

Subject: Science

Grade: 8

Hallsville R-IV Middle School

8th Grade Science

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Curriculum Strands

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

8th Grade Science Rationale:

Science education is a vital force in helping our students recognize the critical importance of scientific developments in today's and tomorrow's world. This course provides students with the basic knowledge of science as it relates to them and to their own range of experience. Historical achievements in the field of science and some thoughts on the future will contribute to the growth and development of the student.

8th Grade Science Course Description:

This course provides students with a broad scope of all science disciplines with an emphasis in earth systems and the physical universe. This is obtained through scientific inquiry using scientific relevance in the way of labs, hands-on experiences, scientific readings, lectures, and projects. In the above approach the student will gain an appreciation and positive attitude toward the world of science.

Concept: Matter and Energy

[top](#)**Topic Objective:**

Strand 1: Matter and Energy - All students will demonstrate proficiency in the knowledge that changes in properties and states of matter provide evidence of the atomic theory of matter and that energy has a source, can be transferred, and can be transformed into various forms but is conserved between and within systems.

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>1A. Recognize that elements (unique atoms) and compounds (molecules or crystals) are pure substances that have characteristic properties.</p> <p>1B. Describe the physical and chemical properties (e.g., magnetic attraction, conductivity, melting point, and boiling point, reactivity) of pure substances (elements or compounds) (e.g., copper wire, aluminum wire, iron, charcoal, sulfur, water, salt, sugar, sodium bicarbonate, galena, quartz, magnetite, pyrite) using appropriate senses and tools.</p> <p>1C. Describe evidence (e.g., diffusion of colored material into clear material such as water; light reflecting off of dust particles in air; changes in physical properties and reactivity such as gold hammered into foil, oil spreading on the surface of water, decay of organic matter,</p>		SC 1			<p>1A Read "Atoms, Elements, Molecules" and complete a journal entry after kinesthetically modeling gas molecules.</p> <p>1B Take the concept of physical properties of common substances and contrast with the chemical properties of the same substance. Then compare the physical properties of the planets in our solar system.</p> <p>1C Question: "How small is small?" By answering the question through discussion, students will examine evidence that proves an atom is the smallest unit of matter.</p> <p>1D, E, F Role play solid, liquid, and gas molecules to demonstrate the molecular bonding that occurs at each phase. The apply that knowledge by creating a poster that explains how to effectively store and transport matter as a solid, liquid, or</p>	<p>1A - K Students will be assessed using written tests, quizzes, and engage in inquiry activities. (Scoring Guide)</p> <p>1B, C Students will describe how the properties of a substance (solid, liquid or gas) affects how the substance will be packaged and transported. (Scoring Guide)</p>

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>condensation of water vapor by decreased pressure) that supports the theory that matter is composed of moving particles too small to be seen (atoms, molecules).</p> <p>1D. Using the Kinetic Theory model, illustrate and account for the physical properties (i.e., shape, volume, malleability, and viscosity) of a solid, liquid, or gas in terms of the arrangement and motion of molecules in a substance.</p> <p>1E. Use the Kinetic Theory model to explain changes in the volume, shape, and viscosity of materials in response to temperature changes during a phase change.</p> <p>1F. Predict the effect of transfer on the physical properties of a substance as it changes to or from a solid, liquid, or gas (i.e., phase changes that occur during freezing, melting, evaporation, boiling, condensation).</p> <p>1G. Recognize more than 100 known elements (unique atoms) exist that may be combined in nature or by man to produce compounds that make up the living and nonliving substances in the</p>					<p>gas to space.</p> <p>1G Model nitrogen gas bonds to explore nitrogen's non-reactive property. Explore the role of the large amount of nitrogen in the atmosphere and research nitrogen's benefit to life.</p> <p>1H Weigh the individual ingredients to make slime. Mix the ingredients and take a final mass. Record observations of how the properties of the original ingredients have changed during the reaction.</p> <p>1I, J Create a diagram of the carbon cycle and conclude that the carbon cycle maintains a balance of carbon dioxide in the Earth's atmosphere, thus helping to maintain a moderate surface temperature.</p> <p>1J Observe "model of the water cycle", discussing characteristics of cycles and review conservation of matter in chemical reactions and in digesting food. Read a story tracing the path of carbon and oxygen atoms as they change form and move in a cycle. Finally, compare and contrast the cycle of matter with the flow of energy.</p>	

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<p>environment (Do not assess memorization of Periodic Table).</p> <p>1H. Provide evidence that mass is conserved during a chemical change in a closed system (e.g., vinegar + baking soda, mold growing in a closed container, steel wool rusting)</p> <p>1I. Explain that the amount of matter remains constant while being recycled through the rock cycle.</p> <p>1J. Explain that the amount of matter remains constant while being recycled through food chains and food webs.</p> <p>1K. Recognize chemical energy is stored in chemical compounds (e.g., energy stored in and released from food molecules, batteries, nitrogen explosives, fireworks, organic fuel).</p> <p>1L. Identify the evidence of different energy transformations (e.g., explosion of light, heat, and sound, temperature change, electrical charge) that may occur as chemical energy is released during a chemical reaction.</p>					<p>1K, L Oxidize a piece of steel wool. While the wool oxidizes, measure the temperature change. After the activity, apply the idea of energy in the form of heat being released to how oxygen releases energy from sugar for use in the body.</p>	

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Resources:

"The Nature of Matter" Glencoe - McGraw Hill

<http://astroventure.arc.nasa.gov>

www.scilinks.org

Instructional Methods:

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: Processes and Interactions of the Earth's Systems - All students will demonstrate proficiency in the knowledge that Earth's systems (Geosphere, Atmosphere, and Hydrosphere) have common components and unique structures; and 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>5A. Differentiate between minerals and rocks (which are composed of different kinds of minerals).</p> <p>5B. Describe the distinguishing properties that can be used to classify minerals (i.e., texture, smell, luster, hardness, crystal shape, streak and reaction to magnets and acids).</p> <p>5C. Describe the methods used to identify the distinguishing properties of minerals.</p> <p>5D. Classify rocks as sedimentary, igneous, or metamorphic.</p> <p>5E. Explain that convection currents are the result of uneven heating inside the mantle resulting in the melting of rock material, convection of magma, eruption/flow of magma, and movement of crustal plates.</p>		SC 5			<p>5A Complete a compare/contrast form for minerals and rocks.</p> <p>5B, C Review the terms, physical and chemical properties. Use the physical and chemical properties of minerals to identify them. (Students will also be assessed on their ability to describe the method used to identify the mineral)</p> <p>5D, I Use the properties of rocks to classify them as sedimentary, igneous and metamorphic. Further classify igneous and metamorphic rocks by their physical properties and infer how the rocks were formed from their properties.</p> <p>5H, J Look at the rock cycle and infer what processes are needed for the rocks to change from one form to the next. Classify the processes as internal or external.</p>	<p>5 A - L Students will be assessed using written tests, quizzes, and engage in inquiry activities (Scoring Guide)</p> <p>5A - C Students will match the properties of minerals (texture, smell, luster, etc.) to a description of how to test for them. (Scoring Guide)</p> <p>5A - C Students will be given 5 unknown rocks. Using a key, they will classify the rocks as Sedimentary, Metamorphic or Igneous. (Scoring Guide)</p>

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Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>5F. Explain how rock layers are affected by the folding, breaking, and uplifting of rock layers due to plate motion.</p> <p>5G. Describe how the movement of crustal plates can cause earthquakes and volcanic eruptions that can result in mountain building and trench formation.</p> <p>5H. Explain how heating and cooling in the mantle layer leads to the formation of metamorphic rocks and some igneous rocks.</p> <p>5I. Make inferences about the formation of igneous and metamorphic rocks from their physical properties (e.g., crystal size indicates rate of cooling, air pockets or glassy texture indicate volcanic activity).</p> <p>5J. Explain and diagram the external and internal processes of the rock cycle (e.g., weathering and erosion, sedimentation, compaction, heating, recrystallization, and resurfacing due to forces that drive plate motion).</p>					<p>5E Use the inquiry process to determine what causes a substance to change density, and thus cause movement. Heat glittered water and observe that an increase in temperature causes a substance to be less dense and rise above a denser substance, then cool and become denser, causing it to sink. This creates convection currents. Use this knowledge to draw and explain how movement occurs in the Earth's mantle.</p> <p>5G Predict where volcanoes occur on a blank map of the Earth's plates. Observe a map of volcano zones and conclude that volcanoes occur where plates collide, move apart, and at hot spots. Discuss the Theory of Plate Tectonics and design a model of plate tectonics. The class makes and discusses one or two of the selected design models.</p>	

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Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>5K. Describe the methods used to estimate geologic time and the age of the Earth (e.g., techniques used to date rocks and rock layers, presence of fossils).</p> <p>5L. Use rock and fossil evidence to make inferences about the age, history, and changing life forms and environment of the Earth (i.e., changes in successive layers of sedimentary rock and the fossils contained within them, similarities between fossils in different geographic locations, fossils of organisms indicating changes in climate, fossils of extinct organisms).</p>					<p>5F, K, I Look at the age of the Earth. Study how fossils are made and the type of fossils scientists find. How the fossil and rock layer, in which it is found, is made, helps in determining the geologic time periods. Study how uplifting from the plate movement may change the rock layers. Given a diagram of rock layers with fossils in them, using clues from the fossils and rock layer position, determine the geologic age of the various rock layers.</p>	
<p>Resources: "Earth Materials and Processes" Glencoe McGraw Hill http://astroventure.arc.nasa.gov www.scilins.org</p>				<p>Instructional Methods:</p>		
<p>Enrichment/ Special Needs:</p>						

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+Key to Integrated Skills

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Topic Objective:
Strand 6: Composition and Structure of the Universe and the Motion of Objects within It - All student will demonstrate proficiency in the knowledge that the universe has observable properties and structures and that the 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>6A. Classify celestial bodies in the solar system into categories: Sun, moon, planets and other small bodies (i.e., asteroids, comets, meteors) based on physical properties.</p> <p>6B. Compare and contrast the size, composition, atmosphere and surface of the planets (inner vs. outer) in our solar system and Earth's moon.</p> <p>6C. Identify the relative proximity of common celestial bodies (i.e., Sun, moon, planets, smaller celestial bodies such as comets and meteors, other stars) in the sky to the Earth.</p> <p>6D. Describe how the Earth's placement in the solar system is favorable to sustain life (i.e., distance from the Sun, temperature, atmosphere).</p>		SC 6			<p>6A Using the definitions for stars, satellites, planets, asteroids, comets, and meteors, classify unknown objects into these categories. Write a short essay that explains the Solar System as a system.</p> <p>6B After completing a compare/contrast of inner and outer planets, examine the physical characteristics of the planets through the lens of human habitation. Determine which planet in our solar system has the closest characteristics to earth.</p> <p>6C Looking at monthly star maps, observe how the patterns of constellations appear to change through out the year.</p>	<p>6A - 6AB Students will be assessed using written tests, quizzes, and engaged in inquiry activities. (Scoring Guide)</p> <p>6H, I, J Students will plot the azimuth of the sun versus time of day (for Hallsville) for the following dates: Sept. 20th, March 20th, Dec. 20th and June 20th. From those graphs, students will then predict the graphs for the azimuth of the sun for the equator and the Southern hemisphere for the same times. At the end of the activity, students are assessed by writing a paragraph describing the different path of the sun and how/why it is dependent on latitude. (Scoring Guide)</p>

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Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>6E. Compare and contrast the characteristics of Earth that support life with the characteristics of other planets that are considered favorable or unfavorable to life (e.g., atmospheric gases, extremely high/low temperatures)</p> <p>6F. Recognize stars are separated from one another by vast and different distances, which cause stars to appear smaller than the Sun.</p> <p>6G. Compare the distance light travels from the Sun to Earth to the distance light travels from other stars to Earth using light years.</p> <p>6H. Relate the apparent east-to-west changes in the positions of the Sun, other stars, and planets in the sky over the course of a day to Earth's counterclockwise rotation about its axis.</p> <p>6I. Describe the pattern that can be observed in the changes in number of hours of visible sunlight, and the time and location of sunrise and sunset, throughout the year.</p>					<p>6D Using the Internet (www.astroventure.arc.nasa.gov), make changes to our solar system and make descriptive, unbiased observations of the effect of those changes on Earth. Also identify the characteristics of our solar system that allow for human survival.</p> <p>6E Using a comparison chart for the planets, compare and contrast the features of the Earth to the other planets in the solar system. Look for features that are crucial for human survival.</p> <p>6F, G Make hanging constellations that illustrate the distance between stars in the sky. Explain the expression "Looking at the stars is like looking into the past."</p>	

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Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>6J. Recognize the Northern Hemisphere, the Sun appears lower in the sky during the winter and higher in the sky during the summer.</p> <p>6K. Recognize in winter, the Sun appears to rise in the southeast and set in the Southwest, accounting for a relatively short day length, and that in summer, the Sun appears to rise in the Northeast and set in the Northwest, accounting for a relatively long day length.</p> <p>6L. Recognize the Sun is never directly overhead when observed from North America.</p> <p>6M. Observe the change in time and location of moon rise, moon set, and the moon's appearance relative to time of day and month over several months and note the pattern in this change.</p> <p>6N. Recognize the moon rises later each day due to its revolution around the Earth in a counterclockwise direction.</p>						

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<p>6O. Recognize the Moon is in the sky for roughly 12 hours in a 24-hour period (i.e., if the Moon rises at about 6 P.M., it will set at about 6 A.M.)</p> <p>6P. Recognize that one half of the Moon is always facing the Sun and therefore one half of the Moon is always lit.</p> <p>6Q. Relate the apparent change in the moon's position in the sky as it appears to move east to west over the course of a day to Earth's counterclockwise rotation about its axis.</p> <p>6R. Describe how the appearance of the moon that can be seen from Earth changes approximately every 28 days in an observable pattern (moon phases).</p> <p>6S. Illustrate and explain a day as the time it takes a planet to make a full rotation on its axis.</p> <p>6T. Diagram the path (orbital ellipse) the Earth travels as it revolves around the sun.</p>						

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<p>6U. Illustrate and explain a year as the time it takes a planet to revolve around the Sun.</p> <p>6V. Explain the relationships between a planet's length of year (period of revolution) and its position in the solar system.</p> <p>6W. Describe how the moon's relative position changes as it revolves around the Earth.</p> <p>6X. Recognize that the phases of the moon are due to the relative positions of the Moon with respect to the Earth and Sun.</p> <p>6Y. Relate the axial tilt and orbital position of the Earth as it revolves around the Sun to the intensity of sunlight falling on different parts of the Earth during different seasons.</p> <p>6Z. Describe how the Earth's gravity pulls any object on or near the Earth toward it (including natural and artificial satellites).</p> <p>6AA. Describe how the planets' gravitational pull keeps satellites and moons in orbit around them.</p>						

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Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
6AB. Describe how the Sun's gravitational pull holds the Earth and other planets in their orbits.						

Resources:

Instructional Methods:

Enrichment/ Special Needs:

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Concept: Science Inquiry

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Topic Objective:
Strand 7: Science Inquiry - All students will demonstrate proficiency in the knowledge that science understanding is developed through the use of science process skills and scientific knowledge in combination with scientific investigation, reasoning, and critical thinking.

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>7A. Formulate testable questions and hypotheses.</p> <p>7B. Recognize the importance of the independent variable, dependent variable, control of constants, and multiple trials to the design of a valid experiment.</p> <p>7C. Design and conduct a valid experiment.</p> <p>7D. Evaluate the design of an experiment and make suggestions for reasonable improvements of extensions of an experiment.</p>		SC 7			<p>7A - T Weigh the individual ingredients to make slime. Mix the ingredients and take a final mass. Record observations of how the properties of the original ingredients have changed during the reaction.</p> <p>7A - T Oxidize a piece of steel wool. While the wool oxidizes, measure the temperature change. After the activity, apply the idea of energy in the form of heat being released to how oxygen releases energy from sugar for use in the body.</p>	<p>7A - T Inquiry: students will engage in at least one complete inquiry during the school year. Students will use a whiteboard to present their result to the class. From class discussion, students will make corrections to their write-up and turn it in for a final grade. (Scoring Guide)</p>

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Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>7E. Recognize that different kinds of questions suggest different kinds of scientific investigations (e.g., some involve observing and describing objects, organisms, or events; some involve collecting specimens; some involve experiments; some involve making observations in nature; some involve discovery of new objects and phenomena; and some involve making models)</p> <p>7F. Acknowledge that there is no fixed procedure called "the scientific method", but that some investigations involve systematic observations, carefully collected, relevant evidence, logical reasoning, and some imagination in developing hypotheses and other explanations.</p> <p>7G. Make qualitative observations using the five senses.</p> <p>7H. Determine the appropriate tools and techniques to collect data.</p> <p>7I. Use a variety of tools and equipment to gather data (e.g., microscope, thermometer, analog and digital meters, computers, spring scales, balances, metric rulers, graduated cylinders, stopwatches)</p>					<p>7A - T Use the inquiry process to determine what causes a substances to change density, and thus cause movement. Heat littered water and observe that an increase in temperature causes a substance to be less dense and rise above a denser substance, then cool and become denser, causing it to sink. This creates convection currents. Use this knowledge to draw and explain how movement occurs in the Earth's mantle.</p>	

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Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>7J. Measure length to the nearest millimeter, mass to the nearest gram, volume to the nearest milliliter, force (weight) to the nearest Newton, temperature to the nearest degree Celsius, time to the nearest second.</p> <p>7K. Compare amounts /measurements.</p> <p>7L. Judge whether measurements and computations of quantities are reasonable.</p> <p>7M. Calculate the range and average/mean of a set of data.</p> <p>7N. Use quantitative and qualitative data to construct reasonable explanations (conclusions).</p> <p>7O. Use data as a support for observed patterns and relationships, and make to predictions to be tested.</p> <p>7P. Recognize the possible effects of errors in observations, measurements, and calculations on the formulation of explanations (conclusions).</p> <p>7Q. Make predictions supported by scientific knowledge/explanations.</p>						

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Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>7R. Analyze whether evidence (data) and scientific principles support proposed explanations (hypotheses, laws, theories).</p> <p>7S. Evaluate the reasonableness of an explanation (conclusion).</p> <p>7T. Communicate the procedure and results of investigations and explanations through:</p> <ul style="list-style-type: none">* oral presentations* drawings and maps* data tables (allowing for the recording and analysis of data relevant to the experiment, such as independent and dependent variables, multiple trials beginning and ending times or temperatures, derived quantities)* graphs (bar, single line, pictographs)* equations and writings <p>7U. Interpret data in order to make and support conclusions.</p>						

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Resources:

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Concept: Impact of Science

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Topic Objective:
Strand 8: Impact of Science, Technology and Human Activity - All students will demonstrate proficiency in the knowledge that the nature of technology is advanced by and can advance science as it seeks to apply scientific knowledge in ways that meet human needs and that science is a human endeavor.

Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>8A. Explain how technological improvements, such as those developed for use in space exploration, the military, or medicine, have led to the invention of new products that may improve lives here on Earth (e.g., new materials, freeze-dried foods, infrared goggles, Velcro, satellite imagery, robotics, lasers)</p> <p>8B. Identify the link between technological developments and the scientific discoveries made possible through their development (e.g., Hubble telescope and stellar evolution, composition and structure of the universe; the electron microscope and cell organelles; sonar and the composition of the Earth; manned and unmanned space missions and space exploration; Doppler radar and weather conditions; MRI and CAT-scans and brain activity)</p>		SC 8			<p>8A Students will look at spin-offs from NASA and discuss how they have impacted our society.</p> <p>8F During the discussion of our solar system, students will see how a lack of definition for what is a planet has put the number of planets our solar system has in question.</p>	<p>8 G, H Mission To Mars: Plan a mission to Mars keeping within budget and weight constraints given. (Scoring Guide)</p> <p>8G, H Technology: Students will look at a technology and "foresee" how that technology may be in the future. They will write a paper that covers the following:</p> <ul style="list-style-type: none"> * History of This Technology * Present Use * Future * Impacts of This Technology * What Needs to Happen to Make This Technology Happen?

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Measurable Learner Objectives	Process	Content	GLE's	Integrated Skills	Suggested Activities	Suggested Assessments/Tools
<p>8C. Describe how technological solutions to problems (e.g., storm water runoff, fiber optics, windmills, efficient car design, electronic trains without conductors, sonar, robotics, Hubble telescope) can have both benefits and drawbacks (e.g., design constraints, unintended consequences, risks) (Assess Locally)</p> <p>8D. Describe how the contributions of scientists and inventors, representing different cultures, races and gender, have contributed to science, technology and human activity (e.g., George Washington Carver, Thomas Jefferson, Isaac Newton, Marie Curie, Galileo, Albert Einstein, Mae Jemison, Edwin Hubble, Charles Darwin, Jonas Salk, Louis Pasteur, Jane Goodall, Tom Akers, John Wesley Powell, Rachael Carson) (Assess Locally)</p> <p>8E. Recognize the difficulty science innovators experience as they attempt to break through accepted ideas (hypotheses, laws, theories) of their time to reach conclusions that may lead to changes in those ideas and serve to advance scientific</p>						

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<p>understanding (e.g., Darwin, Copernicus, Newton)</p> <p>8F. Recognize explanations have changed over time as a result of new evidence.</p> <p>8G. Describe ways in which science and society influence one another (e.g., scientific knowledge and the procedures used by scientists influence the way many individuals in society think about themselves, others, and the environment; societal challenges often inspire questions for scientific research; social priorities often influence research priorities through the availability of funding for research)</p> <p>8H. Identify and evaluate the physical, social, economic, and/or environmental problems that may be overcome using science and technology (e.g., the need for alternative fuels, human travel into space, AIDS)</p>						
Resources:				Instructional Methods:		

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