

Subject: Science

Grade: 10 Earth/Space

Hallsville R-IV High School

Earth/Space

[Rationale](#) | [Course Description](#)

Curriculum Strands

- Matter and Energy
- Force and Motion
- Living Organisms
- [Ecology/Environments](#)
- [Earth Systems](#)
- [Universe](#)
- Scientific Inquiry
- Impact of Science, Technology and Human Activity

Earth/Space Rationale:

The primary task of science education is to foster student's curiosity to investigate the natural phenomena of their world. Students will develop confidence in the ability to use scientific concepts and principles to understand and control real-world situations. In preparation for careers and life choices, students must comprehend the impact of science and technology on their world.

Earth/Space Course Description:

This course is designed to be an introduction to alternative science disciplines for potential science majors. This course will explore astronomy, planetary geology, and oceanography. The topics will center on processes in space as well as here on Earth. This course will include some chemistry and biology as due to the interrelatedness of the many disciplines of science. Topics to be covered will include observational astronomy, the life cycles of stars, the structure of the universe, planetary geologic processes, as well as the related Earth systems.

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Concept: Biological Evolution

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Topic Objective:
Strand 4.3: Changes in Ecosystems and Interactions of Organisms with the Environments - All students will demonstrate proficiency in the knowledge that genetic variations sorted by the natural selection process explains evidence of biological evolution.

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>3A. Interpret fossil evidence to explain the relatedness of organisms using the principles of superposition and fossil correlation.</p> <p>3B. Evaluate the evidence that supports the theory of biological evolution (e.g., fossil records, similarities between DNA and protein structures, similarities between development stages of organisms, homologues and vestigial structures)</p>		SC 4			<p>3A Lyell's Principles:</p> <p>3A Make a Model environment:</p> <p>3B Make a Model Environment II:</p> <p>3B Evolution Within a Species:</p>	<p>3A, B Discussions: (Scoring Guide)</p> <p>3A, B Mini-quiz: (Scoring Guide)</p> <p>3A, B Notebook Check: (Scoring Guide)</p> <p>3A Written Test: (Scoring Guide)</p> <p>3A Lab: (Scoring Guide)</p> <p>3B Socratic Seminar: (Scoring Guide)</p>
Resources:				Instructional Methods:		

Subject: Science

Grade: 10 Earth/Space

Enrichment/ Special Needs:

+Key to Integrated Skills

DS = Disability Equity
C = Character Education
E = Gender Equity
D = Cultural Diversity

R = Research Skills
W = Workplace Skills
T = Technology Skills

Concept: Earth Systems

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Topic Objective:
Strand 5.1: Process and Interactions of the Earth's Systems (Geosphere, Atmosphere, and Hydrosphere) _ All students will demonstrate proficiency in the knowledge that Earth's systems (geosphere, atmosphere, and hydrosphere) have common components and unique structures.

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>1A. Recognize the importance of water as a solvent in the environment as it relates to karst topography (cave formation), acid rain, and water pollution.</p> <p>1B. Relate the composition of gases and temperature of the layers of the atmosphere (i.e., troposphere, stratosphere, ionosphere) to cloud formation and transmission of radiation (e.g., ultraviolet, infrared)</p> <p>1C. Describe the causes and consequences of observed and predicted changes in the ozone layer.</p> <p>1D. Provide evidence (e.g., melting glaciers, fossils, desertification) that support theories of climate change due to natural phenomena and/or human interactions.</p>		SC 5			<p>1A What's In the Air:</p> <p>1A Do You Have Acid Rain in Your Community?:</p> <p>1A How Hard Is Your Water?:</p> <p>1A Water, Water, Everywhere:</p> <p>1B Temperature Affects the Density of Air:</p> <p>1B Does Air Have Mass?:</p> <p>1B Making a Barometer:</p> <p>1B The Heat Is On:</p> <p>1B What Do Convection Currents Look Like?:</p> <p>1C Microclimates:</p> <p>1C What Can We Learn From Tree Rings?:</p>	<p>1A Socratic Seminar: (Scoring Guide)</p> <p>1A Discussions: (Scoring Guide)</p> <p>1A Mini-quizzes: (Scoring Guide)</p> <p>1A Research Paper: (Scoring Guide)</p> <p>1A Notebook Check: (Scoring Guide)</p>

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Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
1E. Explain how climate and weather patterns in a particular region are affected by factors, such as proximity to large bodies of water or ice/ocean currents, latitude, altitude, prevailing wind currents, and amount of solar radiation.					1C The Greenhouse Effect: 1D Glacial Grooving: 1D Where are Deserts Found?: 1E Can You Make It Rain?: 1E Discover How Currents Work?:	

Resources:

Instructional Methods:

Enrichment/ Special Needs:

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Concept: Earth Systems

Topic Objective:
Strand 5.2: Processes and Interactions of the Earth's Systems (Geosphere, Atmosphere, and Hydrosphere) - All students will demonstrate proficiency in the knowledge that Earth's systems (geosphere, atmosphere, and hydrosphere) interact with one another as they undergo change by common processes.

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>2A. Explain the external processes (i.e., weathering, erosion, deposition of sediment) that result in the formation and modification of landforms.</p> <p>2B. Describe the factors that affect rates of weathering and erosion of landforms (e.g., soil/rock type, amount and force of run-off, slope)</p> <p>2C. Describe the internal source of energy on Earth that results in uneven heating of the mantle (i.e., decay of radioactive isotopes)</p> <p>2D. Illustrate and explain the convection currents that result from the uneven heating inside the mantle and cause movement of crustal plates.</p> <p>2E. Describe how the energy of an earthquake travels as seismic waves and provides evidence for the layers</p>		SC 5			<p>2A Things That Affect Water Erosion:</p> <p>2A Where Does Most Erosion Occur in a Stream?:</p> <p>2A Stream Speed:</p> <p>2A How Can You Measure Pore Space?:</p> <p>2A What's So Special About Sand?:</p> <p>2A Find Out How Sediments Move From One Location to Another:</p> <p>2A What Causes Mass Movement?:</p> <p>2B Compare Different Rates of Weathering:</p> <p>2B Weathering Chalk:</p> <p>2B How does Rust Form?:</p>	<p>2A Socratic Seminar: (Scoring Guide)</p> <p>2A - H Discussions: (Scoring Guide)</p> <p>2A, B, F, H Performance -based Activities: (Scoring Guide)</p> <p>2A - H Mini-quizzes: (Scoring Guide)</p> <p>2A, E, H Written Test: (Scoring Guide)</p> <p>2A - H Notebook Check: (Scoring Guide)</p> <p>2C, E, G Lab: (Scoring Guide)</p>

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Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>of the geosphere.</p> <p>2F. Relate the densities of the materials found in continental and oceanic plates to the processes that result in each type of plate boundary (i.e., diverging, converging, transform)</p> <p>2G. Describe the effects of the movement of crustal plates (i.e., earthquakes, sea floor spreading, mountain building, volcanic eruptions) at a given location on the planet.</p> <p>2H. Articulate the processes involved in the Theory of Plate Tectonics (i.e., uneven heating of the mantle due to the decay of radioactive isotopes, movement of materials via convection currents, movement of continental and oceanic plates along diverging, converging, or transform plate boundaries) and describe evidence that supports that theory (e.g., correlation of rock sequences, landforms, and fossils; presence of intrusions and faults; evidence of sea-floor spreading)</p>					<p>2B What Is Soil Made Of?:</p> <p>2B Soil Characteristics:</p> <p>2B How Do Plant Roots Help Hold Soil in Place?:</p> <p>2C Radioactive Decay:</p> <p>2C Radiometric Dating:</p> <p>2C Show How Forces Inside Earth Cause Rocks to Deform:</p> <p>2D Seafloor Spreading:</p> <p>2D How Do Convection Currents Form?:</p> <p>2E Earthquake Depth:</p> <p>2E Can the Travel Time of Seismic Waves Be Used to Find the Distance to an Earthquake?:</p> <p>2E Epicenter Location:</p> <p>2E How Can Structures Be Made Earthquake-Safe?:</p> <p>2F Continental vs. Oceanic Crust:</p> <p>2F How Can You Make a Density Current Model?:</p>	

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Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>2I. Use evidence from relative and real dating techniques (e.g., correlation of trace fossils, landforms, and rock sequences; evidence of climate changes; presence of intrusions and faults; magnetic orientation; relative age of drill samples) to infer geologic history.</p> <p>2J. Predict the weather at a designated location using weather maps (including map legends) and/or weather data (e.g., temperature, barometric pressure, cloud cover and type, wind speed and direction, precipitation)</p> <p>2K. Discover and evaluate patterns and relationships in the causes of weather phenomena and regional climates (e.g., circulation of air and water around the Earth, movement of global winds and water cycles due to solar radiation)</p> <p>2L. Explain how global wind and ocean currents are produced on the Earth's surface (e.g., effects of unequal heating of the Earth's land masses, oceans, and air by the Sun due to latitude and surface material type; effects of gravitational forces</p>					<p>2F Make a Model of a Submersible:</p> <p>2F What does a Topographic Map of the Ocean Basins Show?:</p> <p>2F The Ups and downs of the Ocean floor:</p> <p>2G Pangaea - Reassemble the Pieces of Photo:</p> <p>2G Determine If Separate Continents Were Once Joined:</p> <p>2G Seafloor Spreading Rates:</p> <p>2H Plate Tectonic Model:</p> <p>2H Make a Model Volcano:</p> <p>2H Locate Active Volcanoes:</p> <p>2H Comparing Volcanic Rocks:</p> <p>2H Identify Types of Volcanoes:</p> <p>2I Make a Model of a Fossil to See One Way They Might Form:</p> <p>2I What Type of Fossils Might Be Preserved From Our Time?:</p>	

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<p>acting on layers of air of different densities due to temperature differences; effects of the rotation of the Earth; effects of surface topography)</p> <p>2M. Describe the effects of natural phenomena (e.g., burning organic material, volcanic eruptions, lightning, changes in global wind and ocean currents) on the properties of the atmosphere.</p>					<p>2I Relative age Dating of Geologic Features:</p> <p>2I What are the Dates of some Events in Earth's History?:</p> <p>2I Fossil Correlation:</p> <p>2I Geologic Time:</p> <p>2K How Can Dew Point be Determined?:</p> <p>2L Blowing In The Wind:</p> <p>2L Make a Model of a Tornado:</p> <p>2M Materials ejected From Volcanoes:</p> <p>2M Making Waves:</p> <p>2M Cleaning Up Oil Spills:</p>	
Resources:				Instructional Methods:		
Enrichment/ Special Needs:						

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Concept: Earth Systems

Topic Objective:

Strand 5.3: Processes and Interactions of Earth's Systems (Geosphere, Atmosphere, and Hydrosphere) - All students will demonstrate proficiency in the knowledge that human activity is dependent upon and affects Earth's resources and systems.

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>3A. Distinguish between renewable and nonrenewable energy resources.</p> <p>3B. Recognize the finite availability of fresh water for use by living organisms.</p> <p>3C. Identify human activities that adversely affect the composition of the atmosphere, hydrosphere, or geosphere.</p> <p>3D. Predict the effect of change on the other sphere when given a scenario describing how the composition of the atmosphere, hydrosphere or geosphere is altered.</p> <p>3E. Recognize how the geomorphology of Missouri (i.e., different types of Missouri soil and rock materials such as limestone, granite, clay, loam; land formations such as karst (cave) formations; glaciated plains, river channels) affects the development of land use</p>		SC 5			<p>3A Draw a Population Growth Model:</p> <p>3A A Crowded Encounter:</p> <p>3A Recycling Everything:</p> <p>3B What's Happening to the Fish?:</p> <p>3B Water Use:</p> <p>3C How Much Waste Do You Generate in a Day?:</p> <p>3C Can One Person Make a Difference?:</p> <p>3C A Model Landfill:</p> <p>3D Study Your Air:</p> <p>3D Model the Movement of a Water Particle in a Wave:</p> <p>3E, F, G Geology of Missouri Project:</p>	<p>3A - G Discussions: (Scoring Guide)</p> <p>3A - G Mini-quiz: (Scoring Guide)</p> <p>3A - G Notebook Check: (Scoring Guide)</p> <p>3B, E, F, G Socratic Seminar: (Scoring Guide)</p>

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<p>(e.g., agriculture, recreation, planning and zoning, waste management)</p> <p>3F. Recognize the limited availability of major mineral deposits in the United States (e.g., lead, petroleum, coal, copper, zinc, iron, gravel, aluminum) and the factors that affect their availability.</p> <p>3G. Recognize the economic, political, social, and ethical constraints associated with obtaining and using natural resources (e.g., mining and use of different types of Missouri mineral resources such as lead mining, gravel dredging, strip mining, coal burning, production of fertilizers and explosives; use of fossil fuels versus renewable resources) (Assess Locally)</p>					3E, F, G The Miner's Mission:	
Resources:				Instructional Methods:		
Enrichment/ Special Needs:						

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Concept: Motion of Objects

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Topic Objective:
Strand 6.1: Composition and Structure of the Universe and the Motion of the Objects Within It - All students will demonstrate proficiency in the knowledge that the universe has observable properties and structure.

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>1A. Describe and relate the position and motion of the Sun-Earth solar system, the Milky-Way galaxy, and other galaxies within the universe (i.e., it is just one of several solar systems orbiting the center of a rotating spiral galaxy; that spiral galaxy is just one of many galaxies which orbit a common center of gravity; the expanding universe causes the distance between galaxies to increase)</p> <p>1B. Explain how Earth's environmental characteristics and location in the universe (e.g., atmosphere, temperature, orbital path, magnetic field, mass-gravity, location in solar system) provides a life-supporting environment.</p> <p>1C. Compare the environmental characteristics and location in the universe of Earth and other celestial bodies (e.g., planets, moons) to determine ability to support life.</p>		SC 6			<p>1A Planetary Orbits:</p> <p>1A Can You Draw Planets to Scale?:</p> <p>1A Solar system Distance Model:</p> <p>1A Expansion of the Universe Model:</p> <p>1A How Can Gravity be Simulated in a Space Station?:</p> <p>1B What's the Shape of Earth?:</p> <p>1B Probe to Mars:</p> <p>1B Space Colonization - Where?:</p> <p>1C Gravity - Mars vs. Earth:</p> <p>1C Atmosphere - Venus vs. Earth:</p> <p>1D Is White Light More Than It Seems?:</p> <p>1D How Do Star Sizes Compare?:</p>	<p>1A - E Discussion: (Scoring Guide)</p> <p>1A Performance Model: (Scoring Guide)</p> <p>1A - E Mini-quiz: (Scoring Guide)</p> <p>1A Planetary Model Project: (Scoring Guide)</p> <p>1A - E Notebook Check: (Scoring Guide)</p> <p>1A Written Test: (Scoring Guide)</p> <p>1D, E Socratic Seminar: (Scoring Guide)</p> <p>1E Telescope Lab: (Scoring Guide)</p>

Subject: Science

Grade: 10 Earth/Space

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>1D. Identify information that the electromagnetic spectrum provides about the stars and the universe (e.g., chemical composition, temperature, age of stars, location of black holes, motion of celestial bodies)</p> <p>1E. Evaluate the advantages/disadvantages of using different tools (e.g., spectroscope, different types of telescopes, probes) to gather information about the universe (e.g., background radiation, magnetic fields, discovery of previously unknown celestial bodies)</p>					<p>1D Sunspots?:</p> <p>1E How Far Can We See into Space?:</p> <p>1E A Homemade Antenna:</p> <p>1E Telescopes:</p> <p>1E Compare the Effects of Light Pollution:</p>	
Resources:				Instructional Methods:		
Enrichment/ Special Needs:						

Subject: Science

Grade: 10 Earth/Space

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Subject: Science

Grade: 10 Earth/Space

Concept: Sun/Moon

Topic Objective:

Strand 6.2: Composition and Structure of the Universe and the Motion of the Objects Within It - All students will demonstrate proficiency in the knowledge that regular and predictable motions of objects in the universe can be described and explained as the result of gravitational forces.

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>2A. Relate units of time (i.e., day, month, year) to the regular and predictable motion of the planets and moons and their positions in the Solar system.</p> <p>2B. Explain seasonal phenomena (i.e., weather, length of day, temperature, intensity of sunlight) as a consequence of a planet's axial tilt as it rotates and a planet's orbital position as it revolves around the Sun.</p> <p>2C. Provide evidence that can be observed from Earth that supports the fact Earth rotates on its axis and revolves around the Sun.</p> <p>2D. Predict the moon rise/set times, phases of the moon, and/or eclipses when given the relative positions of the moon, planet, and Sun.</p>		SC 6			<p>2A What Else Orbits Our Sun?:</p> <p>2B Tilt and Temperature:</p> <p>2B Causes of Earth's Seasons:</p> <p>2B Determine What Causes Seasons:</p> <p>2B How Does Earth's Tilt Affect the Radiation Received?:</p> <p>2C What Patterns Do You See in Stars?:</p> <p>2C Measuring Parallax:</p> <p>2D Moon Project:</p> <p>2D Moon Phases and Eclipses:</p> <p>2E How Does the Moon Affect the Ocean?:</p>	<p>2A - E Discussions: (Scoring Guide)</p> <p>2A - D Mini-quizzes: (Scoring Guide)</p> <p>2A - E Notebook Check: (Scoring Guide)</p> <p>2B, D Socratic Seminar: (Scoring Guide)</p> <p>2B Test: (Scoring Guide)</p> <p>2C Lab: (Scoring Guide)</p>

Subject: Science

Grade: 10 Earth/Space

2E. Explain how the gravitational forces, due to the relative positions of a planet, moon, and Sun, determine the height and frequency of tides. 2F. Explain orbital motions of moons around planets, and planets around the Sun, as the result of gravitational forces between those objects.						
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Resources:

Instructional Methods:

Enrichment/ Special Needs:

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