

GRADE: KINDERGARTEN

FOSS Module: Animals Two by Two

FOSS OBJECTIVES:

- *develop a growing curiosity for the living world around them
- *observe and describe structures of common animals
- *compare structures and behaviors of different animals
- *observe interactions of animals and their surroundings
- *handle animals carefully
- *communicate observations

NYS PERFORMANCE INDICATORS:

STANDARD 1: Mathematical Analysis

- M1.1 Use mathematical notation and symbolism to communicate in mathematics and compare and describe quantities and relationships
- M2.1 Use simple logical reasoning to develop conclusions, recognizing that patterns and relationships assist them in making conclusions
- M3.1 Explore and solve problems using concrete objects and manipulatives such as a balance, graduated cylinder, ruler

STANDARD 1: Scientific Inquiry

- S1.1 Ask "why" questions in attempts to seek greater understanding of events they have observed or heard about
- S1.2 Question the explanations they hear from others and read about, seek clarification, and compare to their own
- S1.3 Develop relationships among observations to construct tentative explanations for what they have observed
- S2.2 Share their research plans with others and revise based on suggestions
- S2.3 Carry out plans for exploring phenomena using appropriate inquiry and process skills
- S3.1 Organize observations and measurements through classification and preparation of charts and tables
- S3.2 Interpret observations and measurements and recognize relationships
- S3.3 Share findings with others and seek their ideas
- S3.4 Adjust understandings based on findings or new ideas

STANDARD 1: Engineering Design

- T1.2 Investigate prior solutions and ideas from various resources
- T1.3 Generate ideas for possible solutions, apply math and science skills, evaluate and determine the best solution, and justify your choices
- T1.5 Discuss how best to test the solution, perform, record, discuss, summarize, and suggest improvements

STANDARD 4: Physical Environment

- 2.1e Extreme natural events may have positive or negative impacts on living things
- 3.1b Matter has properties that can be observed through the senses.
- 3.1c Objects have properties that can be observed, described, and/or measured
- 3.1e The material an object is made up of determines some specific properties of the object. Properties can be observed.
- 3.1f Objects and/or materials can be sorted or classified according to their properties

3.1g Some properties of an object are dependent on the conditions of the present surroundings

3.2c Changes in the properties of materials can be observed and described.

5.1a The position of an object can be described by locating it relative to another object or the background

STANDARD 4: Living Environment

1.1 Describe the characteristics of and variations between living and nonliving things

1.2 Describe the life processes common to all living things

2.1 Recognize that traits of living things are both inherited and learned

2.2 Recognize that for humans and other living things there is genetic continuity between generations

3.1 Describe how the structures of plants and animals complement their environment

3.2 Observe that differences within the species may give individuals an advantage in surviving and reproducing

4.1 Describe the major stages in the life cycles of selected plants and animals

4.2 Describe evidence of growth, repair, and maintenance

5.1 Describe basic life functions of common living specimens

5.2 Describe some survival behaviors of common living specimens

5.3 Describe the factors that help promote good health and growth in humans

6.1 Describe how plants and animals depend on each other and the nonliving environment

STANDARD 6: Interconnectedness

1: Through systems thinking, they recognize commonalities that exist and how parts of a system interrelate and combine to perform special functions

2: Models are simplified representations

3: Grouping by magnitudes into a series provides a useful way to deal with the immense range and changes in scale

4: Equilibrium is a state of stability

5: Identifying patterns for change is necessary for making predictions about future behavior and conditions

STANDARD 7: Interdisciplinary Problem Solving

1: The knowledge and skills of mathematics, science, and technology are used together to make informed decisions and solve problems

2: Solving interdisciplinary problems involves a variety of skills and strategies such as effective work habits, gathering information, generating ideas, making connections, and presenting ideas

GRADE: KINDERGARTEN

FOSS Module: Wood and Paper

FOSS OBJECTIVES:

- *develop a growing curiosity for the physical world around them
- *observe and describe properties of wood and paper
- *compare different kinds of wood and paper
- *observe interactions of wood and paper with different substances
- *gain awareness of natural resources
- *communicate observations

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STANDARD 4: Physical Environment

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observed.

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6.1 Describe how plants and animals depend on each other and the nonliving environment

7.1 Identify ways in which humans have changed their environment and the effects of those changes

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Simple Engineering- Building a Paper Table

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GRADE: 1st

FOSS Module: Pebbles, Sand, and Silt

FOSS OBJECTIVES:

- *develop a growing curiosity for the physical world around them
- *observe, sort, and describe earth materials based on properties
- *observe the properties of a river rock mixture and different soils
- *explore places where earth materials can be found
- *explore ways that earth materials are used
- *organize and communicate observations through drawing and writing

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STANDARD 4: Physical Environment

- 2.1d Erosion and deposition result from the interaction among air, water, and land
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GRADE: 1st

FOSS Module: Balance and Motion +friction

FOSS OBJECTIVES:

- *develop a growing curiosity for the physical world around them
- *investigate materials and use trial and error persistently
- *explore balance, counterweight, stability, and equilibrium
- *discover and construct objects that have rotational motion
- *explore and describe rolling systems, rolling spheres, and friction
- *organize and communicate observations

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4.1a Energy exists in various forms: heat, electric, sound, chemical, mechanical, and light

4.1f Heat can be released in many ways (burning, friction, or combining substances)

5.1a The position of an object can be described by locating it relative to another object or the background

5.1b The position or direction of motion of an object can be changed by pushing or pulling

5.1d The amount of change in the motion of an object is affected by friction.

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EiE Module: Civil Engineering/Bridge Building

EiE OBJECTIVES:

- *explore why bridges are shaped differently
- *distinguish between beam, arch, and suspension bridges
- *learn how bridge designs counteract and redirect forces and motion
- *design, construct, and test a bridge in a culminating design challenge

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STANDARD 2: Information Systems

1: Information technology is used to retrieve, process, and communicate information and is a tool for learning

2: Knowledge of the impacts and limitations of information systems is essential to its effective and ethical use

3: Information technology can have a positive and negative impact on society, depending on its use

STANDARD 4: Physical Environment

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GRADE: 2nd

FOSS Module: Air and Weather

FOSS OBJECTIVES:

- *develop an interest in air and weather and the tools used by meteorologists
- *experience air as a material that takes up space and can be compressed
- *observe the force of air pressure and moving air on objects and materials
- *observe changes in air and weather over time and compare monthly and seasonal weather conditions
- *observe the location of the Sun and Moon over a day and the changes in the Moon over a month
- *organize and communicate observations through drawing and writing

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STANDARD 4: Physical Environment

- 1.1a Natural patterns and cycles include, Earth's rotation and revolution, seasons, Moon phases
- 1.1b Humans organize time into units based on natural motions of earth
- 1.1c The Sun and other stars appear to move in a recognizable pattern both daily and seasonally.
- 2.1a Weather is the condition of the outside air at a particular moment
- 2.1b Weather can be described and measured by temperature, wind speed and direction, precipitation, and sky conditions
- 2.1c Water is recycled by evaporation, condensation, precipitation, runoff, and groundwater
- 2.1d Erosion and deposition result from the interaction among air, water, and land
- 2.1e Extreme natural events may have positive or negative impacts on living things
- 3.1b Matter has properties that can be observed through the senses.
- 3.1c Objects have properties that can be observed, described, and/or measured
- 3.1e The material an object is made up of determines some specific properties of the object. Properties can be observed.
- 3.1f Objects and/or materials can be sorted or classified according to their properties
- 3.1g Some properties of an object are dependent on the conditions of the present surroundings
- 3.2a Matter exists in three states: solid, liquid, gas; each with distinct properties
- 3.2b Temperature can affect the state of matter of a substance
- 3.2c Changes in the properties of materials can be observed and described.
- 4.1a Energy exists in various forms: heat, electric, sound, chemical, mechanical, and light
- 4.1d Energy and matter interact: water is evaporated by Sun's heat; a bulb is lighted by electricity
- 5.1a The position of an object can be described by locating it relative to another object or the background

STANDARD 4: Living Environment

- 6.2 Describe the relationship of the Sun as an energy source

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GRADE: 2nd

FOSS Module: Solids and Liquids

FOSS OBJECTIVES:

- *develop a growing curiosity for the physical world around them
- *observe and describe the properties of liquids and solids
- *explore a number of liquids and sort solids based on properties, such as particle size
- *observe what happens when solids are mixed with water
- *observe what happens when other liquids are mixed with water
- *use information gathered to conduct an investigation on an unknown material

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EiE Module: Chemical Engineering- Play Dough Formula

EiE OBJECTIVES:

- *develop an understanding of sequenced processes
- *explore the properties of solids and liquids, and some possible outcomes of mixing the two
- *use data to complete a design challenge
- *investigate how to improve a standard production process

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- 3.1g Some properties of an object are dependent on the conditions of the present surroundings
- 3.2a Matter exists in three states: solid, liquid, gas; each with distinct properties
- 3.2b Temperature can affect the state of matter of a substance
- 3.2c Changes in the properties of materials can be observed and described.
- 4.1a Energy exists in various forms: heat, electric, sound, chemical, mechanical, and light
- 5.1a The position of an object can be described by locating it relative to another object or the background

STANDARD 6: Interconnectedness

- 1: Through systems thinking, they recognize commonalities that exist and how parts of a system interrelate and combine to perform special functions
- 2: Models are simplified representations
- 3: Grouping by magnitudes into a series provides a useful way to deal with the immense range and changes in scale
- 4: Equilibrium is a state of stability
- 5: Identifying patterns for change is necessary for making predictions about future behavior and conditions
- 6: In order to arrive at the best solution to meet criteria and constraints, trade-offs are often necessary

STANDARD 7: Interdisciplinary Problem Solving

- 1: The knowledge and skills of mathematics, science, and technology are used together to make informed decisions and solve problems
- 2: Solving interdisciplinary problems involves a variety of skills and strategies such as effective work habits, gathering information, generating ideas, making connections, and presenting ideas

GRADE: 2nd

FOSS Module: Insects

FOSS OBJECTIVES:

- *develop a growing curiosity for the living world around them
- *experience diversity in the animal kingdom
- *compare different life sequences of insects
- *observe the behaviors and properties of insects at different stages of the life cycle
- *provide for the needs of insects
- *organize and communicate observations

NYS PERFORMANCE INDICATORS:

STANDARD 1: Mathematical Analysis

M1.1 Use mathematical notation and symbolism to communicate in mathematics and compare and describe quantities and relationships

M2.1 Use simple logical reasoning to develop conclusions, recognizing that patterns and relationships assist them in making conclusions

M3.1 Explore and solve problems using concrete objects and manipulatives such as a balance, graduated cylinder, ruler

STANDARD 1: Scientific Inquiry

S1.1 Ask "why" questions in attempts to seek greater understanding of events they have observed or heard about
S1.2 Question the explanations they hear from others and read about, seek clarification, and compare to their own

S1.3 Develop relationships among observations to construct tentative explanations for what they have observed

S2.1 Develop written plans for exploring phenomena or for evaluating explanations guided by questions

S2.2 Share their research plans with others and revise based on suggestions

S2.3 Carry out plans for exploring phenomena using appropriate inquiry and process skills

S3.1 Organize observations and measurements through classification and preparation of charts and tables

S3.2 Interpret observations and measurements and recognize relationships

S3.3 Share findings with others and seek their ideas

S3.4 Adjust understandings based on findings or new ideas

STANDARD 1: Engineering Design

T1.2 Investigate prior solutions and ideas from various resources

T1.3 Generate ideas for possible solutions, apply math and science skills, evaluate and determine the best solution, and justify your choices

T1.5 Discuss how best to test the solution, perform, record, discuss, summarize, and suggest improvements

STANDARD 4: Physical Environment

2.1e Extreme natural events may have positive or negative impacts on living things

3.1b Matter has properties that can be observed through the senses.

3.1c Objects have properties that can be observed, described, and/or measured

3.1e The material an object is made up of determines some specific properties of the object. Properties can be observed.

3.1f Objects and/or materials can be sorted or classified according to their properties

3.1g Some properties of an object are dependent on the conditions of the present surroundings

3.2c Changes in the properties of materials can be observed and described.

5.1a The position of an object can be described by locating it relative to another object or the background

STANDARD 4: Living Environment

1.1 Describe the characteristics of and variations between living and nonliving things

1.2 Describe the life processes common to all living things

2.1 Recognize that traits of living things are both inherited and learned

2.2 Recognize that for humans and other living things there is genetic continuity between generations

3.1 Describe how the structures of plants and animals complement their environment

3.2 Observe that differences within the species may give individuals an advantage in surviving and reproducing

4.1 Describe the major stages in the life cycles of selected plants and animals

4.2 Describe evidence of growth, repair, and maintenance

5.1 Describe basic life functions of common living specimens

6.1 Describe how plants and animals depend on each other and the nonliving environment

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2: Solving interdisciplinary problems involves a variety of skills and strategies such as effective work habits, gathering information, generating ideas, making connections, and presenting ideas

GRADE: 3rd

FOSS Module: Measurement +displacement

FOSS OBJECTIVES:

- *understand the necessity for standard units of measure
- *develop an understanding and intuitive feel for the metric system
- *measure length and distance in meters and centimeters using a meter tape
- *measure mass in grams with a balance and mass pieces
- *measure liquid volume and capacity in liters and milliliters using a graduated cylinder and syringe
- *measure temperature in degrees Celsius using a thermometer
- *understand the concept of **displacement** and its relation to an item's volume
- *develop and refine the manipulative skills required for using measuring tools
- *develop and conduct investigations and build explanations

NYS PERFORMANCE INDICATORS:

STANDARD 1: Mathematical Analysis

M1.1 Use mathematical notation and symbolism to communicate in mathematics and compare and describe quantities and relationships

M2.1 Use simple logical reasoning to develop conclusions, recognizing that patterns and relationships assist them in making conclusions

M3.1 Explore and solve problems using concrete objects and manipulatives such as a balance, graduated cylinder, ruler

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S2.2 Share their research plans with others and revise based on suggestions

S2.3 Carry out plans for exploring phenomena using appropriate inquiry and process skills

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S3.2 Interpret observations and measurements and recognize relationships

S3.3 Share findings with others and seek their ideas

S3.4 Adjust understandings based on findings or new ideas

STANDARD 1: Engineering Design

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T1.2 Investigate prior solutions and ideas from various resources

T1.3 Generate ideas for possible solutions, apply math and science skills, evaluate and determine the best solution, and justify your choices

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GRADE: 3rd

FOSS Module: Structures of Life +animal behavior

FOSS OBJECTIVES:

- *develop an attitude of respect for life and gain experience with organisms
- *Observe and compare properties of seeds and fruits
- *investigate the effect of water on seeds and record properties of germinated seeds
- *grow plants hydroponically and observe the life cycle of plants
- *observe and record crayfish and Bess beetle structures and behaviors
- *maintain organisms in a classroom and develop responsibility for their care
- *organize data about crayfish territorial behavior
- *develop and conduct investigations and build explanations
- *investigate animal behavior

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3.1 Describe how the structures of plants and animals complement their environment

3.2 Observe that differences within the species may give individuals an advantage in surviving and reproducing

4.1 Describe the major stages in the life cycles of selected plants and animals

4.2 Describe evidence of growth, repair, and maintenance

5.1 Describe basic life functions of common living specimens

5.2 Describe some survival behaviors of common living specimens

5.3 Describe the factors that help promote good health and growth in humans

6.1 Describe how plants and animals depend on each other and the nonliving environment

STANDARD 6: Interconnectedness

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GRADE: 3rd

FOSS Module: Water

FOSS OBJECTIVES:

- *observe and record properties of water in solid, liquid, and gaseous states
- *observe the contraction and expansion of water with changes in temperature
- *consider components of the water cycle and investigate factors that influence evaporation and condensation of water
- *compare how water moves through different types of earth materials
- *consider the water quality of local sources
- *investigate how water can be used to do work and become aware of the importance of water to our lives
- *organize and communicate observations
- *develop and conduct investigations and build explanations

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T1.5 Discuss how best to test the solution, perform, record, discuss, summarize, and suggest improvements

STANDARD 4: Physical Environment

2.1c Water is recycled by evaporation, condensation, precipitation, runoff, and groundwater

2.1d Erosion and deposition result from the interaction among air, water, and land

2.1e Extreme natural events may have positive or negative impacts on living things

3.1b Matter has properties that can be observed through the senses.

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GRADE: 3rd

EiE Module: Industrial Engineering- Simple Machines

EiE OBJECTIVES:

- *learn about how factories use processes, systems, and machines to help make work easier and safer for workers
- *add depth to the notion that simple machines help make work easier
- *compare individual craftsmanship to factory production, and explore the benefits and disadvantages
- *measure the force required to complete a given task with and without simple machines
- *develop a combination of a series of simple machines to complete the various tasks of a model potato chip factory
- *use data to complete a design challenge

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STANDARD 1: Engineering Design

T1.1 Describe objects, imaginary or real, that might be modeled or made differently and suggest ways to improve

T1.2 Investigate prior solutions and ideas from various resources

T1.3 Generate ideas for possible solutions, apply math and science skills, evaluate and determine the best solution, and justify your choices

T1.5 Discuss how best to test the solution, perform, record, discuss, summarize, and suggest improvements

STANDARD 2: Information Systems

- 1: Information technology is used to retrieve, process, and communicate information and is a tool for learning
- 2: Knowledge of the impacts and limitations of information systems is essential to its effective and ethical use
- 3: Information technology can have a positive and negative impact on society, depending on its use

STANDARD 4: Physical Environment

- 3.1b Matter has properties that can be observed through the senses.
- 3.1c Objects have properties that can be observed, described, and/or measured
- 3.1d Measurements can be made with standard metric units and nonstandard units (meteorology).
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- 3.1f Objects and/or materials can be sorted or classified according to their properties
- 3.1g Some properties of an object are dependent on the conditions of the present surroundings
- 3.2c Changes in the properties of materials can be observed and described.
- 4.1a Energy exists in various forms: heat, electric, sound, chemical, mechanical, and light
- 4.1b Energy can be transferred from one place to another.
- 5.1a The position of an object can be described by locating it relative to another object or the background
- 5.1b The position or direction of motion of an object can be changed by pushing or pulling
- 5.1d The amount of change in the motion of an object is affected by friction.
- 5.1f Mechanical energy may cause change in motion through the application of force and simple machines

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GRADE: 4th

FOSS Module: Matter and Energy

FOSS OBJECTIVES:

- *learn that light from the Sun is the source of most of the energy on Earth
- *observe energy sources doing work and learn how energy can be converted from one form to another
- *learn that stored energy takes many forms; machines and organisms can convert energy into motion and heat
- *describe how energy can be carried from one place to another by waves, electric current, and moving objects
- *light energy travels in straight lines
- *find out how light can reflect from the surface of a mirror
- *learn that an object is seen only when light from that object enters an eye
- *learn that white light is a mixture of all colors of light and that matter can absorb and reflect light
- *learn that the apparent color of an object is the result of the light it reflects

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3.2b Temperature can affect the state of matter of a substance

3.2c Changes in the properties of materials can be observed and described.

4.1a Energy exists in various forms: heat, electric, sound, chemical, mechanical, and light

4.1b Energy can be transferred from one place to another.

4.1c Some materials transfer energy better than others (heat/electricity)

4.1d Energy and matter interact: water is evaporated by Sun's heat; a bulb is lighted by electricity

4.1f Heat can be released in many ways (burning, friction, or combining substances)

4.1g Interactions with forms of energy can be either helpful or harmful

4.2a Everyday events involve one form of energy being changed to another

4.2b Humans utilize interactions between matter and energy and changes between forms of energy

5.1a The position of an object can be described by locating it relative to another object or the background

STANDARD 4: Living Environment

6.2 Describe the relationship of the Sun as an energy source

STANDARD 6: Interconnectedness

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GRADE: 4th

FOSS Module: Sun, Moon, and Stars +gravity

FOSS OBJECTIVES:

- *observe and record how the Sun, Earth's star, rises in the east and sets in the west
- *learn that Earth's rotation on its axis, causing day and night
- *understand that the exact path of the Sun varies by season
- *understand that shadows are caused the position of the Sun in the sky
- *learn that Earth is one of several planets that orbit the Sun
- *learn that the Moon orbits Earth and its appearance changes over 4 weeks
- *learn how useful telescopes are in studying the solar system, as they make distant objects look closer and larger
- *learn that stars are suns positioned at great distances from Earth and form groups called constellations
- *use tools to collect and analyze data to develop logical conclusions about the movements of objects in the sky
- *investigate the causes and the effects of **gravity** on objects

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- S3.4 Adjust understandings based on findings or new ideas

STANDARD 1: Engineering Design

- T1.2 Investigate prior solutions and ideas from various resources
- T1.3 Generate ideas for possible solutions, apply math and science skills, evaluate and determine the best solution, and justify your choices
- T1.5 Discuss how best to test the solution, perform, record, discuss, summarize, and suggest improvements

STANDARD 4: Physical Environment

- 1.1a Natural patterns and cycles include, Earth's rotation and revolution, seasons, Moon phases
- 1.1b Humans organize time into units based on natural motions of earth
- 1.1c The Sun and other stars appear to move in a recognizable pattern both daily and seasonally.
- 3.1b Matter has properties that can be observed through the senses.
- 3.1c Objects have properties that can be observed, described, and/or measured
- 3.1d Measurements can be made with standard metric units and nonstandard units (meteorology).
- 3.1e The material an object is made up of determines some specific properties of the object. Properties can be observed.
- 3.1f Objects and/or materials can be sorted or classified according to their properties
- 3.1g Some properties of an object are dependent on the conditions of the present surroundings
- 3.2c Changes in the properties of materials can be observed and described.
- 4.1d Energy and matter interact: water is evaporated by Sun's heat; a bulb is lighted by electricity
- 5.1a The position of an object can be described by locating it relative to another object or the background
- 5.1c The force of gravity pulls objects toward the center of Earth
- 5.2a The forces of magnetism and gravity can affect objects through gases, liquids, and solids

STANDARD 4: Living Environment

- 6.2 Describe the relationship of the Sun as an energy source

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GRADE: 4th

FOSS Module: Magnetism and Energy

FOSS OBJECTIVES:

- *observe the interaction of permanent magnets with common materials
- *discover that magnets display forces of attraction and repulsion
- *measure the change in force between two magnets as the distance between them changes
- *Identify materials that are conductors and insulators
- *understand and construct circuits
- *make an electromagnet and experience the relationship of the number of turns of wire and strength of the magnetism
- *use knowledge of electromagnets to create a telegraph
- *develop and refine the manipulative skills required for investigating magnetism and electricity
- *develop and conduct investigations and build explanations

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S1.3 Develop relationships among observations to construct tentative explanations for what they have observed

S2.1 Develop written plans for exploring phenomena or for evaluating explanations guided by questions

S2.2 Share their research plans with others and revise based on suggestions

S2.3 Carry out plans for exploring phenomena using appropriate inquiry and process skills

S3.1 Organize observations and measurements through classification and preparation of charts and tables

S3.2 Interpret observations and measurements and recognize relationships

S3.3 Share findings with others and seek their ideas

S3.4 Adjust understandings based on findings or new ideas

STANDARD 1: Engineering Design

- T1.1 Describe objects, imaginary or real, that might be modeled or made differently and suggest ways to improve
- T1.2 Investigate prior solutions and ideas from various resources
- T1.3 Generate ideas for possible solutions, apply math and science skills, evaluate and determine the best solution, and justify your choices
- T1.4 Plan and build a model of a solution
- T1.5 Discuss how best to test the solution, perform, record, discuss, summarize, and suggest improvements

STANDARD 4: Physical Environment

- 3.1b Matter has properties that can be observed through the senses.
- 3.1c Objects have properties that can be observed, described, and/or measured
- 3.1d Measurements can be made with standard metric units and nonstandard units (meteorology).
- 3.1e The material an object is made up of determines some specific properties of the object. Properties can be observed.
- 3.1f Objects and/or materials can be sorted or classified according to their properties
- 3.1g Some properties of an object are dependent on the conditions of the present surroundings
- 3.2c Changes in the properties of materials can be observed and described.
- 4.1a Energy exists in various forms: heat, electric, sound, chemical, mechanical, and light
- 4.1b Energy can be transferred from one place to another.
- 4.1c Some materials transfer energy better than others (heat/electricity)
- 4.1d Energy and matter interact: water is evaporated by Sun's heat; a bulb is lighted by electricity
- 4.1e Electricity travels in a closed circuit
- 5.1a The position of an object can be described by locating it relative to another object or the background
- 5.1e Magnetism is a force that may attract or repel certain materials
- 5.2a The forces of magnetism and gravity can affect objects through gases, liquids, and solids
- 5.2b The forces of magnetism on objects decrease as distance increases.

STANDARD 6: Interconnectedness

- 1: Through systems thinking, they recognize commonalities that exist and how parts of a system interrelate and combine to perform special functions
- 2: Models are simplified representations
- 3: Grouping by magnitudes into a series provides a useful way to deal with the immense range and changes in scale
- 4: Equilibrium is a state of stability
- 5: Identifying patterns for change is necessary for making predictions about future behavior and conditions

STANDARD 7: Interdisciplinary Problem Solving

- 1: The knowledge and skills of mathematics, science, and technology are used together to make informed decisions and solve problems
- 2: Solving interdisciplinary problems involves a variety of skills and strategies such as effective work habits, gathering information, generating ideas, making connections, and presenting ideas

GRADE: 4th

EiE Module: Transportation Engineering- Maglev System

EiE OBJECTIVES:

- *explore transportation, engineering, magnetism, and technological innovation
- *manipulate magnets to observe their properties and poles
- *design, test, and improve on the design of a magnetic levitation transportation system

NYS PERFORMANCE INDICATORS:

STANDARD 1: Mathematical Analysis

M1.1 Use mathematical notation and symbolism to communicate in mathematics and compare and describe quantities and relationships

M2.1 Use simple logical reasoning to develop conclusions, recognizing that patterns and relationships assist them in making conclusions

M3.1 Explore and solve problems using concrete objects and manipulatives such as a balance, graduated cylinder, ruler

STANDARD 1: Scientific Inquiry

S1.1 Ask "why" questions in attempts to seek greater understanding of events they have observed or heard about

S1.2 Question the explanations they hear from others and read about, seek clarification, and compare to their own

S1.3 Develop relationships among observations to construct tentative explanations for what they have observed

S2.1 Develop written plans for exploring phenomena or for evaluating explanations guided by questions

S2.2 Share their research plans with others and revise based on suggestions

S2.3 Carry out plans for exploring phenomena using appropriate inquiry and process skills

S3.1 Organize observations and measurements through classification and preparation of charts and tables

S3.2 Interpret observations and measurements and recognize relationships

S3.3 Share findings with others and seek their ideas

S3.4 Adjust understandings based on findings or new ideas

STANDARD 1: Engineering Design

T1.1 Describe objects, imaginary or real, that might be modeled or made differently and suggest ways to improve

T1.2 Investigate prior solutions and ideas from various resources

T1.3 Generate ideas for possible solutions, apply math and science skills, evaluate and determine the best solution, and justify your choices

T1.4 Plan and build a model of a solution

T1.5 Discuss how best to test the solution, perform, record, discuss, summarize, and suggest improvements

STANDARD 2: Information Systems

1: Information technology is used to retrieve, process, and communicate information and is a tool for learning

2: Knowledge of the impacts and limitations of information systems is essential to its effective and ethical use

3: Information technology can have a positive and negative impact on society, depending on its use

STANDARD 4: Physical Environment

3.1b Matter has properties that can be observed through the senses.

3.1c Objects have properties that can be observed, described, and/or measured

3.1d Measurements can be made with standard metric units and nonstandard units (meteorology).

3.1e The material an object is made up of determines some specific properties of the object. Properties can be

observed.

3.1f Objects and/or materials can be sorted or classified according to their properties

3.1g Some properties of an object are dependent on the conditions of the present surroundings

3.2c Changes in the properties of materials can be observed and described.

4.1a Energy exists in various forms: heat, electric, sound, chemical, mechanical, and light

4.1b Energy can be transferred from one place to another.

4.1c Some materials transfer energy better than others (heat/electricity)

4.1d Energy and matter interact: water is evaporated by Sun's heat; a bulb is lighted by electricity

4.1g Interactions with forms of energy can be either helpful or harmful

4.2a Everyday events involve one form of energy being changed to another

4.2b Humans utilize interactions between matter and energy and changes between forms of energy

5.1a The position of an object can be described by locating it relative to another object or the background

5.1b The position or direction of motion of an object can be changed by pushing or pulling

5.1d The amount of change in the motion of an object is affected by friction.

5.1e Magnetism is a force that may attract or repel certain materials

5.1f Mechanical energy may cause change in motion through the application of force and simple machines

5.2a The forces of magnetism and gravity can affect objects through gases, liquids, and solids

5.2b The forces of magnetism on objects decrease as distance increases.

STANDARD 4: Living Environment

6.2 Describe the relationship of the Sun as an energy source

STANDARD 6: Interconnectedness

1: Through systems thinking, they recognize commonalities that exist and how parts of a system interrelate and combine to perform special functions

2: Models are simplified representations

3: Grouping by magnitudes into a series provides a useful way to deal with the immense range and changes in scale

4: Equilibrium is a state of stability

5: Identifying patterns for change is necessary for making predictions about future behavior and conditions

6: In order to arrive at the best solution to meet criteria and constraints, trade-offs are often necessary

STANDARD 7: Interdisciplinary Problem Solving

1: The knowledge and skills of mathematics, science, and technology are used together to make informed decisions and solve problems

2: Solving interdisciplinary problems involves a variety of skills and strategies such as effective work habits, gathering information, generating ideas, making connections, and presenting ideas