FAIRFIELD PUBLIC SCHOOLS
K-12 SCIENCE VISION STATEMENT

The Fairfield Public Schools believe that science education should promote essential understandings of the natural world and should nurture students' abilities to apply scientific knowledge to make informed and logical judgments about personal and societal issues. As such, this education requires that the fundamental approach to science be a creative and logical process for investigating, reasoning, critiquing and communicating about ideas, not just a static body of facts to be memorized. Understanding the interconnections between science and technology and their shared impact on the environment and societal issues is essential for all students.

We should foster the development and assessment of scientific literacy in all students and motivate students to pursue careers in science, technology and engineering. In the view of Fairfield's science educators, science literacy is a combination of understanding major science concepts and theories, using scientific reasoning, and recognizing the complex interactions among science, technology and society. All students must demonstrate scientific literacy as outlined by the Connecticut State Science standards.

Upon graduation a scientifically literate person is one who

- understands and applies basic concepts, principles and theories of biology, chemistry, physics, earth and space science and their interrelationships
- recognizes and participates in evidence-based scientific endeavors and uses inquiry skills that lead to a greater understanding of the world
- differentiates between scientific explanations of the natural world and popular ideas that are not supported by scientific data
- identifies and solves problems through scientific exploration, including the formation of hypotheses, design of experiments, use of technology, analysis of data and drawing of conclusions
- selects and uses appropriate laboratory technology, equipment and materials, including measuring and sensing devices
- understands and uses existing and emerging technologies that have an effect on society and the quality of life, including personal, academic and work environments
- analyzes the possibilities and limits of science and technology in order to make and defend decisions about societal issues
- understands how scientific knowledge is formulated in order to assess the validity of that knowledge
- determines the reliability of information sources in all formats, based on evaluative criteria
- documents information sources using appropriate scientific format

(adapted from the CSDE Position Statement on Science Education June 2004)

The Fairfield Public Schools plays an essential role in ensuring a quality educational program in science by:

- providing all students with developmentally appropriate, coordinated, meaningful and engaging scientific experiences to support their development of scientific literacy
- providing all teachers and all students with necessary science instructional resources including time, lab space, equipment and materials, technology, textbooks and easy access to electronic resources
- setting a context for scientific learning that is relevant to students
- engaging students in extended, developmentally appropriate scientific investigations that increase effort and interest in scientific learning
- communicating the goals and importance of studying sciences to students and parents
- encouraging students to pursue the study of advanced science and science-related careers

Statement of Purpose

The study of science (K-5) promotes essential understandings of the natural world and nurtures students' abilities to apply scientific knowledge to make informed and logical judgments about societal issues. This is a creative process of investigating, reasoning, critiquing and communicating about ideas, not about a static body of facts to be memorized. Therefore, in science students will participate in endeavors, which are evidence based, and use inquiry skills that lead to a greater understanding of the world. Their scientific explorations will include the formulation of hypotheses, designing of experiments, using technology, gathering and analyzing data using appropriate equipment and materials, and then drawing conclusions.

Audience

Students enrolled in grades Kindergarten through Grade 5

Prerequisite

None

Design and Description

In order for students to gain a deep understanding of scientific concepts, they must actively grapple with the content. In addition they must be developmentally ready to understand the content and possess the requisite thinking skills to comprehend a given scientific idea. This curriculum attempts to lay out a K-5 plan so that this will happen.

The curriculum consists of a series of modular units of study for the grades. Since science is the exploration of questions and not the memorization of answers, the learning of science in this curriculum starts with a question—the Essential Question. It is crucial for the students to then have the opportunity to freely explore the various dimensions of the topic under investigation. They will propose solutions, performs tests and experiments, collect and record data, and model an optimal solution.

The experiences that the students will have in the study of science K-5 are leading them to become scientifically literate citizens. The understanding of scientific concepts grows slowly as students mature and encounter these concepts in different contexts. The learning will be inquiry based. Students will gain analytical skills, which will assist them in making judgments based upon critical reflection. They will engage in scientific experimentation and then make reasoned predictions based upon these experiences.

As citizens it will be expected that they will assess the accuracy of scientific statements based on supportive evidence, apply scientific information in personal decision-making, and engage in scientifically informed discussions of contemporary issues. They will be able to access, read, and understand science-related print and electronic resources and locate valid scientific information when needed.

INFORMATION LITERACY AND TECHNOLOGY STANDARDS

In the Fairfield Public Schools, we adopted the Revised Linking Learning curriculum in April 2000. The primary purpose of the Linking Learning curriculum is to ensure that every student has the opportunity to become an independent, effective responsible, and creative user of ideas and information. The ability to work collaboratively, as well as independently is an essential component of information literacy.

To achieve this end, students must become critical users of information, develop high standards for their work, learn to analyze their efforts, and create quality products. Starting in Kindergarten students use the Information Problem Solving Process, i.e., The Big 6. The specific content used in this process can be science, social studies, mathematics or language arts. In Linking Learning each grade level has specific objectives that address Information Literacy and Technology Skills.

The Fairfield K-5 Science Curriculum has embedded in it dimensions of the Fairfield Public School's Linking Learning Curriculum which is based on the CT State Information and Technology Literacy Framework. Developmentally appropriate connections are addressed both by the Performance Assessments from the State of CT and the Fairfield Sample Assessments.

DEVELOPMENTAL ORGANIZATION OF CORE SCIENCE CURRICULUM FRAMEWORK*

K-2: Development of *wonder* about the natural world and the ability to observe, describe and apply basic process skills

Grades 3-5: Development of *descriptions* of basic natural phenomena and the ability to perform simple experiments and record accurate data

* Core Science Curriculum Framework
Approved CT State Department of Education 2005

K-2 Scientific Inquiry, Literacy and Numeracy

THE STANDARDS FOR SCIENTIFIC INQUIRY, LITERACY AND NUMERACY ARE INTEGRAL PARTS OF THE CONTENT STANDARDS FOR EACH GRADE LEVEL IN THIS CLUSTER.

Grades K-2 Core Scientific Inquiry, Literacy and Numeracy* *How is scientific knowledge created and communicated?*	
Content Standards	**Expected Performances**
SCIENTIFIC INQUIRY ♦ Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena. **SCIENTIFIC LITERACY** ♦ Scientific literacy includes speaking, listening, presenting, interpreting, reading and writing about science. **SCIENTIFIC NUMERACY** ♦ Mathematics provides useful tools for the description, analysis and presentation of scientific data and ideas.	**A INQ.1** Make observations and ask questions about objects, organisms and the environment. **A INQ.2** Use senses and simple measuring tools to collect data. **A INQ.3** Make predictions based on observed patterns. **A INQ.4** Read, write, listen and speak about observations of the natural world. **A INQ.5** Seek information in books, magazines and pictures. **A INQ.6** Present information in words and drawings. **A INQ.7** Use standard tools to measure and describe physical properties such as weight, length and temperature. **A INQ.8** Use nonstandard measures to estimate and compare the sizes of objects. **A INQ.9** Count, order and sort objects by their properties. **A INQ.10** Represent information in bar graphs.

* Core Science Curriculum Framework
Approved CT State Department of Education 2005

Kindergarten Course Objectives*

Students will be able to:

1.Use the senses and simple measuring tools, such as rulers and equal-arm balances, to observe common objects and sort them into groups based on size, weight, shape or color. 2.Sort objects made of materials such as wood, paper and metal into groups based on properties such as flexibility, attraction to magnets, and whether they float or sink in water. 3.Count objects in a group and use mathematical terms to describe quantitative relationships such as: same as, more than, less than, equal, etc.
4.Describe the similarities and differences in the appearance and behaviors of plants, birds, fish, insects and mammals (including humans). 5.Describe the similarities and differences in the appearance and behaviors of adults and their offspring. 6.Describe characteristics that distinguish living from nonliving things.
7.Describe and record daily weather conditions. 8.Relate seasonal weather patterns to appropriate choices of clothing and activities.
9.Describe the types of materials used by people to build houses, and the properties that make the materials useful.

* Core Science Curriculum Framework
Approved CT State Department of Education 2005

Kindergarten Core Themes, Content Standards and Expected Performances*	
Content Standards	**Expected Performances**
Properties of Matter – How does the structure of matter affect the properties and uses of materials? **K.1 - Objects have properties that can be observed and used to describe similarities and differences.** Some properties can be observed with the senses, and others can be discovered by using simple tools or tests.	1. Use the senses and simple measuring tools, such as rulers and equal-arm balances, to observe common objects and sort them into groups based on size, weight, shape or color. 2. Sort objects made of materials such as wood, paper and metal into groups based on properties such as flexibility, attraction to magnets, and whether they float or sink in water. 3 Count objects in a group and use mathematical terms to describe quantitative relationships such as: same as, more than, less than, equal, etc.
Heredity and Evolution – What processes are responsible for life's unity and diversity? **K.2 - Many different kinds of living things inhabit the Earth.** Living things have certain characteristics that distinguish them from nonliving things, including growth, movement, reproduction and response to stimuli.	4. Describe the similarities and differences in the appearance and behaviors of plants, birds, fish, insects and mammals (including humans). 5. Describe the similarities and differences in the appearance and behaviors of adults and their offspring. 6. Describe characteristics that distinguish living from nonliving things.
Energy in the Earth's Systems – How do external and internal sources of energy affect the Earth's systems? **K.3 - Weather conditions vary daily and seasonally.** Daily and seasonal weather conditions affect what we do, what we wear and how we feel.	7.Describe and record daily weather conditions. 8. Relate seasonal weather patterns to appropriate choices of clothing and activities.

Science and Technology in Society – How do science and technology affect the quality of our lives? **K.4 - Some objects are natural, while others have been designed and made by people to improve the quality of life.** Humans select both natural and man-made materials to build shelters based on local climate conditions, properties of the materials and their availability in the environment.	9. Describe the types of materials used by people to build houses, and the properties that make the materials useful.

* Core Science Curriculum Framework
Approved CT State Department of Education 2005

Essential Questions:*

Properties of Objects Module:
Properties of Matter – How does the structure of matter affect the properties and uses of materials?

Characteristics of Living Things Module:
Heredity and Evolution – What processes are responsible for life's unity and diversity?

Energy In Earth's System Module:

Weather-- How do external and internal sources of energy affect the Earth's systems?

Shelters Module:

How do science and technology affect the quality of our lives?

* Core Science Curriculum Framework
Approved CT State Department of Education 2005

Kindergarten Units of Study

PROPERTIES OF OBJECTS MODULE

Essential Question(s):
How does the structure of matter affect the properties and uses of materials?

Content Standards:

Objects have properties that can be observed and used to describe similarities and differences.

Some properties can be observed with the senses, and others can be discovered by using simple tools or tests.

Performance Standards:

1. Use the senses and simple measuring tools, such as rulers and equal-arm balances, to observe common objects and sort them into groups based on size, weight, shape or color.

2. Sort objects made of materials such as wood, paper and metal into groups based on properties such as flexibility, attraction to magnets, and whether they float or sink in water.

3 Count objects in a group and use mathematical terms to describe quantitative relationships such as: same as, more than, less than, equal, etc.

Focus Questions:
How do people gather information about the world around them?
What groupings can be made based on the information gathered?

Unit Objectives:
The student will:

- identify the five senses and related body parts
- use the senses to describe properties of common objects
- use simple tools (for example- balance scale, hand lens, ruler) to identify and describe properties of objects
- sort objects into groups based on properties such as size, weight, shape, and color
- conduct simple experiments to sort objects into groups based on properties such as flexibility, attraction to magnets, and whether they sink or float in water
- count and compare groupings using basic mathematical terms

Content Topics:

1. Five senses enable people to learn about objects in the world. The senses are related to specific body parts.
    - Sight, hearing, taste, touch, smell
    - We can use our senses to keep ourselves safe.
2. We can learn about properties of objects with our senses.
    - Color, size, shape, weight, texture, temperature
    - We can sort objects by their properties.
3. Simple tools help us extend our senses to learn about properties of objects.
    - Balance scale, ruler, hand lens, thermometer
4. Objects can be made of different materials, such as wood, paper, metal, or plastic.
5. Some objects are attracted to magnets, some are not.
    - Experience how the push or pull of a magnet can change the motion of an object.
    - We use magnets in our everyday life.
6. Some objects sink in water, some float.
    - We can make predictions based on past experiences with a particular material or object, and test our predictions.

Sample Assessment:

Sort objects according to properties and describe those rules.

Pacing:

Fall Semester

CHARACTERISTICS OF LIVING THINGS MODULE

Essential Question(s):

What processes are responsible for life's unity and diversity?

Content Standards:

Many different kinds of living things inhabit the Earth.

Living things have certain characteristics that distinguish them from nonliving things, including growth, movement, reproduction and response to stimuli.

Performance Standards:

1.Describe the similarities and differences in the appearance and behaviors of plants, birds, fish, insects and mammals (including humans).

2.Describe the similarities and differences in the appearance and behaviors of adults and their offspring.

3.Describe characteristics that distinguish living from nonliving things.

Focus Question:
What common characteristics can be found which ensure the survival of all living things?

Unit Objectives:
The student will:

- observe and classify objects as living and nonliving.
- describe basic characteristics of living things.
- observe that plants and animals have survival needs of food, water, air, light, and habitat.
- observe the diversity of living things.
- compare the appearance and behaviors of plants and animals.
- distinguish similarities and differences in the appearance and behaviors of adults and their offspring.

Content Topics:
1. Living and nonliving things have observable characteristics.
    - Living things grow and develop, use food for energy, move, reproduce, and respond to the environment.
2. Living things need food, water, air, light, and habitat to survive.
3. Animals are living things.
    - Animals have different physical features, such as body coverings, legs, feet, eyes, beaks, claws, etc. that help them thrive in their environments.
    - Animals move in different ways.
4. Adult animals and their offspring
    - Similarities and differences in appearance
    - Some adult animals care for their young offspring, others do not.
5. Plants are living things.
    - Parts of a plant – roots, stem, leaves, flowers
    - Plants have different physical features that help them thrive in their environment.
6. Many plants grow from seeds.
    - Life cycle of a plant
    - Seeds travel

Sample Assessment:

Sort and classify objects as living and non-living.

Pacing:
Winter/Spring

ENERGY & EARTH'S SYSTEMS MODULE

Essential Question(s):

Weather-- How do external and internal sources of energy affect the Earth's systems?

Content Standards:

Weather conditions vary daily and seasonally.

Daily and seasonal weather conditions affect what we do, what we wear and how we feel.

Performance Standards:

1. Describe and record daily weather conditions.

2. Relate seasonal weather patterns to appropriate choices of clothing and activities.

Focus Question:

How does the weather affect our daily lives?

Unit Objectives:

The student will:

- describe and record daily weather conditions
- recognize seasonal weather conditions
- students will match appropriate clothing choices to weather conditions
- discuss ways that weather helps them make decisions about their outdoor activities.

Content Topics:

1. Weather changes from day to day and seasonally.
    - sunny
    - cloudy
    - rainy
    - foggy
    - windy
    - snowy
2. Weather can be observed with the senses.
3. Tools, such as thermometers, can be used to measure different features of the weather.
4. Information about the weather is recorded and organized to help us understand and predict weather.
5. Weather affects decisions people make about their daily life.
    - clothing
    - activities

Sample Assessment:

1. Dress appropriate clothes on puppet/doll for each season/weather type.
2. Match activities to season/weather.

Pacing:

Ongoing/continuous throughout the year.

SHELTERS MODULE

Essential Question(s):

How do external and internal sources of energy affect the Earth's systems?

Content Standards:

Some objects are natural, while others have been designed and made by people to improve the quality of life.

Humans select both natural and man-made materials to build shelters based on local climate conditions, properties of the materials and their availability in the environment.

Performance Standard:

Describe the types of materials used by people to build houses, and the properties that make the materials useful.

Focus Question:
What factors influence the choices people make when constructing homes/shelters?

Unit Objective:
The student will realize that people build different types of homes using a variety of materials.

Content Topics:
1. People build homes to protect themselves from the weather.
2. Homes provide a safe, private place to rest, eat, and enjoy activities.
3. The types of homes people build vary greatly due to
    - physical environment and climate
    - available materials – natural and man-made
4. Explore examples of homes found in different environments.
    - Discuss and analyze reasons for the homes' designs and construction

Sample Assessment:

Show photos of houses made of various materials and have students discuss why those materials were chosen for that environment. Book: This Is My House by Arthur Dorros.

Pacing:

Spring Semester

Grade One Course Objectives*

Students will be able to:

1. Describe how the motion of objects can be changed. 2.Describe the apparent movement of the sun across the sky and the changes in the length and direction of shadows during the day.
3.Describe the different ways that animals, including humans, obtain water and food. 4.Describe the different structures plants have for obtaining water and sunlight. 5.Describe the structures that animals, including humans, use to move around.
6.Describe the changes in organisms, such as frogs and butterflies, as they undergo metamorphosis. 7.Describe the life cycles of organisms that grow but do not metamorphose.
8.Estimate, measure and compare the sizes and weights of different objects and organisms using standard and nonstandard measuring tools.

* Core Science Curriculum Framework
Approved CT State Department of Education 2005

Grade 1 Core Themes, Content Standards and Expected Performances*	
Content Standards	**Expected Performances**
Forces and Motion – What makes objects move the way they do? **1.1 - The sun appears to move across the sky in the same way every day, but its path changes gradually over the seasons.** ♦ An object's position can be described by locating it relative to another object or the background. ♦ An object's motion can be described by tracing and measuring its position over time.	**A 1.** Describe how the motion of objects can be changed. **A 2.** Describe the apparent movement of the sun across the sky and the changes in the length and direction of shadows during the day.
Structure and Function – How are organisms structured to ensure efficiency and survival? **1.2 - Living things have different structures and behaviors that allow them to meet their basic needs.** ♦ Animals need air, water and food to survive. ♦ Plants need air, water and sunlight to survive.	**A 3.** Describe the different ways that animals, including humans, obtain water and food. **A 4.** Describe the different structures plants have for obtaining water and sunlight. **A 5.** Describe the structures that animals, including humans, use to move around.
Structure and Function – How are organisms structured to ensure efficiency and survival? **1.3 - Organisms change in form and behavior as part of their life cycles.** ♦ Some organisms undergo metamorphosis during their life cycles; other organisms grow and change, but their basic form stays essentially the same.	**A 6.** Describe the changes in organisms, such as frogs and butterflies, as they undergo metamorphosis. **A 7.** Describe the life cycles of organisms that grow but do not metamorphose.
Science and Technology in Society – How do science and technology affect the quality of our lives? **1.4 - The properties of materials and organisms can be described more accurately through the use of standard measuring units.** ♦ Various tools can be used to measure, describe and compare different objects and organisms.	**A 8.** Estimate, measure and compare the sizes and weights of different objects and organisms using standard and nonstandard measuring tools.

* Core Science Curriculum Framework
Approved CT State Department of Education 2005

Essential Questions:*

Forces and Motion Module:

Movement of the Sun and Shadows-- What makes objects move the way they do?

Structure and Function Module:
Living Things -- How are organisms structured to ensure efficiency and survival?

Heredity and Evolution Module:
Life Cycles – What are the processes responsible for life's unity and diversity?

Science and Technology in Society Module:

Measurement-- How do science and technology affect the quality of our lives?

* Core Science Curriculum Framework
Approved CT State Department of Education 2005

Grade 1 Units of Study

FORCES AND MOTION MODULE

Essential Question(s):

Movement of the Sun and Shadows-- What makes objects move the way they do?

Content Standards:

The sun appears to move across the sky in the same way every day, but its path changes gradually over the seasons.

An object's position can be described by locating it relative to another object or the background.

An object's motion can be described by tracing and measuring its position over time.

Performance Standards:

1. Describe how the motion of objects can be changed.

2. Describe the apparent movement of the sun across the sky and the changes in the length and direction of shadows during the day.

Focus Questions:

What makes a shadow?
How and why do the size and shape of shadows change during the day?
What causes day and night?
What causes seasonal change?
Why does an object look smaller as one moves away from it?

Unit Objectives:

Students will:

- use appropriate vocabulary related to changes over time, i.e., sun, light, day, daytime, night time, afternoon, seasons, shadows, and cycles.
- recognize that the sun is a source of light and heat.
- recognize that a day is divided into daytime and nighttime based on the presence or the absence of sunlight.
- sequence and record events and activities that occur over the course of a day, week, or a year.
- recognize that shadows are caused by blocking light.
- observe and describe how the sun appears to change position over the course of a day.
- compare the characteristics of the four seasons.

- recognize how the sun's position affects the four seasons.

Content Topics:

- The sun and the moon have properties, locations, and movements that can be observed and described.
- Identify that the sun is a star and it is the source of heat and light for the Earth.
- The sun and the moon appear to move across the sky on a daily basis.
- Shadow formations.
- Day and night sky
- Seasonal change.

Sample Assessment:

Students will demonstrate their understanding of what causes day and night by making a model and explaining how the apparent movement of the sun across the sky causes day and night on the earth.

Pacing:

Eight weeks. Some of these concepts will spiral throughout the school year.

LIVING THINGS MODULE

Essential Question(s):
How are organisms structured to ensure efficiency and survival?

Content Standards:

Living things have different structures and behaviors that allow them to meet their basic needs.

Animals need air, water and food to survive.

Plants need air, water and sunlight to survive.

Performance Standards:

1. Describe the different ways that animals, including humans, obtain water and food.

2. Describe the different structures plants have for obtaining water and sunlight.

3. Describe the structures that animals, including humans, use to move around.

Focus Questions:
How do plants and animals meet their basic needs in different ways?
How do different kinds of plants have different structures that help them meet their basic needs?
How do different kinds of animals have different structures that help them meet their basic needs?

Unit Objectives:
The students will:

- identify characteristics of living things.
- predict and evaluate possible outcomes of a seed's growth.
- explore and describe the functions of flowers.
- examine roots and describe their function.
- discover how stems take up food from the soil and support the plant.
- describe how leaves absorb sunlight to make food for plants from air, water, and minerals.
- discuss different animal body parts and how animals use them to survive.
- explore how animals get air.
- identify what different animals eat.
- list different body parts animals use to hunt and eat.
- demonstrate and compare how different animals (including humans) use their body parts to move.
- explore how different animals use their senses of sight, hearing, and smell to move and find food.
- discover how animals' body coverings help them to survive.

Content Topics:

- What are the main parts of a plant?
- What do seeds do?
- What do roots do?
- What do stems do?
- What do leaves do?
- What do flowers do?
- What are some animal parts?
- How do animals get air?
- How do animals eat?
- How do animals move?
- How do animals see?
- How do animals smell and hear?
- What do animals' body coverings do?

Sample Assessment:

Students will demonstrate and record their understanding of the structures of plants that ensure their survival by meeting their need for air, sun, and water. Students will complete this task by planting seeds and observing their growth with and without air, sun, and water.

Pacing:

Four to six weeks.
January – two weeks and March/April—six weeks.
Overlap and spiral.

LIFE CYCLES MODULE

Essential Question(s):
How are organisms structured to ensure efficiency and survival?

Content Standards:

Organisms change in form and behavior as part of their life cycle.

Some organisms undergo metamorphosis during their life cycle; other organisms grow and change, but their basic form stays essentially the same.

Performance Standards:

1.Describe the changes in organisms as they undergo metamorphosis.

2.Describe the life cycles of organisms that grow but do not metamorphose.

Focus Questions:
What is a life cycle?
What is metamorphosis?
How do organisms that undergo metamorphosis change as they go through their life cycle?
How do organisms that do not undergo metamorphosis grow and change as they go through their life cycle?

Unit Objectives:
The students will:

- discuss and define what a life cycle is.
- observe and identify the life cycle stages of metamorphosis.
- observe and identify the life cycle stages of organisms that do not undergo metamorphosis.

Content Topics:

- Life cycles of different types of organisms (i.e. butterflies, frogs, moths, ladybugs, mealworms, humans, dogs, birds, etc.).
- Life cycle stages of metamorphosis.
- Life cycle stages of organisms that do not metamorphose.

Sample Assessment:

1. Students will record and illustrate the changes in organisms, such as frogs, butterflies, or mealworms, as they undergo the stages of metamorphosis.
2. Students will record and illustrate the life cycles of organisms, such as dogs or birds that grow but do not metamorphose.

Pacing:

Eight to twelve weeks throughout year.
Possible breakdown: three weeks in the fall; two-three weeks in January; three-four weeks in the spring. Overlap and spiral.

MEASUREMENT MODULE

Essential Question(s):
How do science and technology affect the quality of our lives?

Content Standards:

The properties of materials and organisms can be described more accurately through the use of standard measuring units.

Performance Standard:
Estimate, measure and compare the sizes and weights of different objects and organisms using standard and nonstandard measuring tools.

Focus Question:
How do you measure an object or organism using nonstandard units?
How do you measure an object or organism using standard units?
Why is measurement important?

Unit Objectives:

The students will:

- estimate, measure and compare the length of objects and organisms using nonstandard units.
- estimate, measure and compare the length of objects and organisms using standard units.
- estimate, measure and compare the weight of objects and organisms using nonstandard units.
- order objects using the attributes of size, length, and weight.

Content Topics:

Length

- Measurement tools
- Nonstandard units (i.e. cubes, paperclips, tiles, bears, inchworms)
- Standard units (inches, centimeters)

Weight

- Measurement tools
- Nonstandard units (cubes, blocks, bears).

Sample Assessment:

Mathematics Assessment – Chapter 10 – Performance Assessment

Pacing:

April – May; Four to five weeks.

Grade Two Course Objectives:*

Students will be able to:

1.Describe differences in the physical properties of solids and liquids.
2.Describe the life cycles of flowering plants as they grow from seeds, proceed through maturation and produce new seeds. 3.Explore and describe the effects of light and water on seed germination and plant growth.
4.Sort different soils by properties, such as particle size, color and composition. 5.Relate the properties of different soils to their capacity to retain water and support the growth of certain plants.
6.Describe the physical properties of rocks and relate them to their potential uses. 7.Relate the properties of rocks to the possible environmental conditions during their formation.

* Core Science Curriculum Framework
Approved CT State Department of Education 2005

Grade 2 Core Themes, Content Standards and Expected Performances*	
Content Standards	**Expected Performances**
Properties of Matter – How does the structure of matter affect the properties and uses of materials? **2.1 - Materials can be classified as solid, liquid or gas based on their observable properties.** ♦ Solids tend to maintain their own shapes, while liquids tend to assume the shapes of their containers, and gases fill their containers fully.	**A 9.** Describe differences in the physical properties of solids and liquids.
Structure and Function – How are organisms structured to ensure efficiency and survival? **2.2 - Plants change their forms as part of their life cycles.** ♦ The life cycles of flowering plants include seed germination, growth, flowering, pollination and seed dispersal.	**A 10.** Describe the life cycles of flowering plants as they grow from seeds, proceed through maturation and produce new seeds. **A 11.** Explore and describe the effects of light and water on seed germination and plant growth.
The Changing Earth – How do materials cycle through the Earth's systems? **2.3 - Earth materials have varied physical properties which make them useful in different ways.** ♦ Soils can be described by their color, texture and capacity to retain water. ♦ Soils support the growth of many kinds of plants, including those in our food supply.	**A 12.** Sort different soils by properties, such as particle size, color and composition. **A 13.** Relate the properties of different soils to their capacity to retain water and support the growth of certain plants.
The Changing Earth – How do materials cycle through the Earth's systems? **3.3 - Earth materials have different physical and chemical properties.** ♦ Rocks and minerals have properties that may be identified through observation and testing; these properties determine how earth materials are used.	**A 23.** Describe the physical properties of rocks and relate them to their potential uses. **A 24.** Relate the properties of rocks to the possible environmental conditions during their formation.

* Core Science Curriculum Framework
Approved CT State Department of Education 2005

Essential Questions:*

Properties of Matter Module:
Solids, Liquids, & Gases-- How does the structure of matter affect the properties and uses of materials?

Structure and Function Module:

Plant Life Cycles—How do plants grow and change? How is their environment suitable to their needs?

The Changing Earth Module:

Rocks and Soil--How do rocks and soil form and change through the earth's systems?

The Seashore Habitat Module:
How do diverse seashore habitats support coastal organisms?

* Core Science Curriculum Framework
Approved CT State Department of Education 2005

Grade 2 Units of Study

PROPERTIES OF MATTER MODULE

Essential Question(s)
Solids, Liquids, & Gases-- How does the structure of matter affect the properties and uses of materials?

Content Standards:

Materials can be classified as solid, liquid or gas based on their observable properties.

Solids tend to maintain their own shapes, while liquids tend to assume the shapes of their containers, and gases fill their containers fully.

Performance Standard:

Describe differences in the physical properties of solids and liquids.

Focus Questions:
What are the three states of matter?
What are the properties of matter?
What causes change in matter?
How can matter be measured?

Unit Objectives:
The students will:

- identify characteristics of matter
- explore and define mass
- identify and define three states of matter
- distinguish objects in the environment as solids, liquids and gases
- identify properties of various solids, liquids and gases
- recognize and explore physical changes in matter
- recognize and explore chemical changes in matter
- experiment with mixtures
- experiment with solutions
- explore the various ways to measure matter

Content Topics:

- What is matter?
- What are some properties of matter?
- What is mass?
- What are solids?
- What are some samples of solids in our environment?
- What are some properties of solids?
- How can you measure solids?
- How can solids be changed?
- What are liquids?
- What are some samples of liquids in our environment?
- What are some properties of liquids?
- How can liquids be changed?
- What are gases?
- What are some samples of gases in our environment?
- What are some properties of gases?
- How can you measure gases?
- How can gases be changed?
- What is a mixture?
- What is a solution?
- What happens to some solids in water?
- What happens to some liquids in water?
- How does a solid change to a liquid?
- How does a liquid change to a solid?
- How does a liquid change to a gas?

Sample Assessment:

Students will each create individual "Books of Matter" which will include an illustration and written characteristic for each property.

Pacing:

Second semester Winter (January-March) Approximately 18 lessons; 2-3 months.

PLANT LIFE CYCLES MODULE

Essential Question(s):

How do plants grow and change?

How are plants structured to ensure efficiency and survival?

Content Standards:

Plants change their forms as part of their life cycles.

The life cycles of flowering plants include seed germination, growth, flowering, pollination and seed dispersal.

Performance Standards:

1. Describe the life cycles of flowering plants as they grow from seeds, proceed through maturation and produce new seeds.

2. Explore and describe the effects of light and water on seed germination and plant growth.

Focus Question:

What is the life cycle of flowering plants as they grow from seeds, and proceed through maturation to produce new seeds?

Unit Objectives:

The students will:

- be able to identify different environments where plants live: cold, wet, dry, and hot.
- examine seeds as they germinate
- plant a diversity of seeds and observe and record similarities and differences in their growth
- examine roots, stems, leaves, flowers, fruits and seeds as they develop and record appropriate observations
- record the order of plant development and create a simple life cycle
- explore the effect of light, water, soil and space on plant development and growth
- explore the interdependence of plants and animals on pollenation, seed dispersal and plant growth
- explore similarities and differences among plants/plant growth and relate to environmental adaptation
- explore the ways plants are used in society

Content Topics:

- How do plants adapt to their environment?
- What are the parts of a flowering plant?
- Compare different plants and their growth: How are they alike and how are they different?
- What are the different parts of a flowering plant?
- What roles do the different parts of a flowering plant have?
- In what order does a plant's parts grow?
- What is the simple life cycle of a plant?
- What affect does light, soil, water, and space have on plant development?
- How does pollination occur?

- How does seed dispersal take place?
- How are plants used in society?

Sample Assessment:

1. The student will be able to show the stages of growth from a dry seed to a full-grown plant by cutting and pasting pictures in order and labeling them using a word bank.

2. The student will be given a choice between two plants (one that received proper lighting and water and one that did not.) The student will be asked to choose the plant that grew best and explain why.

Pacing:

Outdoor planting first semester, revisited in spring; Third semester majority of unit is taught.

CHANGING EARTH MODULE

Essential Question(s):

How do rocks and soil form and change through the earth's systems?

Content Standards:

Earth materials have varied physical properties, which make them useful in different ways.

Soils can be described by their color, texture and capacity to retain water.

Soils support the growth of many kinds of plants, including those in our food supply.

Earth materials have different physical properties.

Rocks and minerals have properties that may be identified through observation and testing; these properties determine how earth materials are used.
Earth is constantly changing. The Earth changes slowly through processes such as erosion and weathering.
Earth changes quickly through forces such as earthquakes, mudslides and volcanoes.

Performance Standards:

1.Sort different soils by properties, such as particle size, color and composition.

2.Relate the properties of different soils to their capacity to retain water and support the growth of certain plants.

3.Describe the physical properties of rocks and relate them to their potential uses.

4.Relate the properties of rocks to the possible environmental conditions during their formation.

Focus Questions:
What are the various physical properties that make soils useful in different ways?
What are the different physical properties of rocks?
How does the earth constantly change?

Unit Objectives:
The students will:

- recognize that minerals are natural resources from which rocks are made
- recognize natural resources as materials that come from the earth
- recognize soil as a natural resource and the components from which it is formed
- identify different properties of rocks such as color, hardness, luster, texture, etc.
- explore and identify the three types of rock formation—igneous, sedimentary, metamorphic
- relate properties of rocks to possible environmental conditions during formation
- recognize how the formation of rocks and soil gives clues to earth's past
- sort different soils by properties
- recognize that properties of different soils determine how they support the growth of different plants
- identify how changes occur beneath earth's surface
- examine how the earth changes slowly through processes such as erosion and weathering
- examine how the earth changes quickly through processes such as earthquakes, volcanoes, mudslides

Content Topics:
What are natural resources?

- What are minerals?
- What are rocks and minerals?
- What are the properties of rocks?
- How are rocks formed?
- What are igneous rocks?
- What are sedimentary rocks?
- What are metamorphic rocks?
- How are rocks and minerals alike?
- How are rocks and minerals different?
- How are rocks and minerals used?
- How do rocks change?
- How does the rock cycle work?
- What can you learn from rock layers?

- What is soil?
- What is soil made of?
- What are the different types of soil?
- How are different types of soil alike and different?
- Why is soil important?
- How is soil used?
- How can soil change over time?
- What lies under the earth's surface?
- What forces shape and change the earth?
- What is an earthquake?
- What is a volcano?
- What is a mudslide?
- What processes change and shape earth?
- What is erosion?
- What is weathering?

Sample Assessment:

Word Bank

erosion	earthquakes
igneous	mudslides
volcanoes	metamorphic
minerals	weathering
sedimentary	

Given the word bank the student will give an example of how rocks or soil form and change.

Students may simply write a short answer to demonstrate understanding or teachers may adapt the assessment into a culminating project that would promote choice.

Pacing:

Fall: September to November for two to three months.

THE SEASHORE HABITAT MODULE

Essential Question(s):
How do diverse seashore habitats support coastal organisms?

Content Standards:
Seashore habitats can contain many different types of organisms—crab, hermit crab, periwinkle, mud snail, and other bi-valves.

The seashore environments can have a number of different components—mudflats, rocky areas, sandy flats, tide pools, salt marshes, and estuaries.

Performance Standards:
1. Determine the various plant inhabitants of a seashore environment such as cord grass, sea lettuce, eel grass, dulse, Irish moss, kelp, rockweed, and knotted wrack.

2. Describe the various animal inhabitants of a seashore environment such as rock crabs, hermit crabs, periwinkles, mud snails, mussels, scallops, oysters, sand worms and other types of bi-valves.

Focus Questions:
What are the components of a seashore habitat?
What types of plants live in the seashore environment?
What kinds of animals live in the seashore habitats?
Do you find the same creatures in each one of the habitats?
What is different about each creature in each habitat?
How do these differences help the creatures to survive in each habitat?

Unit Objectives:
The students will:

- identify and explore the diverse habitats at the seashore
- identify and learn about the wide variety of plants and animals living in this diverse area
- develop an understanding of why this area is so important and hence why it should be conserved

Content Topics:

- What body of water is creating the seashore?
- What does a high tide do to the mudflats?
- What happens to the animals in the mudflats during low tide?
- What animals and plants live in the mudflats?
- What animals and plants live in the sandy flats?
- How do we find the animals living in the flats when we cannot see them?
- Who lives in tide pools?
- What types of birds live at the seashore?

- What animals and plants live in the salt marsh?
- Why is the salt marsh such an important area of the seashore?

Sample Assessment:

Students will demonstrate their understanding of the different seashore habitats by illustrating a picture depicting at least three habitats studied. Within these illustrations the students will include at least one creature (and label it) that can be found in this habitat. In addition the students will write a sentence or two explaining why this habitat is conducive to the creatures' survival.

Pacing:

Spring: May/June for two months; Set-up salt water tank in early fall is optional. September is suggested.

3-5 Scientific Inquiry, Literacy and Numeracy*

THE STANDARDS FOR SCIENTIFIC INQUIRY, LITERACY AND NUMERACY ARE INTEGRAL PARTS OF THE CONTENT STANDARDS FOR EACH GRADE LEVEL IN THIS CLUSTER.

Grades 3-5 Core Scientific Inquiry, Literacy and Numeracy *How is scientific knowledge created and communicated?*	
Content Standards	**Expected Performances**
SCIENTIFIC INQUIRY ♦ Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena. **SCIENTIFIC LITERACY** ♦ Scientific literacy includes speaking, listening, presenting, interpreting, reading and writing about science. **SCIENTIFIC NUMERACY** ♦ Mathematics provides useful tools for the description, analysis and presentation of scientific data and ideas.	**B INQ.1** Make observations and ask questions about objects, organisms and the environment. **B INQ.2** Seek relevant information in books, magazines and electronic media. **B INQ.3** Design and conduct simple investigations. **B INQ.4** Employ simple equipment and measuring tools to gather data and extend the senses. **B INQ.5** Use data to construct reasonable explanations. **B INQ.6** Analyze, critique and communicate investigations using words, graphs and drawings. **B INQ.7** Read and write a variety of science-related fiction and nonfiction texts. **B INQ.8** Search the Web and locate relevant science information. **B INQ.9** Use measurement tools and standard units (e.g., centimeters, meters, grams, kilograms) to describe objects and materials. **B INQ.10** Use mathematics to analyze, interpret and present data.

* Core Science Curriculum Framework
Approved CT State Department of Education 2005

Grade Three Course Objectives:*

Students will be able to:

1. Describe how different plants and animals are adapted to obtain air, water, food and protection in specific land habitats. 2. Describe how different plants and animals are adapted to obtain air, water, food and protection in water habitats.
3. Sort and classify materials based on properties such as dissolving in water, sinking and floating, conducting heat, and attracting to magnets. 4. Describe the effect of heating on the melting, evaporation, condensation and freezing of water
5. Describe how Earth materials can be conserved by reducing the quantities used, and by reusing and recycling materials rather than discarding them.

* Core Science Curriculum Framework
Approved CT State Department of Education 2005

Grade 3 Core Themes, Content Standards and Expected Performances*	
Content Standards	**Expected Performances**
Properties of Matter – How does the structure of matter affect the properties and uses of materials? **3.1 - Materials have properties that can be identified and described through the use of simple tests.** ♦ Heating and cooling cause changes in some of the properties of materials.	**B 1.** Sort and classify materials based on properties such as dissolving in water, sinking and floating, conducting heat, and attracting to magnets. **B 2.** Describe the effect of heating on the melting, evaporation, condensation and freezing of water.
Heredity and Evolution – What processes are responsible for life's unity and diversity? **3.2 - Organisms can survive and reproduce only in environments that meet their basic needs.** ♦ Plants and animals have structures and behaviors that help them survive in different environments.	**B 3.** Describe how different plants and animals are adapted to obtain air, water, food and protection in specific land habitats. **B 4.** Describe how different plants and animals are adapted to obtain air, water, food and protection in water habitats.
Science and Technology in Society – How do science and technology affect the quality of our lives? **3.4 - Earth materials provide resources for all living things, but these resources are limited and should be conserved.** ♦ Decisions made by individuals can impact the global supply of many resources.	**B 5.** Describe how earth materials can be conserved by reducing the quantities used, and by reusing and recycling materials rather than discarding them.

* Core Science Curriculum Framework
Approved CT State Department of Education 2005

Essential Questions:*

Life's Unity and Diversity in Ecosystems Module:

What processes are responsible for life's unity and diversity?

Properties of Matter Module:
How does the structure of matter affect the properties and uses of materials?

Science and Technology Module:

Earth Conservation -- How do science and technology affect the quality of our lives?

* Core Science Curriculum Framework
Approved CT State Department of Education 2005

Grade 3 Units of Study

LIFE'S UNITY AND DIVERSITY IN ECOSYSTEMS MODULE

Essential Question(s)

What processes are responsible for life's unity and diversity?

Content Standards:

Organisms (plants, animals, algae) can survive and reproduce only in environments that meet their basic needs.

Plants and animals have adaptations (structures and behaviors) that help them survive in different environments.

Performance Standards:

1. Describe how different organisms (plants, animals, algae) are adapted to obtain air, water, food and protection in specific land habitats.

2. Describe how different plants and animals are adapted to obtain air, water, food and protection in water habitats.

Focus Questions:

How do the parts of the river basin system support the life of organisms?
How does erosion affect the formation of the river and its habitats?
How are organisms adapted to live in a river basin system?
How do organisms support (make contributions to) a river basin system?

Unit Objectives:

The student will:

- construct a map and a model to show the different parts of the river basin system and label the parts on that map and model.
- explain how the different parts work together to make a river basin system.
- explain the effects of erosion and deposition on the river basin system.
- describe how adaptations help organisms survive in the land and water habitats of the river basin system and other habitats such as forests, oceans, and deserts.
- describe how organisms help the river basin system in which they live.
- record on-site observations of a local river basin system.

Content Topics:

- Systems
- Rivers
- Parts of river basin system
- Introduction to water cycle
- Erosion, deposition, and sorting in a river basin system

- Habitats
- Adaptations
- Organisms' adaptations to land and water habitats in the river basin system
- Contributions of organisms to the system

Sample Assessments:

1. Label parts of the river basin system on a map/model.
2. Describe in writing the five main parts of a river basin system.
3. Explain in writing how different parts work together to make a river basin system.
4. Explain the role of erosion, deposition, and sorting in relation to the formation of habitats.
5. Tell how three organisms are adapted to survive (obtain air, water, food, and protection) in the river basin system and other habitats such as deserts, forests, and oceans.
6. Tell how one organism contributes to (helps) the river basin system in which it lives.
7. Record and explain on-site observations of the local river basin system.

Pacing:
First Semester plus December

PROPERTIES OF MATTER MODULE

Essential Question(s):
How does the structure of matter affect the properties and uses of materials?

Content Standards:

Materials have properties that can be identified and described through the use of simple tests.

Heating and cooling cause changes in some of the properties of materials.

Performance Standards:

1. Sort and classify materials based on properties such as dissolving in water, sinking and floating, conducting heat, and attracting to magnets.

2. Describe the effect of heating on the melting, evaporation, condensation and freezing of water.

Focus Questions:
What are physical properties of matter?
What are solids, liquids, and gases?
How can you measure different properties of matter?

Unit Objectives:
The student will:

- explain what matter is and describe its three states.
- explain what causes matter to change states.
- explain what a physical property is.
- classify matter by physical properties (dissolving in water, sinking and floating, conducting heat, attracting to magnets).
- describe the effect of heat and cold on matter (specifically water).
- explain ways to combine matter.

Content Topics:

- Three stages of matter
- Properties of matter
- How to classify materials based on properties (dissolving in water, sinking and floating, conducting heat, attracting to magnets)
- How matter changes physical state with heating and cooling

Curriculum Embedded Performance Task (from the State of CT)
"Soggy Paper" task to be done near the completion of second semester.

Sample Assessments:

1. State the three stages of matter and describe their characteristics.
2. Classify on a chart different pieces of matter by their properties.
3. List ways to make physical changes in matter.
4. Explain the three states of water and what causes the physical changes from one state to another.
5. List three examples of mixtures and three examples of solutions.

Pacing:
Second semester minus December.

EARTH CONSERVATION MODULE

Essential Question(s):
How do science and technology affect the quality of our lives?

Content Standards:

Earth materials provide resources for all living things, but these resources are limited and should be conserved.

Decisions made by individuals can impact the global supply of many resources.

Performance Standard:
Describe how the Earth's materials can be conserved by reducing the quantities used, and by reusing and recycling materials rather than discarding them.

Focus Questions:
How can the Earth's materials provide resources for all living things?
Which Earth's resources are in limited supply and why are they scarce?
How can we conserve our limited resources?

Unit Objectives:
The student will:

- explain the importance of water to people.
- describe three ways water can become polluted.
- explain how governments help keep water clean.
- explain how people can help control the amount of trash.
- describe how recycling helps conserve Earth materials.
- explain how people change the environment.

Content Topics:

- Water resources, water pollution, and water habitats
- Wastewater and sewage treatment, fertilizers, pesticides, and heat pollution
- Incineration, sanitary landfills, decomposition
- Controlling trash, recycling, recycling centers
- People's effect on the environment
- Population, communities, endangered and extinct living things
- Protecting habitats, passing laws, wildlife refuges

Sample Assessments:
1. Create crossword puzzles or word searches dealing with the ways people and animals depend on water.
2. Explain three ways water can become polluted.
3. Describe what the government is doing to help keep water clean.
4. Create a useful product using clean trash or recyclables.
5. Conduct a survey of products at home with recyclable or reusable containers. The survey should contain at least 10 products.
6. Create a poster showing how people can protect the environment.

Pacing:
Third semester

Grade Four Course Objectives:*

Students will be able to:

1. Describe how the sun's energy impacts the water cycle. 2.Describe the role of water in erosion and river formation.
3.Describe how animals, directly or indirectly, depend on plants to provide the food and energy they need in order to grow and survive. 4.Describe how natural phenomena and some human activities may cause changes to habitats and their inhabitants.
5.Describe the effects of the strengths of pushes and pulls on the motion of objects. 6.Describe the effect of the mass of an object on its motion. 7.Describe how batteries and wires can transfer energy to light a light bulb. 8.Explain how simple electrical circuits can be used to determine which materials conduct electricity. 9.Describe the properties of magnets, and how they can be used to identify and separate mixtures of solid materials.

* Core Science Curriculum Framework
Approved CT State Department of Education 2005

Grade 4 Core Themes, Content Standards and Expected Performances*	
Content Standards	**Expected Performances**
Forces and Motion – What makes objects move the way they do? **4.1 - The position and motion of objects can be changed by pushing or pulling**. ♦ The size of the change in an object's motion is related to the strength of the push or pull. ♦ The more massive an object is, the less effect a given force will have on its motion.	**B 6.** Describe the effects of the strengths of pushes and pulls on the motion of objects. **B 7.** Describe the effect of the mass of an object on its motion.
Matter and Energy in Ecosystems – How do matter and energy flow through ecosystems? **4.2 - All organisms depend on the living and non-living features of the environment for survival.** ♦ When the environment changes, some organisms survive and reproduce, and others die or move to new locations.	**B 8.** Describe how animals, directly or indirectly, depend on plants to provide the food and energy they need in order to grow and survive. **B 9.** Describe how natural phenomena and some human activities may cause changes to habitats and their inhabitants.
Energy in the Earth's Systems – How do external and internal sources of energy affect the Earth's systems? **4.3 - Water has a major role in shaping the Earth's surface.** ♦ Water circulates through the Earth's crust, oceans and atmosphere.	**B 10.** Describe how the sun's energy impacts the water cycle. **B 11.** Describe the role of water in erosion and river formation.
Energy Transfer and Transformations – What is the role of energy in our world? **4.4 - Electrical and magnetic energy can be transferred and transformed.** ♦ Electricity in circuits can be transformed into light, heat, sound and magnetic effects. ♦ Magnets can make objects move without direct contact between the object and the magnet.	**B 12.** Describe how batteries and wires can transfer energy to light a light bulb. **B 13.** Explain how simple electrical circuits can be used to determine which materials conduct electricity. **B 14.** Describe the properties of magnets, and how they can be used to identify and separate mixtures of solid materials.

* Core Science Curriculum Framework
Approved CT State Department of Education 2005

Essential Questions:*

Mill River Ecosystem Module:
Energy in the Earth's Systems –
How do external and internal sources of energy affect the Earth's systems?

Matter and Energy in Ecosystems – How do matter and energy flow through ecosystems?

Electricity and Magnetism Module:
Energy Transfer and Transformations – What is the role of energy in our world?

Force and Motion Module:

What makes objects move the way they do?

* Core Science Curriculum Framework
Approved CT State Department of Education 2005

Grade 4 Units of Study

MATTER AND ENERGY IN ECOSYSTEMS

Essential Question(s)

How do external and internal sources of energy affect the Earth's systems?

How do matter and energy flow through ecosystems?

Content Standards:

Water has a major role in shaping the Earth's surface.

Water circulates through the Earth's crust, oceans and atmosphere.

All organisms depend on the living and non-living features of the environment for survival.

When the environment changes, some organisms survive and reproduce, and others die or move to new locations.

Performance Standards:

1. Describe how the sun's energy impacts the water cycle.

2. Describe the role of water in erosion and river formation.

3. Describe how animals, directly or indirectly, depend on plants to provide the food and energy they need in order to grow and survive.

4. Describe how natural phenomena and some human activities may cause changes to habitats and their inhabitants.

Focus Questions:

Water's role in shaping the earth

- How does the sun's energy impact the water cycle?
- How does water circulate through earth's crust, oceans, and atmosphere?
- What is the role of water in erosion in shaping the earth's surface?

Survival of Organisms

- How do animals depend on plants to grow and survive?
- How do natural phenomena cause changes to habitats and their inhabitants?
- How do human activities cause changes to habitats and their inhabitants?

Unit Objectives:

The student will:

(Water's role in shaping the earth)

- explain the sun's role in the Water Cycle
- define the Water Cycle
- recreate the sequence of the Water Cycle
- diagram and label the layers of the earth
- recreate a model of the Underground Water System
- define water erosion
- identify types of water erosion
- describe River Formation (River Basin System)

(River Lab study trip)

- visit Mill River to discover, record, and analyze data pertaining to the Underground Water System

(Survival of Organisms)

- define a food chain
- create a model of a food chain
- explore natural phenomena as it impacts habitats and their inhabitants
- explore human activities that impact habitats and their inhabitants

Content Topics:

Water's role in shaping the earth

- Water Cycle
- UWS/Layers of the earth's crust
- Erosion/weathering, glaciers

Survival of Organisms

- Food chain
- Impact of natural phenomena on the environment e.g. geological events, weather events
- Impact of human activities on the environment e.g. pollution, development

Sample Assessments:

- Defend this statement: It is our responsibility to protect the River Basin System in order that it continues to support its inhabitants.
- Create a food chain and explain how it supports life

Pacing:

September, October, November (first semester)

River Lab experience - middle of September through early October

FORCE AND MOTION MODULE

Essential Question(s):

What makes objects move the way they do?

Content Standards:

The position and motion of objects can be changed by pushing or pulling.

The size of the change in an object's motion is related to the strength of the push or pull.

The more massive an object is, the less effect a given force will have on its motion.

.

Performance Standards:

1.Describe the effects of the strengths of pushes and pulls on the motion of objects.

2.Describe the effect of the mass of an object on its motion.

Focus Questions:

How do the strengths of pushes and pulls affect the position and motion of objects?
How does the mass of an object affect its motion?
How do simple machines make work easier?
How do simple machines combine to form compound machines?

Unit Objectives:

The student will:

- define force, work, and friction.
- explain how force causes objects to move, slow down, or stop.
- describe how friction can slow or stop the motion of objects.
- predict how differing types of friction impact the motion of an object.
- explain that work is done when a force moves an object.
- identify and classify six simple machines.
- explore how strength, direction, and/or speed of a force impact work.
- evaluate the ingenuity of ancient civilizations and their use of simple machines.
- explain how ancient civilizations used simple machines for construction.
- create a model of a simple machine.
- discover how gears transmit force.
- describe a compound machine.
- distinguish between a simple and compound machine.
- explore modern machines.

Content Topics:

- Force, work, and friction
- Six simple machines
- The use of simple machines by ancient civilizations
- Compound machines
- Modern machines

Sample Assessments:

- Produce a model of a simple machine.
- Label simple machines within a compound machine.

Pacing:

December, January, February (second semester)

ELECTRICITY AND MAGNETISM MODULE

Essential Question(s):

Energy Transfer and Transformations – What is the role of energy in our world?

Content Standards:

Electrical and magnetic energy can be transferred and transformed.

- ♦ Electricity in circuits can be transformed into light, heat, sound and magnetic effects.
- ♦ Magnets can make objects move without direct contact between the object and the magnet.

Performance Standards:

1.Describe how batteries and wires can transfer energy to light a light bulb.

2.Explain how simple electrical circuits can be used to determine which materials conduct electricity.

3.Describe the properties of magnets, and how they can be used to identify and separate mixtures of solid materials.

Focus Questions:

Electricity

- How can batteries and wires transfer energy to light a light bulb?
- How can simple electrical circuits be used to determine which materials conduct electricity?

Magnetism

- What is a magnet?
- How can magnets separate a mixture of solid materials?

Unit Objectives:
The student will:
(Electricity)

- define types of energy.
- define electricity, batteries, and circuits.
- construct both open and closed circuits to light a light bulb.
- compare and contrast an open and closed circuit.
- explore materials to determine whether they conduct electricity.
- identify materials that conduct electricity.

(Magnetism)

- define a magnet.
- explore solids to determine which are magnetic.
- identify solids that are magnetic.

Content Topics:

- Energy
- Electricity
- Electrical circuits
- Magnetism

Curriculum Embedded Performance Task (from the State of CT)
"Go With The Flow" task will be completed at the year of the third semester after the contents of this Unit of Study.

Sample Assessments:

- Create an electrical circuit to transform energy into light, heat, sound, or a magnetic field.
- Predict and categorize various materials in regard to their magnetism.

Pacing:
April, May, June (3rd semester)

Grade Five Course Objectives:*

Students will be able to:

1.Describe the factors that affect the pitch and loudness of sound produced by vibrating objects. 2.Describe how sound is transmitted, reflected and/or absorbed by different materials. 3.Describe how light is absorbed and/or reflected by different surfaces.
4.Describe how light absorption and reflection allow one to see the shapes and colors of objects. 5.Describe the structure and function of the human senses and the signals they perceive. 6.Compare and contrast the structures of the human eye with those of the camera. 7. Describe the uses of different instruments, such as eye glasses, magnifiers, periscopes and telescopes, to enhance our vision.
8.Explain the cause of day and night based on the rotation of Earth on its axis. 9.Describe the monthly changes in the appearance of the moon, based on the moon's orbit around the Earth.
10. Explain how living things affect the productivity of the river basin. 11. Explain how humans and the river basin system interact. 12. Describe how seasons affect change on the flood plain.

* Core Science Curriculum Framework
Approved CT State Department of Education 2005

Grade 5 Core Themes, Content Standards and Expected Performances*	
Content Standards	**Expected Performances**
Energy Transfer and Transformations – What is the role of energy in our world? **5.1 - Sound and light are forms of energy.** ♦ Sound is a form of energy that is produced by the vibration of objects and is transmitted by the vibration of air and objects. ♦ Light is a form of energy that travels in a straight line and can be reflected by a mirror, refracted by a lens, or absorbed by objects.	**B 15.** Describe the factors that affect the pitch and loudness of sound produced by vibrating objects. **B 16.** Describe how sound is transmitted, reflected and/or absorbed by different materials. **B 17.** Describe how light is absorbed and/or reflected by different surfaces.
Structure and Function – How are organisms structured to ensure efficiency and survival? **5.2 - Perceiving and responding to information about the environment is critical to the survival of organisms.** ♦ The sense organs perceive stimuli from the environment and send signals to the brain through the nervous system.	**B 18.** Describe how light absorption and reflection allow one to see the shapes and colors of objects. **B 19.** Describe the structure and function of the human senses and the signals they perceive.
Earth in the Solar System – How does the position of Earth in the solar system affect conditions on our planet? **5.3 - Most objects in the solar system are in a regular and predictable motion.** ♦ The positions of the Earth and moon relative to the sun explain the cycles of day and night, and the monthly moon phases.	**B 20.** Explain the cause of day and night based on the rotation of Earth on its axis. **B 21.** Describe the monthly changes in the appearance of the moon, based on the moon's orbit around the Earth.
Science and Technology in Society – How do science and technology affect the quality of our lives? **5.4 - Humans have the capacity to build and use tools to advance the quality of their lives.** ♦ Advances in technology allow individuals to acquire new information about the world.	**B 22.** Compare and contrast the structures of the human eye with those of the camera. **B 23.** Describe the uses of different instruments, such as eye glasses, magnifiers, periscopes and telescopes, to enhance our vision.

* Core Science Curriculum Framework
Approved CT State Department of Education 2005

Essential Questions:*

Sound and Light Module:

What is the role of energy in our world?

Structure and Function Module:

How are organisms structured to ensure efficiency and survival?

How do science and technology affect the quality of our lives?

Solar System Module:

How does the position of the Earth in the solar system affect conditions on our planet?

River Ecosystem Module:

How do living things interact with their river environment during the spring?

* Core Science Curriculum Framework
Approved CT State Department of Education 2005

Grade 5 Units of Study

SOLAR SYSTEM MODULE

Essential Question(s):

How do the movement and position of the Earth related to the sun and the moon affect conditions on our planet?

Content Standards:

Most objects in the solar system are in a regular and predictable motion.

The positions of the Earth and moon relative to the sun explain the cycles of day and night and the monthly moon phases.

Performance Standards:

1. Explain the cause of day and night based on the rotation of the Earth on its axis.
2. Describe the monthly changes in the appearance of the moon, based on the moon's orbit around Earth.

Focus Questions:

How does the Earth revolve around the sun?
What causes the change in seasons?
How does the rotation of the earth create night and day?
How does gravity affect the sun, moon, and the Earth?
What are the phases of the moon?
Why does the appearance of the moon seem to change?
Why do tides change?

Unit Objectives:

The student will

- explain how the Earth rotates in space once every 24 hours.
- observe how the Earth's rotation causes day and night on Earth.
- explore the phases of the moon.
- explore the systems of the sun, earth, and moon.
- demonstrate how Earth revolves in a path around the sun once each year.
- explain how the tilt of the earth as it revolves around the sun causes the seasons.
- explain how tides are created.

Content Topics:

- Day and Night
- Seasons
- Phases of the moon

Sample Assessments:
(choose from below)

Write an essay explaining how life on the Earth would be different if

- there were no moon or
- if Earth were not tilted.

The student must provide supporting details.

Explain and illustrate the revolution of Earth around the sun.

Explain and illustrate how the rotation of Earth creates day and night.

Explain and illustrate the phases of the moon.

Explain what causes the change in seasons.

Demonstrate how Earth rotates around its axis while it revolves around the sun.

Draw and label a diagram of a simple system other than the solar system.

Pacing: September through October

STRUCTURE AND FUNCTION MODULE

Essential Question(s):

How are organisms structured to ensure efficiency and survival?

How do science and technology affect the quality of our lives?

Content Standards:

Perceiving and responding to information about the environment is critical to the survival of organisms.

The sense organs perceive stimuli from the environment and send signals to the brain through the nervous system.

*NOTE: Senses of sight and hearing are addressed in the module, " Light and Sound."

Performance Standard:

Describe the structure and function of the human senses and the signals they perceive.

Focus Questions:

What are the parts of the nervous system?

a. Spinal chord
b. Network of nerves
c. Brain

What are the body sense organs?

d. Eyes*
e. Ears*
f. Nose
g. Taste buds
h. Skin

* See note above

What are the senses?

i. Sight*
j. Hearing*
k. Smell
l. Taste
m. Touch

* See note above

Why are the senses important?

n. Adaptations for survival

Unit Objectives:

The student will:

- investigate and gather data about the senses using simple equipment and measuring tools.
- analyze and make observations about how the sense organs perceive stimuli from the environment and send signals to the brain through the nervous system.

Content Topics:

- Nervous system
- Senses organs
- Senses

Curriculum Embedded Performance Task (from the State of CT)
"Catch It" task will be completed near the conclusion of this unit of study.

Sample Assessments:

1. Describe the structure of the nervous system and sense organs.
2. Explain the function of sense organs.

Pacing: November – December

LIGHT AND SOUND MODULE

Essential Question(s):

What is the role of light and sound energy in our world?

Content Standards:

Sound and light are forms of energy.

Sound is a form of energy that is produced by the vibration of objects and is transmitted by the vibration of air and objects.

Light is a form of energy that travels in a straight line and can be reflected by a mirror, refracted by a lens, or absorbed by objects.

Perceiving and responding to information about the environment is critical to the survival of organisms.

The sense organs perceive stimuli from the environment and send signals to the brain through the nervous system.

Humans have the capacity to build and use tools to advance the quality of life.

Advances in technology allow us to acquire new information about our world.

Performance Standards:

1. Describe the factors that affect the pitch and loudness of sound produced by vibrating objects.
2. Describe how sound is transmitted, reflected, and/or absorbed by different materials.
3. Describe how light is absorbed and/or reflected by different surfaces.
4. Describe how light absorption and reflection allows one to see the shapes and colors of objects.
5. Describe the structure and function of the human senses and the signals they perceive.
6. Compare and contrast the structures of the human eye with those of the camera.
7. Describe the uses of different instruments, such as eyeglasses, magnifiers, periscopes, and telescopes to enhance our vision.

Focus Questions:

What is sound energy?
How is sound made?
How does sound travel?
How does the ear perceive stimuli?
What is light energy?
How do light and matter interact?

- Reflection
- Absorption
- Refraction

How does the eye perceive stimuli?
What is the structure of a camera?
How do advances in technology allow us to acquire new information about our world?

Unit Objectives:

The student will:

- define sound and light energy.
- describe sound and light energy.
- describe how the eye and ear perceive stimuli.
- compare and contrast the eye to the camera.
- describe the use of different instruments, such as eye glasses, magnifiers, periscopes, and telescopes to enhance our vision.

Content Topics:

- Sound and light energy
- Transmission of sound and light energy
- Interaction of sound and light waves with matter
- The brain's perception of stimuli (sound and light waves)
- Structure of the camera
- Technological advances using light to enhance vision (eye glasses, magnifiers, periscopes, and telescopes).

Sample Assessments:

1. Diagram, label, and describe the structure of the ear.

2. Diagram, label, and describe the path of sound waves to the brain.

3. Describe the paths of light waves to the human brain when looking at an object (for example, a shirt, rainbow, etc.).

4. Optional: Imagine your group is taking a trip to a different habitat or time period (for example, the moon or Civil War era). Create a virtual toolkit that would be needed by the group to survive. This toolkit should show advances in technology that enhance seeing and hearing. Use creative writing to describe the setting, mood, color, and other details.

Pacing: January - March.

RIVER ECOSYSTEM MODULE:
(Ecology: the science of the relationship between living things and their environment.)

Essential Question: How do living things interact with their river environment during the spring?

Content Standards:

Perceiving and responding to information about the environment are critical to survival of organisms.

Protists, plants and animals in the river basin system react to spring seasonal changes by reproduction.

Performance Standards:

1. Describe the spring seasonal changes to life in the river basin system.

2. Explain how a healthy river is a producer in all its parts.

3. Explain how human activity affects river, estuarine and coastal productivity.

4. Use of magnifiers and microscopes to enhance our vision to examine microscopic aquatic life.

Focus Questions:
How do living things in the river basin system affect the productivity of the river basin?
How do humans and the river basin system interact?
How do seasons effect change on the floodplain?

Unit Objectives:

The student will:

- examine the river basin ecosystem and adaptations and contributions of organisms to the system.
- explore man's impact on the river basin system.
- investigate different populations that exist in the river.
- explore how the products and by-products of plant and animal reproduction contribute to the river basin system.
- connect spring seasonal changes to life in the river basin system.
- use magnifying lenses and microscopes to view various materials.
- explore the plant cycle through the study of pollination, germination and fertilization.

- record and explain on-site observations of local river basin productivity including a classroom freshwater plankton lab.

Content Topics:
River basin system.

Productivity of the floodplain.

- The explosion of protist, plant and animal products during the spring reproductive season greatly increases productivity in a river basin.
- River and floodplain organisms such as protists, plants and animals contribute to the productivity of the floodplain and river.
- Estuarine and coastal productivity depends on enrichment from the inland basin.

Floodplain organisms and their contributions.

- Freshwater plankton is the base of a living basin system (web of life).
- Habitats for freshwater plankton are essential to the full productive potential of a living river basin system.

Human activity affects river productivity.

Seasons affect physical and life changes in the floodplain.

Sample Assessment:

River System Scenario—Given a situation, predict and evaluate possible effects upon a river system.

Pacing: 9 weeks (April, May, June)