on</p>

	Solar Energy Climate Change	of the atmosphere changed over time?	Global Warming. Solar Ovens, Solar Energy, Temperature Changes Tea Bag Explanation for Convection Draw a model of the greenhouse effect in your daily life? Weather investigation that shows the inverse relationship between temperature and pressure. Atmosphere Model Poster showing what is in atmosphere and where. Hot air balloon showing expansion and convection Greenhouse box lab/demo
Standard 4 Students will understand the dynamics of the hydrosphere.			
<p>Learning Targets</p> <p>#1 I will be able to model the convection currents in the ocean due to salinity and temperature.</p> <p>#2 I will be able to explain how adhesion and cohesion are necessary for water cycle processes.</p> <p>#3 I will be able to model how water and energy move through different reservoirs in the water cycle.</p>	<p>Academic Vocabulary</p> <p>Convection Salinity Adhesion Cohesion Water Cycle terms(ex: reservoirs, condensation...) Biotic Abiotic</p>	<p>Questions Stems</p> <p>Question 1: What properties of water make in unique?</p> <p>Question 2: How does <u>energy</u> move <u>matter</u> (water) between reservoirs in the water cycle?</p> <p>Question 3: How does water in</p>	<p>Possible Assessments</p> <p>Exploring the Ocean biotic/abiotic Poster</p> <p>Water Cycle posters.</p> <p>Salinity Lab</p> <p>Goldfish Lab</p>

	Hydrosphere	influence biotic and abiotic factors in ecosystems? Question 4: How does the ocean affect global climate?	Model convection currents in deep ocean currents. Ecosystem Investigation- Biotic Vs Abiotic (bottle biology) Comparing salinity and density water lab Ocean video, life, name that "fish". List organisms from video and discuss. Biosphere/Hydrosphere Properties of water lab for adhesion and cohesion. Stations lab/activity.
--	-------------	--	--

Standard 5 Students will understand how Earth science interacts with society.

Learning Targets	Academic Vocabulary	Questions Stems	Possible Assessments
<p>#1 I will be able to explain how Earth's systems are dynamic and continually react to natural and human caused changes.</p> <p>#2 I can identify and describe natural hazards that occur locally and globally.</p> <p>#3 I can research and explain how scientists study feedback loops to inform the public about Earth's interacting systems</p>	<p>Feedback Loop Biosphere Hydrosphere Atmosphere Geosphere</p>	<p>Question 1: How do feedback loops help scientists understand changes in the earth both past and present.</p> <p>Question 2: Describe some human caused changes in the spheres of the Earth.</p> <p>Question 3 - What are natural hazards that affect you and your family/the area you live?</p>	<p>Creating Feedback Loops the Lorax, or other practical examples of feedback loops.</p> <p>Local Natural Hazards Project/Presentation and Model.</p> <p>Overfishing activity to illustrate social, economic, and ecosystem impacts.</p>

			<p>Cookie Mining activity, students remove the chocolate chips with 'tools' to illustrate human impact on resources.</p> <p>Research and report on human vs. natural caused hazards that occur in a particular area or destination.</p>
<i>ILOs or Intended Learning Outcomes</i>			
<p>Learning Targets</p> <p>1- Use Science Process and Thinking Skills 2- Manifest Scientific Attitudes and Interests 3- Demonstrate Understanding of Science Concepts, Principles and Systems 4- Communicate Effectively Using Science Language and Reasoning 5- Demonstrate Awareness of Social and Historical Aspects of Science 6- Demonstrate Understanding of the Nature of Science</p>	<p>Academic Vocabulary</p> <p>generalize, conclude, hypothesis, theory, variable, measure, evidence, data, inference, infer, compare, predict, interpret, analyze, relate, calculate, observe, describe, classify, technology, experiment, investigation, tentative, assumption, ethical, replicability, precision, skeptical, methods of science</p>	<p>Question Stems</p> <p>Question 1: How has technology influenced the progress of science and how has science influenced advances in technology?</p> <p>Question 2: Why is it important to reference information from reliable, peer reviewed sources?</p>	<p>Possible Assessments</p> <p>Students create graphs of their data and design models.</p> <p>Students utilize technology to research and present information.</p> <p>Students engage in respectful scientific arguments through online discussions.</p>

