

ELL INTRODUCTION TO SCIENCE 4350

Description An inquiry-based science survey course with an emphasis on developing English communication skills and vocabulary relevant to science content. Energy is the focus of this course that will provide a foundation for high school English Language Learners in future science courses.

Credits 1

Prerequisites none

Textbooks/Resources

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 K-4 Students

- I. Science Connections
 - A. Conduct science investigations, ask and answer questions that will help decide the general areas of science being addressed.
 - B. Investigate science-related problems and decide what evidence, models, or explanations previously studied can be used for investigation.
 - C. Investigate science-related problems and decide what data can be collected to determine the most useful explanations.
 - D. Decide which science themes are important in investigating a specific science-related problem.
 - E. Decide what changes have occurred when investigating a specific science-related problem.

- II. Nature of Science
 - A. Use references to help answer science-related questions and plan investigations.
 - B. Acquire information about people who have contributed to the development of major ideas in science.
 - C. Show how the major developments of scientific knowledge have changed over time.

- III. Science Inquiry
 - A. Use vocabulary of the unifying themes to ask questions about science.
 - B. Use scientific content being learned to ask questions, plan investigations, make observations, make predictions, and offer explanations.
 - C. Select multiple sources of information to help answer questions selected for classroom investigation.
 - D. Use science equipment safely and effectively to collect data relevant to questions and investigations.
 - E. Use data collected to develop explanations and answer questions generated by investigation.
 - F. Communicate results of investigations in ways audiences will understand.
 - G. Support conclusions with logical arguments.
 - H. Ask additional questions that might help focus or further an investigation.
 - I. Develop record systems to organize and record information.

- IV. Physical Science
 - A. Understand that objects are made of more than one substance.
 - B. Group and/or classify objects and substances based on properties of materials.
 - C. Understand the characteristics of solids, liquids, and gases.
 - D. Observe and describe changes in matter and construct explanations for the changes.
 - E. Construct models of matter undergoing change.
 - F. Observe and describe objects at rest or in motion.
 - G. Discover the characteristics of energy (including light, heat, electricity, sound, and magnetism).

AASD Science Standards for Grades K-4 Students (continued)

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| V. Earth and Space Science | <ul style="list-style-type: none">A. Investigate and understand components of soil, its origin, and importance to plants and animals.B. Investigate the composition of rocks, minerals, and soils.C. Identify and describe land and water masses.D. Identify the seasons and their characteristics.E. Investigate and understand basic weather found in Wisconsin.F. Find patterns and cycles in the earth's daily, yearly, and long-term changes.G. Describe renewable and nonrenewable resources in the home and community.H. Give examples of resources used in mining, forestry, farming, and manufacturing.I. Identify celestial objects and note changes in their patterns. |
| VI. Life and Environmental Science | <ul style="list-style-type: none">A. Explain the basic needs of organisms.B. Compare plant and animal structures and functions.C. Give examples of plant and animal life cycles.D. Explain that plants and animals grow to resemble the parents.E. Explain how animals depend on plants.F. Relate an organism's pattern of behavior and survival to the nature of that organism's dynamic environment. |
| VII. Science Applications | <ul style="list-style-type: none">A. Identify the benefits of technology used in jobs in Wisconsin.B. Describe technological advances in the workplace over time.C. Determine science discoveries that have led to changes in technologies which are being used in the work place.D. Identify the combinations of simple machines in a commonly used device.E. Ask questions and find answers about how devices and machines were invented and produced. |
| VIII. Science in Social and Personal Perspectives | <ul style="list-style-type: none">A. Describe how science and technology have helped and sometimes hindered progress in state and local issues.B. Show how science has contributed to meeting personal needs.C. Develop a list of issues about which citizens must make decisions and discuss ways of finding information about the issues. |

WIDA English Language Proficiency Standards (Grades 9-12)

| Domain | Level 1 Entering | Level 2 Beginning | Level 3 Developing | Level 4 Expanding | Level 5 Bridging |
|------------------|--|--|---|---|---|
| Listening | <ul style="list-style-type: none"> locate physical, biological, chemical, or earth/space structures from pictures and oral statements (such as cells, organs, magnetism, atoms, or constellations) collect and prepare real-life materials needed for scientific experiments based on oral directions | <ul style="list-style-type: none"> differentiate types of physical, biological, chemical, or earth/space structures from pictures and oral statements (such as plant cells, kidneys and liver, compounds, or solar systems) replicate scientific experiments using real-life materials based on oral directions | <ul style="list-style-type: none"> match the functions of related physical, biological, chemical, or earth/space structures from oral descriptions (such as homeostasis/dormancy or atomic/nuclear structures) build different hypotheses based on oral descriptions of science issues | <ul style="list-style-type: none"> compare/contrast the functions of related physical, biological, chemical, or earth/space structures from oral descriptions (such as fossils/genetics or boiling/melting points) match different oral explanations of the results with evidence of the findings | <ul style="list-style-type: none"> match analogies (of the functions) of related biological, chemical, or physical structures from oral descriptions from grade level science text conduct scientific inquiry using multimedia resources that include oral input |
| Speaking | <ul style="list-style-type: none"> identify components of systems, chains, or cycles from diagrams or graphic organizers (such as taxonomic systems, food chains, or life cycles) create and present collages or depictions of scientific issues | <ul style="list-style-type: none"> give examples of or describe components of systems, chains, or cycles from diagrams or graphic organizers (such as functions of veins and arteries of the circulatory system) brainstorm ideas based on illustrations scientific issues that affect everyday life (e.g., "What are some examples of pollution?") | <ul style="list-style-type: none"> describe how systems, chains, or cycles operate from diagrams or graphic organizers (such as solar system or water cycle) describe ways in which scientific issues can be resolved (e.g., "How can we reduce pollution?") | <ul style="list-style-type: none"> discuss how systems, chains or cycles are interdependent (such as ecosystems or respiratory systems) discuss pros and cons of scientific issues using graphic organizers | <ul style="list-style-type: none"> explain and give examples of the principle of interdependence of systems or the iterative nature of chains and cycles (such as endocrine system) engage in debates on scientific issues (such as genetic engineering, nuclear energy) |

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

| Course Objectives | Performance Indicators | Classroom Assessments |
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| <p>1. When conducting science investigations, ask and answer questions that will help decide the general areas of science being addressed. (A.4.1.)</p> | <p>Performance will be satisfactory when the student:</p> <p>1. identifies the general area(s) of science being addressed in a question.</p> | <p>1.a. In cooperative groups, generate a question and design an experiment. Identify the science domain of this question and experiment.</p> <p>1.b. Ask and answer questions relating to which science domain(s) an experiment and/or investigation represents.</p> |
| <p>Above objective aligned with AASD Science standards: Science Connections</p> | | |
| <p>2. When faced with a science-related problem, decide what evidence, models, or explanations previously studied can be used to better understand what is happening now. (A.4.2.)</p> | <p>Performance will be satisfactory when the student:</p> <p>1. identifies background knowledge related to a problem.</p> | <p>1.a. Use graphic organizers such as KWHL charts. K= what you know W = what you want to know H = how will you find out L = what you learned</p> <p>1.b. Create a word web or semantic map.</p> <p>1.c. In a small group, generate a problem and specify the necessary steps to solve the problem.</p> |
| <p>Above objective aligned with AASD Science standards: Science Connections</p> | | |

| Course Objectives | Performance Indicators | Classroom Assessments |
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| 3. When investigating a science-related problem, decide what data can be collected to determine the most useful explanations. (A.4.3.) | Performance will be satisfactory when the student: 1. determines what data are necessary to solve the problem. | 1.a. Given types of data, choose the data relevant to the problem. 1.b. Discuss the answers to questions generated in a KWHL chart. K = what you know W = what you want to know H = how will you find out L = what you learned |
| Above objective aligned with AASD Science standards: Science Connections | | |
| 4. When studying science-related problems, decide which of the science themes are important. (A.4.4.) | Performance will be satisfactory when the student: 1. identifies the science themes. 2. chooses the science themes important to the problem. | 1.a. Given a student-initiated or teacher-initiated demonstration, identify the science theme being displayed. 1.b. Participate in activities to demonstrate each science theme. 2.a. Given a graphic of a problem, identify the science theme(s) important to the science-related problem. 2.b. Match the science theme(s) to given problems. |
| Above objective aligned with AASD Science standards: Science Connections | | |

| Course Objectives | Performance Indicators | Classroom Assessments |
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| <p>5. Use the vocabulary of the unifying themes to ask questions about objects, organisms, and events being studied. (C.4.1.)</p> | <p>Performance will be satisfactory when the student:</p> <ol style="list-style-type: none"> 1. uses examples to demonstrate the vocabulary of unifying themes. 2. classifies questions related to and using the vocabulary of unifying themes. | <ol style="list-style-type: none"> 1.a. Complete experiments related to the unifying themes. 1.b. List examples (in pictures, words, or symbols) from the student's own experience related to the unifying themes. 2.a. Sort given questions according to the unifying themes. |
| <p>Above objective aligned with AASD Science standards: Science Inquiry</p> | | |
| <p>6. Use the science content being learned to ask questions, plan investigations, make observations, make predictions, and offer explanations. (C.4.2.)</p> | <p>Performance will be satisfactory when the student:</p> <ol style="list-style-type: none"> 1. identifies and use prior knowledge related to content to ask question and plan investigation. | <ol style="list-style-type: none"> 1.a. Complete a KWHL about science content. K = what you know W = what you want to know H = how will you find out L = what you learned |
| <p>Above objective aligned with AASD Science standards: Science Inquiry</p> | | |
| <p>7. Use simple science equipment including rulers, balances, graduated cylinders, hand lenses, thermometers, and computers safely and effectively to collect data relevant to questions and investigations. (C.4.4.)</p> | <p>Performance will be satisfactory when the student:</p> <ol style="list-style-type: none"> 1. identifies the use of simple science equipment 2. uses simple science equipment to complete an experiment | <ol style="list-style-type: none"> 1.a. Given a science problem, find the best equipment to solve the problem 2.a. Measure objects, using a variety of tools (e.g., rulers, string, or paper clips) 2.b. Collect data using simple science equipment safely |
| <p>Above objective aligned with AASD Science standards: Science Inquiry</p> | | |

| Course Objectives | Performance Indicators | Classroom Assessments |
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| 8. Use data they have collected to develop explanations and answer questions generated by investigations. (C.4.5.) | Performance will be satisfactory when the student: 1. applies collected data. | 1.a. In groups, use collected data to explain investigations. 1.b. In a teacher-led discussion, form a question relevant to the investigation. 1.c. Based on collected data, answer generated questions. |
| Above objective aligned with AASD Science standards: Science Inquiry | | |
| 9. Communicate the results of their investigations in ways their audiences will understand by using charts, graphs, drawings, written descriptions, and various other means. (C.4.6.) | Performance will be satisfactory when the student: 1. expresses the results of investigation. | 1.a. Use visuals to share the results of the student's investigation. 1.b. Lead other students in a demonstration to illustrate results of the student's investigation. |
| Above objective aligned with AASD Science standards: Science Inquiry | | |
| 10. Support their conclusions with logical arguments. (C.4.7.) | Performance will be satisfactory when the student: 1. supports the conclusion. | 1.a. Gather questions from the teacher and other students which challenge the student's conclusion. 1.b. Through demonstrations or pictures, defend against the challenges. |
| Above objective aligned with AASD Science standards: Science Inquiry | | |

| Course Objectives | Performance Indicators | Classroom Assessments |
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| 11. Ask additional questions that might help focus or further an investigation. (C.4.8.) | Performance will be satisfactory when the student: 1. identifies two more questions to further an investigation. | 1.a. Create a flowchart of the investigation with questions located at the appropriate stages. |
| Above objective aligned with AASD Science standards: Science Inquiry | | |
| 12. Observe, predict and describe changes in form, temperature, color, speed, and direction of objects and construct explanations for the changes. (D.4.4.) | Performance will be satisfactory when the student: 1. observes and predicts changes in form, temperature, color, speed, and direction of objects. 2. describes changes that occur in objects. 3. explains why changes occur. | 1.a. Observe and predict changes in water as it freezes, melts, and evaporates. 2.a. List changes (using drawing, word map, or discussion) that occur as water freezes, melts, and evaporates. 3.a. Explain changes through drawings or other visuals. |
| Above objective aligned with AASD Science standards: Physical Science | | |
| 13. Observe and describe physical events in objects at rest or in motion. (D.4.6.) | Performance will be satisfactory when the student: 1. observes and describes objects at rest and in motion. | 1.a. Experiment with objects at rest or in motion. 2.a. Construct a demonstration to show the physical events of objects at rest and in motion. |
| Above objective aligned with AASD Science standards: Physical Science | | |

| Course Objectives | Performance Indicators | Classroom Assessments |
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| <p>14. Ask questions and make observations to discover the differences between matter and energy. (D.4.8.)</p> | <p>Performance will be satisfactory when the student:</p> <ol style="list-style-type: none"> 1. identifies prior knowledge related to the topic. 2. makes observations of the relevant characteristics of variables during experimentation. | <ol style="list-style-type: none"> 1.a. List things that can be touched and list things that cannot be touched. 2.a. Participate in activities involving things that can be touched and things that cannot be touched. 2.b. Create a visual (e.g., discussion web or Venn diagram) to display the differences between things that can be touched and things that cannot be touched. |
| <p>Above objective aligned with AASD Science standards: Physical Science</p> | | |
| <p>15. Identify celestial objects (stars, sun, moon, planets) in the sky, noting changes in patterns of those objects over time. (E.4.4.)</p> | <p>Performance will be satisfactory when the student:</p> <ol style="list-style-type: none"> 1. identifies celestial objects in the sky. 2. notes change in patterns of celestial objects over time. | <ol style="list-style-type: none"> 1.a. Draw pictures of celestial objects. 1.b. Create models of celestial objects. 1.c. Label pictures of celestial objects. 2.a. After visiting a planetarium or watching a video about celestial changes, draw pictures, make models, or create a timeline to show changes over time. |
| <p>Above objective aligned with AASD Science standards: Earth and Space Science</p> | | |

| Course Objectives | Performance Indicators | Classroom Assessments |
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| <p>16. Describe the weather commonly found in Wisconsin in terms of clouds, temperature, humidity, and forms of precipitation, and the changes that occur over time, including seasonal changes. (E.4.5.)</p> | <p>Performance will be satisfactory when the student:</p> <ol style="list-style-type: none"> 1. describes the weather commonly found in Wisconsin. 2. describes the changes in the weather occurring over time. | <ol style="list-style-type: none"> 1.a. Keep a journal to describe daily weather. 1.b. Keep a graph or chart of daily weather. 1.c. Use various resources (e.g., the Internet, encyclopedias, and personal experience) to compare weather commonly found in Wisconsin to the weather in the student's native country. 2.a. Using a daily journal or chart, compare weather in different seasons. 2.b. Create a graph to show changes in the weather over time. |
| <p>Above objective aligned with AASD Science standards: Earth and Space Science</p> | | |
| <p>17. Using the science themes, find patterns and cycles in the earth's daily, yearly, and long-term changes. (E.4.6.)</p> | <p>Performance will be satisfactory when the student:</p> <ol style="list-style-type: none"> 1. finds patterns and cycles in the earth's daily, yearly, and long-term changes. | <ol style="list-style-type: none"> 1.a. Create a picture, physical model, or other visual to show the patterns or cycles of the earth's changes. 1.b. Identify patterns and cycles in the student's own life experience. |
| <p>Above objective aligned with AASD Science standards: Earth and Space Science</p> | | |

| Course Objectives | Performance Indicators | Classroom Assessments |
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| 18. Using the science themes, describe resources used in the home, community, and nation as a whole. (E.4.7.) | Performance will be satisfactory when the student: <ol style="list-style-type: none"> 1. identifies resources related to science themes. 2. describes resources used in a home. 3. describes resources used in a community. 4. describes resources used in a nation. | <ol style="list-style-type: none"> 1.a. Brainstorm or complete a KWHL chart to list resources related to science themes. K = what you know W = what you want to know H = how will you find out L = what you learned 2.a. Collect examples from home of resources related to the science themes. 3.a. Observe (through slides, field trips, and class guests) and record resources used in a community which relate to the science themes. 4.a. Using computers, contact other students around the nation to find examples of resources related to the science themes. |
| Above objective aligned with AASD Science standards: Earth and Space Science | | |
| 19. Discover how each organism meets its basic needs for water, nutrients, protection, and energy in order to survive. (F.4.1.) | Performance will be satisfactory when the student: <ol style="list-style-type: none"> 1. identifies the basic needs of organisms. 2. discovers how an organism meets its basic needs. | <ol style="list-style-type: none"> 1.a. Identify the student's own basic needs. 1.b. Distinguish between survival needs and wants. 2.a. Raise and study an organism from birth to adult stage. |
| Above objective aligned with AASD Science standards: Life and Environmental Science | | |

| Course Objectives | Performance Indicators | Classroom Assessments |
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| 20. Investigate how organisms, especially plants, respond to both internal cues (the need for water) and external cues (changes in the environment). (F.4.2.) | Performance will be satisfactory when the student: <ol style="list-style-type: none"> 1. investigates how plants respond to internal cues. 2. investigates how plants respond to external cues. | <ol style="list-style-type: none"> 1.a. Record in a journal what happens to plants given different amounts of water. 2.a. Record in a journal what happens to plants kept at different temperatures. |
| Above objective aligned with AASD Science standards: Life and Environmental Science | | |
| 21. Identify the technology used by someone employed in a job or position in Wisconsin and explain how the technology helps. (G.4.1.) | Performance will be satisfactory when the student: <ol style="list-style-type: none"> 1. identifies technology use in Wisconsin. 2. identifies the technology used by someone employed in Wisconsin. 3. explains how technology helps in jobs. | <ol style="list-style-type: none"> 1.a. Match examples of technology to job. 2.a. Shadow a person in their job and determine technology used. 3.a. Hypothesize and illustrate a certain job's increased difficulty without technology |
| Above objective aligned with AASD Science standards: Science Applications | | |
| 22. Identify the combinations of simple machines in a device used in the home, the workplace, or elsewhere in the community. (G.4.4.) | Performance will be satisfactory when the student: <ol style="list-style-type: none"> 1. identifies simple machines. 2. identifies combinations of simple machines in a device. | <ol style="list-style-type: none"> 1.a. List simple machine's used in the home, the workplace, or elsewhere in the community. 1.b. Group machines according to type. 2.a. Label the simple machines in a given device. 2.b. Collect examples of devices from the home, the workplace, or elsewhere which use combinations of simple machines. |
| Above objective aligned with AASD Science standards: Science Applications | | |

| Course Objectives | Performance Indicators | Classroom Assessments |
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| <p>23. Ask questions to find answers about how devices and machines were invented and produced. (G.4.5.)</p> | <p>Performance will be satisfactory when the student:</p> <ol style="list-style-type: none"> 1. asks questions about a machine’s invention. 2. investigates the invention and production of a certain device or machine. | <ol style="list-style-type: none"> 1.a. Brainstorm questions about machines used daily. 2.a. Research, using books, the Internet, interview, and native language sources, to discover how a chosen device or machine was invented or produced and present the information to others in a student-chosen form. |
| <p>Above objective aligned with AASD Science standards: Science Applications</p> | | |
| <p>24. Using the science themes, identify local and state issues that are helped by science and technology, and explain how science and technology can also cause a problem. (H.4.2.)</p> | <p>Performance will be satisfactory when the student:</p> <ol style="list-style-type: none"> 1. identifies an issue at the state or local level. 2. illustrates how science and technology helps a chosen issue. 3. illustrates how science and technology can cause a problem. | <ol style="list-style-type: none"> 1.a. Gather a variety of local and state issues from resources (e.g., television, newspapers, and people). 2.a. Research an issue using television, newspapers, and native language sources to discover and record how science or technology helped it. 3.a. Research an issue using television, newspapers, and native language sources to discover and record how science or technology caused it. |
| <p>Above objective aligned with AASD Science standards: Science in Social and Personal Perspectives</p> | | |

| Course Objectives | Performance Indicators | Classroom Assessments |
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| <p>25. Develop a list of issues that citizens must make decisions about and describe a strategy for becoming informed about the science behind these issues. (H.4.4.)</p> | <p>Performance will be satisfactory when the student:</p> <ol style="list-style-type: none"> 1. develops a list of issues about which citizens must make decisions. 2. describes a strategy for becoming informed about the science behind these issues. | <ol style="list-style-type: none"> 1.a. Make a chart of science-related issues. 2.a. List resources to find information about a chosen issue. |
| <p>Above objective aligned with AASD Science standards: Science in Social and Personal Perspectives</p> | | |