

## ELL LIFE SCIENCE 4420

**Description** This practical, hands-on general biology course uses a variety of activities and laboratory experiences to develop scientific problem-solving skills and an emphasis on developing English communication skills and vocabulary relevant to science content. The course focuses on scientific thinking, cell biology, evolution, human body systems, application of technology and humans' environmental impact. The course emphasizes various methods that build communication and study skills. Life science applies the principles of biology to home, work, and leisure.

**Credits** 1

**Prerequisites** ELL Physical and Earth Science

**Textbooks/Resources** *Life Science*. Trefil, James; Calvo, Rita; Cutler, Kenneth. McDougal Littell. 2005. ISBN 0-618-30367-7

**Required Assessments** District-Wide Standards-Based Assessment

**Board Approved** October, 2005  
**Revised**

### AASD Science Goals for K-12 Students

- *Students will know about science themes and connect and integrate them into what they know about themselves and the world around them.*
- *Students will realize that scientific knowledge is public, replicable, and continually undergoing revision and refinement based on new experiments and data.*
- *Students will realize that science includes questioning, forming hypotheses, collecting and analyzing data, reaching conclusions, evaluating results, and communicating procedures and findings to others.*
- *Students will use science to explain and predict changes that occur around them.*
- *Students will use science to evaluate consequences in order to make responsible choices.*
- *Students will use their knowledge of science concepts and processes in making informed choices regarding their lifestyles and the impact they have on their environment, and enhance their natural curiosity about their environment.*
- *Students will understand that science and technology affect the Earth's systems and provide solutions to human problems.*
- *Students will use science to analyze topics related to personal health, environment, and management of resources; they will help evaluate the merits of alternative courses of action.*

## AASD Science Standards for Grades 5-12 Students

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|------------------------|---|
| I. Science Connections | <ul style="list-style-type: none"><li>A. Apply the underlying themes of science to develop defensible visions of the future.</li><li>B. Show how conflicting assumptions about science themes lead to different opinions and show how these opinions and decisions have diverse effects on an individual, a community, and a country, both now and in the future.</li><li>C. Give examples that show how partial systems, models, and explanations are used to give quick and reasonable solutions that are accurate enough for basic needs.</li><li>D. Construct arguments that show how conflicting models and explanations of events can start with similar evidence.</li><li>E. Show how the ideas and themes of science can be used to make real-life decisions about careers, work places, life-styles, and use of resources.</li><li>F. Identify and replace inaccurate personal models and explanations of science-related phenomena using evidence learned or discovered.</li><li>G. Re-examine the evidence and reasoning that lead to conclusions drawn from investigations.</li></ul> |
| II. Nature of Science  | <ul style="list-style-type: none"><li>A. Show how cultures and individuals have contributed to the development of major ideas in science.</li><li>B. Identify the cultural conditions that are usually present during great periods of discovery, scientific development, and inventions.</li><li>C. Relate the major themes of science to human progress in understanding science and the world.</li><li>D. Show how basic research and applied research contribute to new discoveries, inventions, and applications.</li><li>E. Explain how science is based on assumptions about the natural world and themes that describe the natural world.</li></ul>   |
| III. Science Inquiry   | <ul style="list-style-type: none"><li>A. Ask and write questions suggested by current social issues, scientific literature, and observations of phenomena.</li><li>B. Review previous research on questions, build hypotheses that might answer the questions, design possible investigations, and describe results that might emerge from investigations.</li><li>C. Design and conduct responsible and safe investigations to help answer questions.</li><li>D. Choose the best data collection procedures and materials available, and use them competently.</li><li>E. Calculate the degree of precision of the resulting data from data collection.</li><li>F. Use explanations and models from science to develop likely explanations for the results of investigations.</li><li>G. Present the results of investigations to groups concerned with the issues being investigated.</li><li>H. Evaluate articles and reports from a variety of sources using criteria related to standards of experimental design.</li></ul>  |

## AASD Science Standards for Grades 5-12 Students (continued)

### IV. Physical Science

- A. Observe, describe, and measure physical and chemical properties of elements and other substances.
- B. Use the major ideas of atomic theory and molecular theory to describe physical and chemical interactions.
- C. Conduct investigations and use the science themes to develop explanations of physical and chemical interactions and energy exchanges.
- D. Explain how models of the atomic structure of matter have changed over time.
- E. Describe the forces acting on objects in motion.
- F. Explain motion in relation to real-life situations.
- G. Define energy and conservation of energy.
- H. Describe and investigate the properties of electromagnetic radiation, gravity, and sound as they interact with material objects.
- I. Use models to explain the behaviors of various forms of energy transmission.
- J. Summarize how chemical interactions and behaviors lead to new substances.

### V. Earth and Space Science

- A. Explain and predict changes in major features of (a) land, (b) water, and (c) atmospheric systems.
- B. Describe underlying structures of the Earth that cause changes in the Earth's surface.
- C. Describe climate, weather, ocean currents, soil movements and changes in the forces acting on the earth.
- D. Analyze the influence living organisms have had on the earth's systems, including their impact on the composition of the atmosphere and the weathering of rocks.
- E. Investigate and understand that many aspects of the history and evolution of the Earth and life can be inferred by studying rocks and fossils.
- F. Investigate human use of the Earth's resources over the past 100 years. Explain that the basis for efforts to conserve and recycle renewable and nonrenewable resources are a result of past use.
- G. Describe the general structure of the solar system, galaxies, and the universe, explaining the nature of the evidence used to develop current models of the universe.
- H. Using past and current models of the structure of the solar system, explain the daily, monthly, yearly, and long-term cycles of the earth.

## AASD Science Standards for Grades 5-12 Students (continued)

### VI. Life and Environmental Science

- A. Explain how heredity is comprised of the characteristic traits found in genes within the cells of an organism.
- B. Understand how organisms both reproduce and pass on characteristics of their species.
- C. Understand that organisms are capable of regulating internal body conditions in response to internal and external stimuli.
- D. Distinguish between cell structures and their underlying functions.
- E. Explain that cell functions involve chemical reactions.
- F. Explain how cell differentiation and reproduction is regulated through the expression of different genes.
- G. Investigate how the instructions for specifying the characteristics of the organism are carried in the DNA in all organisms.
- H. Determine that most cells contain chromosomes that allow for variation between generations.
- I. Model the spontaneous process of changes in DNA (mutations).
- J. Explain that species variation allows for variable levels of survival based upon principles of natural selection.
- K. Diagram a biological classification scheme based upon evolutionary relationships between organisms.
- L. Summarize how matter affects earth cycles among the living and nonliving components of the biosphere.
- M. Explain that energy flows through ecosystems in one direction, from photosynthetic organisms to herbivores to carnivores and decomposers.
- N. Investigate how organisms both cooperate and compete in ecosystems.
- O. Explain that population size is dependent upon the amount of resources and environments available.
- P. Explain how biological evolution accounts for the diversity of a species.
- Q. Summarize how the evidence of common ancestry, chemical processes, and internal structures demonstrate unity among organisms.
- R. Trace how the sensory and nervous systems of various organisms react to changes in internal and external environment and transmit survival or learning stimuli to cause changes in behavior or responses.

### VII. Science Applications

- A. Design, build, evaluate, and revise models and explanations related to the earth and space, life and environmental, and physical sciences.
- B. Analyze the costs, benefits, or problems resulting from a scientific or technological innovation, including implications for the individual in the community.
- C. Choose a specific problem in our society, identify alternative scientific or technological solutions to that problem and argue its merits.
- D. Show how a major scientific or technological change has had an impact on work, leisure, or the home.
- E. Identify personal interests in science and technology; account for implications that these interests might have for future education, and options to be considered.

**AASD Science Standards for Grades 5-12 Students (continued)**VIII. Science in Social  
and Personal  
Perspectives

- A. Construct a plan for making decisions that includes the use of current scientific knowledge and scientific reasoning.
- B. Show how policy decisions in science depend on many factors, including social values, ethics, beliefs, timeframes, and considerations of science and technology.
- C. Advocate a solution or combination of solutions to a problem in science or technology.
- D. Analyze the costs, risks, benefits, and consequences of a proposal concerning resource management in the community and determine the potential impact of the proposal on life in the community and the region.
- E. Evaluate proposed policy recommendations in science and technology for validity, evidence, reasoning, and short- and long-term implications.
- F. Investigate how current plans or proposals concerning resource management, scientific knowledge, or technological development will have an impact on the environment or community.
- G. Evaluate data and sources of information when using scientific information to make decisions.

## WIDA English Language Proficiency Standards (Grades 9-12)

Domain	Level 1 Entering	Level 2 Beginning	Level 3 Developing	Level 4 Expanding	Level 5 Bridging
<b>Listening</b>	<ul style="list-style-type: none"> <li>match science domains or their tools with pictures from oral statements (such as earth, life, or physical science)</li> <li>match oral statements of scientific facts with illustrations (e.g., "White is made up of all colors.")</li> </ul>	<ul style="list-style-type: none"> <li>categorize science domains or their tools with pictures and words from oral directions (such as a telescope and sun dial go with the heavens)</li> <li>create scientific models based on illustrations and oral directions (e.g., "Show how light or sound travels;" "Show how the earth goes around the sun.")</li> </ul>	<ul style="list-style-type: none"> <li>identify science domains or their tools from oral descriptions of examples</li> <li>classify examples of properties (of light, sound, stars or planets) based on illustrations and oral directions</li> </ul>	<ul style="list-style-type: none"> <li>compare/contrast examples of science domains or their tools and uses from oral descriptions (such as the difference between telescopes and microscopes)</li> <li>apply oral descriptions of properties (of light, sound, stars or planets) to everyday life</li> </ul>	<ul style="list-style-type: none"> <li>give examples of science domains or their tools from oral reading of grade level science text</li> <li>seek explanations of the properties (of light, sound, stars or planets) through oral scenarios</li> </ul>
<b>Speaking</b>	<ul style="list-style-type: none"> <li>use vocabulary associated with scientific events or discoveries based on illustrations (such as x-rays or vaccines)</li> <li>chart change over time and offer information from charts or graphs (such as phases of the moon, temperatures, daylight hours)</li> </ul>	<ul style="list-style-type: none"> <li>describe scientific events or discoveries based on illustrations</li> <li>describe differences over time based on information from charts or graphs</li> </ul>	<ul style="list-style-type: none"> <li>compare/contrast scientific events or discoveries described orally with visual support (e.g., "___ is similar/ different from ___ because ___.")</li> <li>compare differences based on information from charts or graphs</li> </ul>	<ul style="list-style-type: none"> <li>predict future scientific events or discoveries based on oral or graphic evidence (e.g., "___ could/will/may/might/ lead to ___.")</li> <li>summarize and present information from charts or graphs related to change</li> </ul>	<ul style="list-style-type: none"> <li>predict the effects of future scientific events or discoveries based on oral evidence (e.g., "___ will/may/ might/make it necessary to ___.")</li> <li>explain patterns of change over time based on evidence from charts or graphs</li> </ul>

<p><b>Reading</b></p>	<ul style="list-style-type: none"> <li>identify data from <b>scientific</b> studies from tables, charts, or graphs</li> <li>match pictures of <b>scientific</b> equipment with their uses (such as telescope-see stars)</li> </ul>	<ul style="list-style-type: none"> <li>match sources of data depicted in tables, charts, or graphs from <b>scientific</b> studies with research questions</li> <li>match pictures of <b>scientific</b> equipment with descriptions of kinds of scientists (e.g., “Biologists use this tool to see cells.”)</li> </ul>	<ul style="list-style-type: none"> <li>extract information on the use of data presented in text and tables</li> <li>identify <b>scientific</b> equipment needed for <b>scientific</b> investigations (e.g., “You are examining the migratory patterns of birds. Which scientific tools will help you?”)</li> </ul>	<ul style="list-style-type: none"> <li>interpret data presented in text and tables in <b>scientific</b> studies</li> <li>Identify <b>scientific</b> equipment associated with descriptions of <b>scientific</b> investigations</li> </ul>	<ul style="list-style-type: none"> <li>evaluate <b>scientific</b> data and discuss the implications of the studies presented in grade level text</li> <li>evaluate relative use of <b>scientific</b> equipment based on readings from <b>scientific</b> investigations (e.g., “Which works best to predict weather patterns and why?”)</li> </ul>
<p><b>Writing</b></p>	<ul style="list-style-type: none"> <li>draw pictures and label steps in <b>scientific</b> experiments (such as distillation)</li> <li>use drawings, words, and phrases to answer WH-questions on lab reports based on experiments</li> </ul>	<ul style="list-style-type: none"> <li>state procedures for <b>scientific</b> experiments in biology, chemistry, physics, or earth/space <b>science</b></li> <li>use phrases, sentences, and diagrams to answer questions on lab reports based on experiments</li> </ul>	<ul style="list-style-type: none"> <li>provide information learned from <b>scientific</b> experiments in a lab report, including pre-experiment predictions</li> <li>complete lab reports following step-by-step procedures based on experiments</li> </ul>	<ul style="list-style-type: none"> <li>interpret findings gleaned from data from <b>scientific</b> experiments</li> <li>produce lab reports from outlines or learning logs based on <b>science</b> experiments</li> </ul>	<ul style="list-style-type: none"> <li>justify conclusions reached from examining <b>scientific</b> data</li> <li>produce narrative lab reports based on grade level <b>science</b> experiments</li> </ul>

<b>Course Objectives</b>	<b>Student Performance Indicators</b>	<b>Classroom Assessments</b>
<p><b>1. Apply the underlying themes of science to develop defensible visions of the future. (A.12.1.)</b></p>	<p><b>Performance will be satisfactory when the student:</b></p> <ol style="list-style-type: none"> <li>1. identifies possible future problems.</li> <li>2. develops a defensible vision of the future based on a problem.</li> </ol>	<ol style="list-style-type: none"> <li>1.a. Using computers and/or newspapers, list beginning problems that may worsen.</li> <li>2.a. Model a possible scientific discovery (e.g., living on the moon, video phone) to solve a problem.</li> <li>2.b. Draw a picture or create a model to show the student's city at a given future point.</li> </ol>
<p><b>Above objective aligned with AASD Science standards:</b> Science Connections</p>		
<p><b>2. Show how conflicting assumptions about science themes lead to different opinions and decisions about evolution, health, population, longevity, education, and use of resources, and show how these opinions and decisions have diverse effects on an individual, a community, and a country, both now and in the future. (A.12.2.)</b></p>	<p><b>Performance will be satisfactory when the student:</b></p> <ol style="list-style-type: none"> <li>1. identifies conflicting assumptions about science themes.</li> <li>2. shows how conflicting assumptions lead to different opinions and decisions.</li> <li>3. shows how these opinions and decisions have diverse effects.</li> </ol>	<ol style="list-style-type: none"> <li>1.a. Using interviews, newspapers, and/or computers, list science themes found in resources and conflicting assumptions concerning them.</li> <li>2.a. Present research on a set of conflicting assumptions about a chosen science theme.</li> <li>2.b. Debate conflicting assumptions with a native language group.</li> <li>3.a. Interview and compare in a visual (e.g., a Venn diagram) people who hold conflicting assumptions on a science theme.</li> </ol>
<p><b>Above objective aligned with AASD Science standards:</b> Science Connections</p>		



Course Objectives	Student Performance Indicators	Classroom Assessments
<p><b>3. Give examples that show how partial systems, models, and explanations are used to give quick and reasonable solutions that are accurate enough for basic needs. (A.12.3.)</b></p>	<p><b>Performance will be satisfactory when the student:</b></p> <ol style="list-style-type: none"> <li>1. states problems that occur in everyday life.</li> <li>2. determines which solutions to current problems are based on partial models, explanations and systems.</li> </ol>	<ol style="list-style-type: none"> <li>1.a. Create and administer a survey to other students to determine everyday problems.</li> <li>2.a. List examples showing the use of partial systems, models, and explanations for quick and reasonable solutions.</li> <li>2.b. After watching infomercials, generate questions to challenge the partial explanation, system or model represented.</li> </ol>
<p><b>Above objective aligned with AASD Science standards:</b> Science Connections</p>		
<p><b>4. Construct arguments that show how conflicting models and explanations of events can start with similar evidence. (A.12.4.)</b></p>	<p><b>Performance will be satisfactory when the student:</b></p> <ol style="list-style-type: none"> <li>1. identifies different types of evidence.</li> <li>2. investigates conflicting models to find examples that start from the same evidence.</li> <li>3. designs a model based on evidence.</li> </ol>	<ol style="list-style-type: none"> <li>1.a. Assemble a list of the types of evidence.</li> <li>2.a. Given conflicting models and explanations, research and record the evidence to support each model.</li> <li>3.a. Based on the evidence given, create a model or explanation of the evidence.</li> </ol>
<p><b>Above objective aligned with AASD Science standards:</b> Science Connections</p>		
<p><b>5. Show how the ideas and themes of science can be used to make real-life decisions about careers, work places, lifestyles, and use of resources. (A.12.5.)</b></p>	<p><b>Performance will be satisfactory when the student:</b></p> <ol style="list-style-type: none"> <li>1. shows science's use in making real-life decisions.</li> </ol>	<ol style="list-style-type: none"> <li>1.a. Identify a variety of ideas related to science and real life.</li> <li>1.b. Use the identified ideas to justify, in picture, verbal or written form, the student's career or lifestyle decisions.</li> </ol>
<p><b>Above objective aligned with AASD Science standards:</b> Science Connections</p>		

Course Objectives	Student Performance Indicators	Classroom Assessments
<b>6. Identify and replace inaccurate personal models and explanations of science-related phenomena using evidence learned or discovered. (A.12.6.)</b>	<b>Performance will be satisfactory when the student:</b> <ol style="list-style-type: none"> <li>1. identifies personal models and explanations.</li> <li>2. compares personal models to accurate models.</li> <li>3. uses evidence to replace an inaccurate model.</li> </ol>	<ol style="list-style-type: none"> <li>1.a. Given a teacher-generated science question, illustrate the models and related explanations.</li> <li>2.a. Given a model, create a visual (e.g., a Venn diagram) to compare it to the personal model.</li> <li>3.a. Given a teacher-generated science question, illustrate an accurate model related to it.</li> </ol>
<b>Above objective aligned with AASD Science standards:</b> Science Connections		
<b>7. Show how cultures and individuals have contributed to the development of major ideas in the earth and space, life and environmental, and physical sciences. (B.12.1.)</b>	<b>Performance will be satisfactory when the student:</b> <ol style="list-style-type: none"> <li>1. identifies and describe people or cultures that have contributed to the development of major ideas in the sciences.</li> <li>2. acquires information about people or cultures that contributed to science.</li> </ol>	<ol style="list-style-type: none"> <li>1.a. Identify contributors to the sciences from the student's native country.</li> <li>2.a. Describe a person or culture through a picture, word map, portfolio, demonstration, or skit.</li> </ol>
<b>Above objective aligned with AASD Science standards:</b> Nature of Science		
<b>8. Identify the cultural conditions that are usually present during great periods of discovery, scientific development, and invention. (B.12.2.)</b>	<b>Performance will be satisfactory when the student:</b> <ol style="list-style-type: none"> <li>1. identifies discoveries, developments and inventions during a period.</li> <li>2. describes conditions present during great periods of discovery, scientific development, and invention.</li> </ol>	<ol style="list-style-type: none"> <li>1.a. In groups, create a collage, web, or other visual to show advancements during the Industrial Revolution.</li> <li>2.a. Identify the cultural conditions present during the Industrial Revolution.</li> </ol>
<b>Above objective aligned with AASD Science standards:</b> Nature of Science		

<b>Course Objectives</b>	<b>Student Performance Indicators</b>	<b>Classroom Assessments</b>
<b>9. Relate the major themes of science to human progress in understanding science and the world. (B.12.3.)</b>	<b>Performance will be satisfactory when the student:</b> 1. explains changes in scientific thinking throughout history.	1.a. Compare and contrast the thinking of various scientists (e.g., Aristotle, Copernicus, Galileo, Newton, and Einstein). Show how these scientists challenged the commonly held world view of their time.
<b>Above objective aligned with AASD Science standards:</b> Nature of Science		
<b>10. Show how basic research and applied research contribute to new discoveries, inventions, and applications. (B.12.4.)</b>	<b>Performance will be satisfactory when the student:</b> 1. illustrates the importance of research to a discovery, invention or application.	1.a. Using a teacher-created form, web, graphic organizer or visual, present information to show how an important discoverer or inventor used research. 1.b. Use prior research to invent a new idea or product.
<b>Above objective aligned with AASD Science standards:</b> Nature of Science		
<b>11. Explain how science is based on assumptions about the natural world and themes that describe the natural world. (B.12.5.)</b>	<b>Performance will be satisfactory when the student:</b> 1. gives examples of assumptions or laws about the natural world. 2. explains how an assumption or law affects science.	1.a. Complete experiments based on assumptions or laws and record the represented assumptions or laws. 2.a. Choose a law or assumption and demonstrate through pictures, words or experiments how it affects science.
<b>Above objective aligned with AASD Science standards:</b> Nature of Science		

Course Objectives	Student Performance Indicators	Classroom Assessments
<p><b>12. When studying science content, ask questions suggested by current social issues, scientific literature, and observations of phenomena; build hypotheses that might answer some of these questions; design possible investigations; and describe results that might emerge from such investigations. (C.12.1.)</b></p>	<p><b>Performance will be satisfactory when the student:</b></p> <ol style="list-style-type: none"> <li>1. asks questions based on current issues, literature, and observations.</li> <li>2. builds hypotheses.</li> <li>3. designs investigations to answer questions.</li> <li>4. describes results of investigations.</li> </ol>	<ol style="list-style-type: none"> <li>1.a. Compare science-related questions after discussing, reading, or watching a video concerning current issues, literature and observations.</li> <li>1.b. In a group, generate questions ups based on a demonstration or experiment.</li> <li>2.a. Utilize information from the student's prior knowledge and research to make a logical inference or hypothesis about a question's answer.</li> <li>3.a. Design and complete a process to answer a specific question.</li> <li>4.a. Based on their investigation present results to answer the question.</li> </ol>
<p><b>Above objective aligned with AASD Science standards:</b> Science Inquiry</p>		
<p><b>13. Identify issues from an area of science study, write questions that could be investigated, review previous research on these questions, and design and conduct responsible and safe investigations to help answer the questions. (C.12.2.)</b></p>	<p><b>Performance will be satisfactory when the student:</b></p> <ol style="list-style-type: none"> <li>1. identifies issues in an area of science.</li> <li>2. writes questions related to an area of science.</li> <li>3. identifies prior knowledge related to the questions.</li> <li>4. designs and conduct safe investigations to answer questions.</li> </ol>	<ol style="list-style-type: none"> <li>1.a. Given many issues, classify them into the science areas.</li> <li>2.a. Brainstorm and subsequently classify questions from many science areas.</li> <li>3.a. Relate research and prior knowledge to a selected group of science area questions.</li> <li>4.a. With partners, formulate and conduct a process directly related to a question.</li> </ol>
<p><b>Above objective aligned with AASD Science standards:</b> Science Inquiry</p>		

Course Objectives	Student Performance Indicators	Classroom Assessments
<b>14. Evaluate the data collected during an investigation, critique the data collection procedures and results, and suggest ways to make any needed improvements. (C.12.3.)</b>	<b>Performance will be satisfactory when the student:</b> <ol style="list-style-type: none"> <li>1. establishes parameters for evaluating data.</li> <li>2. evaluates data collected in an investigation.</li> <li>3. suggests ways to improve data-collection.</li> </ol>	<ol style="list-style-type: none"> <li>1.a. Design a rubric or grading scale to evaluate data.</li> <li>2.a. After conducting an experiment, meet with other students to describe, compare, and critique the data collection process.</li> <li>3.a. In groups, list ways to improve data collection.</li> </ol>
<b>Above objective aligned with AASD Science standards:</b> Science Inquiry		
<b>15. During investigations, choose the best data collection procedures and materials available and use them competently. (C.12.4.)</b>	<b>Performance will be satisfactory when the student:</b> <ol style="list-style-type: none"> <li>1. chooses the best data collection procedures.</li> <li>2. uses a data collection procedure competently.</li> </ol>	<ol style="list-style-type: none"> <li>1.a. Given an investigation to complete and a variety of data collection options, select the best option.</li> <li>2.a. Collect and record data during an investigation.</li> </ol>
<b>Above objective aligned with AASD Science standards:</b> Science Inquiry		
<b>16. Analyze the influence living organisms have had on the earth's systems, including their impact on the composition of the atmosphere and the weathering of rocks. (E.8.4.)</b>	<b>Performance will be satisfactory when the student:</b> <ol style="list-style-type: none"> <li>1. investigates how living organisms have played many roles in the earth's system, including affecting the compositions of the atmosphere and contributing to the weathering of rocks.</li> </ol>	<ol style="list-style-type: none"> <li>1.a. Create a research question and describe how the evolution of plants has contributed to changes in the earth's atmosphere.</li> <li>1.b. Create a research question and describe the impact of human activity on the atmosphere's composition.</li> </ol>
<b>Above objective aligned with AASD Science standards:</b> Earth and Space Science		

Course Objectives	Student Performance Indicators	Classroom Assessments
<b>17. Investigate and understand that many aspects of the history and evolution of the Earth and life can be inferred by studying rocks and fossils. (E.8.5.)</b>	<b>Performance will be satisfactory when the student:</b> 1. analyzes the geologic and life history of the earth, including changes over time, using various forms of scientific evidence.	1.a. Make an illustrated timeline to describe the interactive relationship between the earth's geologic history and life history.
<b>Above objective aligned with AASD Science standards:</b> Earth and Space Science		
<b>18. Explain how heredity is comprised of the characteristic traits found in genes within the cell of an organism. (F.8.4.)</b>	<b>Performance will be satisfactory when the student:</b> 1. demonstrates that hereditary information is contained in genes, located in the chromosomes of each cell; each gene carries a single unit of information, and an inherited trait of an individual can be determined by either one or many genes.	1.a. Use construction paper to make a model of DNA and RNA. 1.b. Construct make-believe creatures (ReeBops) based upon the genes they receive. 1.c. Observe and record traits of parents and children and make a hypothesis as to which parent contributed each trait. 1.d. Use vocabulary to describe nucleotides and how they pair up. 1.e. Watch video and explain what they understood.
<b>Above objective aligned with AASD Science standards:</b> Life and Environmental Science		

Course Objectives	Performance Indicators	Classroom Assessments
<p><b>19. Understand how organisms both reproduce and pass on characteristics of their group. (F.8.5.)</b></p>	<p><b>Performance will be satisfactory when the student:</b></p> <ol style="list-style-type: none"> <li>1. shows how different structures both reproduce and pass on characteristics of the group.</li> <li>2. explains how DNA is copied.</li> </ol>	<ol style="list-style-type: none"> <li>1.a. Illustrate the stages of a butterfly’s life cycle and a frog’s life cycle. Compare the cycles and find another life cycle that matches the pattern.</li> <li>1.b. Compare the offspring to the parent for the butterfly and frog.</li> <li>1.c. Interpret DNA strands to determine whether it was copied correctly or not (mutation).</li> <li>1.d. Trace plant growth from seed; make illustrations and record observations.</li> </ol>
<p><b>Above objective aligned with AASD Science standards:</b> Life and Environmental Science</p>		

Course Objectives	Performance Indicators	Classroom Assessments
<p><b>20. Understand that an organism is capable of regulating internal body conditions in response to internal and external stimuli. (F.8.6.)</b></p>	<p><b>Performance will be satisfactory when the student:</b></p> <ol style="list-style-type: none"> <li>1. understands that an organism is regulated both internally and externally.</li> <li>2. explains why fruits and vegetables are sprinkled with water in stores.</li> </ol>	<ol style="list-style-type: none"> <li>1.a. Compare two different species to show similarities and differences, then describe or illustrate the environment in which the species live.</li> <li>1.b. Grow a variety of plants near a light source.</li> <li>1.c. Determine a variety of migratory animals and, using a word map, identify reasons for their migration.</li> <li>1.d. Determine a variety of hibernating animals and identify reasons for their hibernation.</li> <li>2.a. Identify osmosis, diffusion, fermentation, and cellular respiration.</li> <li>2.b. Predict/Interpret diagrams</li> <li>2.c. Draw hypertonic/hypotonic solutions and show where the molecules would go.</li> </ol>
<p><b>Above objective aligned with AASD Science standards:</b> Life and Environmental Science</p>		



<b>Course Objectives</b>	<b>Performance Indicators</b>	<b>Classroom Assessments</b>
<b>21. Distinguish between cell structure and their underlying functions. (F.12.1a.)</b>	<b>Performance will be satisfactory when the student:</b> <ol style="list-style-type: none"> <li>1. evaluates the normal structures of cells in single-celled organisms.</li> <li>2. evaluates the normal structures and general functions of cells in multiple-celled organisms.</li> </ol>	<ol style="list-style-type: none"> <li>1.a. Construct a metaphor for the cell (e.g., factory or school) and illustrate and explain it.</li> <li>1.b. Observe the movement of materials into cell models made of dialysis tubing.</li> <li>2.a. Compare and contrast plant and animal cells.</li> <li>2.b. Explain how microscopes have advanced the knowledge of cells.</li> <li>2.c. Build plant and animal cells and label.</li> <li>2.d. Cell analogies.</li> </ol>
<b>Above objective aligned with AASD Science standards:</b> Life and Environmental Science		
<b>22. Investigate how the instructions for specifying the characteristics of the organism are carried in the DNA in all organisms. (F.12.3a.)</b>	<b>Performance will be satisfactory when the student:</b> <ol style="list-style-type: none"> <li>1. explains current scientific ideas and information about the molecular basis of heredity.</li> <li>2. explains current scientific ideas and information about the genetic basis of heredity.</li> </ol>	<ol style="list-style-type: none"> <li>1.a. Construct a "ReeBop" from given chromosomes.</li> <li>1.b. Construct a DNA model and demonstrate replication.</li> <li>2.a. Explain how the structure of DNA determines the gene properties replication, mutation, and transmission of information to succeeding generations.</li> </ol>
<b>Above objective aligned with AASD Science standards:</b> Life and Environmental Science		

Course Objectives	Performance Indicators	Classroom Assessments
<p><b>23. Explain that species variation allows for variable levels of survival based upon principles of natural selection. (F.12.5a.)</b></p>	<p><b>Performance will be satisfactory when the student:</b></p> <ol style="list-style-type: none"> <li>1. understands the theory of evolution.</li> <li>2. understands the theory of natural selection.</li> </ol>	<ol style="list-style-type: none"> <li>1.a. Recognize issues involving human nutrition, fitness, and disease as viewed from an evolutionary perspective.</li> <li>2.a. Investigate the process of natural selection through a simulation game using colored paper dishes as prey and cloth fabric as habitat.</li> <li>2.b. Cut several colors of construction paper into small pieces and scatter them around outside in the grass. Pick up the pieces and discuss which colors were easiest to find and why.</li> </ol>
<p><b>Above objective aligned with AASD Science standards:</b> Life and Environmental Science</p>		
<p><b>24. Investigate how organisms both cooperate and compete in ecosystems. (F.12.7.)</b></p>	<p><b>Performance will be satisfactory when the student:</b></p> <ol style="list-style-type: none"> <li>1. investigates how organisms both cooperate and compete in ecosystems.</li> </ol>	<ol style="list-style-type: none"> <li>1.a. Design an ecosystem in a two-liter bottle. Identify materials required (soil, volume of water, mass of sand, and types of organisms). Monitor the ecosystem's temperature, and sustain the ecosystem for four weeks ("Bottle Biology").</li> </ol>
<p><b>Above objective aligned with AASD Science standards:</b> Life and Environmental Science</p>		

Course Objectives	Performance Indicators	Classroom Assessments
<p><b>25. Explain that population size is dependent upon the amount of resources and environmental variables. (F.12.8.)</b></p>	<p><b>Performance will be satisfactory when the student:</b></p> <ol style="list-style-type: none"> <li>1. using the science themes, infers changes in ecosystems prompted by environmental conditions.</li> <li>2. using the science themes, infers changes in ecosystems prompted by water pollution.</li> </ol>	<ol style="list-style-type: none"> <li>1.a. Observe the effects of temperature changes in water on fish by having a control group and cooling and/or warming the variable group's water.</li> <li>2.a. Observe photos or videos of an oil spill's effects on living organisms. Graph or chart the results of the student's research of the oil's effects on the organisms, living and dead.</li> <li>2.b. Create a travel brochure for the biomes.</li> <li>2.c. Chart human population increases in a particular area and the effects of that growth on animal and plant life in the same area. Use graphic organizers to illustrate findings.</li> </ol>
<p><b>Above objective aligned with AASD Science standards:</b> Life and Environmental Science</p>		

Course Objectives	Performance Indicators	Classroom Assessments
<p><b>26. Explain that energy flows through ecosystems in one direction from photosynthetic organisms to herbivores to carnivores and decomposers. (F.12.9.)</b></p>	<p><b>Performance will be satisfactory when the student:</b></p> <ol style="list-style-type: none"> <li>1. uses the science themes to investigate energy systems (related to food chains).</li> <li>2. uses the science themes to show how energy is stored in food (plants and animals).</li> </ol>	<ol style="list-style-type: none"> <li>1.a. Use a two-liter bottle to design an ecosystem. Include soil, water, and organisms that the ecosystem will sustain.</li> <li>1.b. Given the sample characteristics of a fictitious animal, identify its place in the food web.</li> <li>1.c. Create a pictorial food chain influenced by the sun.</li> <li>1.d. Explain the relationship between organisms, population, biomes, ecosystems, and biosphere.</li> <li>2.a. Use the order of the food web to identify where and how animals get their energy. Illustrate food webs of given ecosystems and relate the consumers and producers to energy.</li> <li>2.b. Build a model of photosynthesis.</li> </ol>
<p><b>Above objective aligned with AASD Science standards:</b> Life and Environmental Science</p>		

Course Objectives	Performance Indicators	Classroom Assessments
<p><b>27. Trace how the sensory and nervous systems of various organisms react to the internal and external environment and transmit survival or learning stimuli to cause changes in behavior or responses. (F.12.12.)</b></p>	<p><b>Performance will be satisfactory when the student:</b></p> <ol style="list-style-type: none"> <li>1. traces how the sensory systems of various organisms react to the external environment.</li> <li>2. traces how the nervous systems of various organisms react to the external environment.</li> </ol>	<ol style="list-style-type: none"> <li>1.a. Describe the reactions of various mammals to an extremely bright light.</li> <li>2.a. Describe the reactions of various mammals to pain.</li> <li>2.b. Investigate sleep deprivation.</li> <li>2.c. Find an article and give your opinions/reactions.</li> </ol>
<p><b>Above objective aligned with AASD Science standards:</b> Life and Environmental Science</p>		
<p><b>28. Analyze the costs, benefits, or problems resulting from a scientific or technological innovation, including implications for the individual and the community. (G.12.3.)</b></p>	<p><b>Performance will be satisfactory when the student:</b></p> <ol style="list-style-type: none"> <li>1. analyzes the costs, benefits, or problems resulting from a scientific or technological innovation.</li> </ol>	<ol style="list-style-type: none"> <li>1.a. Compare the cost of computers in the school to the benefits or problems created.</li> </ol>
<p><b>Above objective aligned with AASD Science standards:</b> Science Applications</p>		
<p><b>29. Show how a major scientific or technological change has had an impact on work, leisure, or the home. (G.12.4.)</b></p>	<p><b>Performance will be satisfactory when the student:</b></p> <ol style="list-style-type: none"> <li>1. shows the impact of a change on work, leisure, or home.</li> </ol>	<ol style="list-style-type: none"> <li>1.a. Use role playing to show changes resulting from the invention of computers.</li> <li>1.b. Create products individually and on an assembly line, recording and comparing the time needed per product.</li> </ol>
<p><b>Above objective aligned with AASD Science standards:</b> Science Applications</p>		

Course Objectives	Student Performance Indicators	Classroom assessments
<b>30. Show how policy decisions in science depend on many factors, including social values, ethics, beliefs, timeframes, and considerations of science and technology. (H.12.3.)</b>	<b>Performance will be satisfactory when the student:</b> 1. shows how decisions in science depend on many factors.	1.a. Compare policy decisions in many countries 1.b. Compare the student's own experiences with those of the student's parents (e.g., medical practices)
<b>Above objective aligned with AASD Science standards:</b> Science in Social and Personal Perspectives		
<b>31. When making decisions, construct a plan that includes the use of current scientific knowledge and scientific reasoning. (H.12.7.)</b>	<b>Performance will be satisfactory when the student:</b> 1. gathers current scientific knowledge and scientific reasoning. 2. constructs a plan to make a decision.	1.a. Check various resources (e.g., computer, library, and newspaper) related to a potential decision. 1.b. Given various resources, choose ones that relate to a potential decision. 2.a. Construct and relate a plan to improve an area of the community.
<b>Above objective aligned with AASD Science standards:</b> Science in Social and Personal Perspectives		