

# Science Curriculum – Earth/Space Science

## Kindergarten

**Overall Essential Skill** – Students will use their 5 senses to observe and describe characteristics and changes in non-living and living objects in the world around them

- **Process Skills/Scientific Method** –Children will use the scientific method in our inquiry-based activities in all grade levels and content areas in the science curriculum. Students will observe and describe with their five senses
- **Scientific Technology & Tools**- magnifying glasses, simple scales, safety goggles and measuring tools
- **Content Topics** – Using the appropriate tools, technology, and techniques, students will observe the characteristics and changes in living and non-living objects in the world around them
- **Science Safety**- - Students will follow safety instructions, directions, and use appropriate safety equipment.

**Content** – Science at the Kindergarten level is at the free-exploration level. Students will use their 5 senses to observe and describe the characteristics and changes in living and non-living objects in the world around them

### **Students will be exposed to:**

- Living things, both plants and animals
- The physical environment, such as rocks, minerals, soil, day and night, puddles, daily weather, musical instruments and water play

## **Grade One – Weather - STC**

### **Essential Skills**

- **Content Skills**- Students will demonstrate an understanding that cycles are a repeating pattern in living and non-living objects. Students will demonstrate an understanding that properties distinguish one object from another.
- **Process Skills/Scientific Method** –Children will use the scientific method in our inquiry-based activities in all grade levels and content areas in the science curriculum. – Students will use standard/non-standard measurement scales and units to observe and describe, predict, sort, categorize and record
- **Scientific Technology & Tools** – Students will use appropriate tools, technology, and techniques to gather, analyze, interpret, and share data. (Thermometers, rulers (inch & cm), rain gauges (cm units), magnifying glasses, simple microscopes, balances, computers and safety goggles)
- **Science Safety**- Students will follow safety instructions, directions, and use appropriate safety equipment.

### **Content**

- Students will be able to observe, describe and compare seasonal change, daily temperature and precipitation and seasonal cycles.
- Students will explain in their own words how weather affects the decisions that people make.
- Students will use features, patterns and observations of weather to make weather predictions

- Students will observe, describe, and record weather conditions such as clouds, temperature, wind speed, and precipitation

## **Grade Two – Soils - STC**

### **Essential Skills**

- Content Skills- Students will demonstrate an understanding that the Earth gets heat and light from the sun and has air, soil and water to sustain life. Students will understand that proper soil conditions are essential for plant growth and survival. Students will understand that plants have life cycles and plant growth is affected by many different variables. Students will expand their understanding of solids, liquids, and gases and how they change.
- Process Skills/Scientific Method –Children will use the scientific method in our inquiry-based activities in all grade levels and content areas in the science curriculum. Students will use appropriate measurement units and will observe, describe, predict, sort, record, categorize
- Scientific Technology & Tools - Students will use appropriate tools, models, technology, and techniques to gather, analyze, interpret, and share data. (Rulers, magnifying glasses, compare old and new technology, computers and safety goggles)
- Science Safety- - Students will follow safety instructions, directions, and use appropriate safety equipment.

### **Content**

- Students will perform simple tests to identify the three basic soil components (sand, clay, and humus) and describe their properties
- Students will investigate composting as an effective way to recycle organic matter including the vital role of earthworms in soil
- Students will observe and compare how water moves through different soil components to begin to understand why different soils absorb water at different rates
- Students will observe and discuss the connections between roots and plants
- Students will explore the relationship between soil and plant growth

## **Grade Three – Rocks & Minerals - STC**

### **Essential Skills**

- Content Skills- Students will demonstrate an understanding of the characteristics of vertebrates and their adaptations for survival in various environments. Students will understand the basic characteristics of sound. Students will understand the different properties of rocks and minerals; and how those properties determine their use.
- Process Skills/Scientific Method –Children will use the scientific method in our inquiry-based activities in all grade levels and content areas in the science curriculum. Students will use appropriate measurement units, observe, describe, read and create graphs/tables to construct explanations, predict, sort, categorize, record, develop scales, introduce and conduct an experiment isolating one variable
- Scientific Technology & Tools – Students will use appropriate tools, technology, and techniques to gather, analyze, interpret, and share data. (computers, rulers, magnifying glasses, microscopes, balance scales, prisms, and safety goggles)
- Science Safety- - Students will follow safety instructions, directions, and use appropriate safety equipment.

## **Content**

- Students will explain in their own words, with or without visuals, how the three types of rocks were formed (metamorphic, igneous and sedimentary)
- Students will observe and discuss the cause/effect relationship between the natural forces (weathering, erosion, heat, & pressure) and rocks
- Students will use their senses to observe the different properties of rocks and minerals (such as: color, texture, smell, luster, transparency, hardness, shape and reaction to magnets) and categorize their observations through charting
- By investigating the everyday uses of rocks and minerals, students will explain how their properties determine how they are used (e.g. toothpaste, sandpaper, vitamins, granite foundations)

## **Grade Four – Land & Water - STC**

### **Essential Skills**

- Content Skills - Students will demonstrate an understanding of the interactions and interdependence between plants and animals and their habitats in New Hampshire ecosystems. Students will demonstrate an understanding of the interactions between land and water on the planet Earth. Students will explore chemistry in the familiar context of food, and relate nutrients to human health.
- Process Skills/Scientific Method –Children will use the scientific method in our inquiry-based activities in all grade levels and content areas in the science curriculum. Students will use appropriate measurement units and will observe, describe, experiment isolate a variable, pose a question, make a prediction, read and create graphs and tables and create explanations
- Scientific Technology & Tools – Students will use appropriate tools, technology, and techniques to gather, analyze, interpret, and share data. (computers, rulers, magnifying glasses, microscopes, thermometers (F & C), compasses, litmus paper, models and safety goggles)
- Science Safety- - Students will follow safety instructions, directions, and use appropriate safety equipment.

## **Content**

- Students will draw or construct a model and label the parts of the water cycle (evaporation, condensation, precipitation, transpiration, surface runoff, water table, and groundwater)
- Students will explain in their own words, with or without visuals, that soil has properties of color and texture and capacity to retain water and ability to support growth of plants.
- Students will investigate the effects of slope, flow, soil components, and natural formations on erosion and deposition
- Students will give examples of the interaction of land and water in the real world
- Students will give examples of how human activity affects land and water

## **Grade Five – Astronomy**

### **Essential Skills**

- Content Skills- Students will develop an understanding of the differences between scientific law and theory through the study of ecology, astronomy and motion and energy
- Process Skills/Scientific Method –Children will use the scientific method in our inquiry-based activities in all grade levels and content areas in the science

curriculum. Students will use appropriate measurement units, observe, describe, experiment, isolate a variable, pose a question, make a prediction, read and create graphs and tables, create explanations, compare and estimate very large and small numbers, work in small teams and form own conclusion, make hypothesis, and design experiments to test and seek information for comparing past and present science ideas and theories

- Scientific Technology & Tools – Students will use appropriate tools, technology, and techniques to gather, analyze, interpret, and share data. (computers, rulers, magnifying glasses, microscopes, thermometers (F & C), stop watches, compasses, telescopes, microscopes, graduated cylinders, pH paper, and safety goggles)
- Science Safety- - Students will follow safety instructions, directions, and use appropriate safety equipment.

### **Content**

- Students will compare and contrast important features of the Earth, Sun and Moon
- Students will observe and describe the motion of the Sun, Moon, and stars from the perspective of Earth and explain how Earth's relationship to the Sun causes day and night
- Students will explain how the brightness of a star as seen from Earth is related to its size, color and distance from Earth
- Students will explain in their own words using visuals, that Earth is a planet that is part of a system of planets
- Students will use a telescope to magnify the appearance of some distant objects in the sky
- Students will explain in their own words, with or without visuals, that the sun is a star that gives earth heat and light
- Explain phases of the Moon in terms of relative positions of the Earth, Moon, and Sun

## **Grade Six – Weather & Climate**

### **Essential Skills**

- Content Skills- Students will develop an understanding of the human body. Students will develop an understanding of how tools, observation, and technology are used to forecast weather.
- Process Skills/Scientific Method –Children will use the scientific method in our inquiry-based activities in all grade levels and content areas in the science curriculum. Students will work in small teams and form own conclusion, make hypothesis, design experiments to test, seek information for comparing past and present science ideas and theories, determine the relationship between evidence and explanation, comprehend alternative explanations and procedures, and communicate procedures and explanations
- Scientific Technology & Tools – Students will use appropriate tools, technology, and techniques to gather, analyze, interpret, and share data. (microscopes, computers, thermometers, barometers, rulers, magnifying glasses, graduated cylinders, compile data on a computer, use technology to share data, and safety goggles and rain gauges)
- Science Safety-Students will follow safety instructions, directions, and use appropriate safety equipment.

### **Content**

- Students will use weather instruments (commercial or home made

instruments—thermometers, barometers, simple wind gauges, weather vanes and rain gauges.)

- Students will gather and organize weather data using instruments and computer technology (temperature, air pressure, precipitation, wind direction and speed)
- Students will observe, describe, and record weather conditions such as clouds, temperature, air pressure, and precipitation
- Students will compare and contrast the various types of clouds, categorize them as cirrus, cumulus and stratus, and use them for short-term weather predictions
- Students will explain the weather trends that relate to seasonal change
- Using the internet, students will locate weather sites to collect weather data
- Explain weather conditions to large and small-scale weather systems, e.g.. Highs, lows, and fronts
- Explain weather-related phenomena such as thunderstorms, tornadoes, hurricanes, or drought
- Students will explain in their own words, with or without visuals, the relationship between climate and weather in regards to biomes
- Students will draw and label the different parts of the atmosphere (layers)
- Students will explain how human activity affects the atmosphere and how the weather activity of the atmosphere affects humans
- Students will demonstrate with a visual the basic water cycle - precipitation, evaporation and condensation.

## **Grade Nine – Earth/Space Science**

### **Essential Skills**

- Identify and detail the five interacting spheres of influence that support life on earth (5 spheres: exosphere, atmosphere, geosphere or lithosphere, hydrosphere and biosphere)
- Identify and describe responsible use of finite resources
- Describe with supporting details material origins
- Analyze various rock samples and obtain evidence of weathering and erosion
- Construct and detail models demonstrating the effects of water, ice, wind, and waves on earth's land surfaces (e.g., stream tables and wave tanks)
- Identify and describe the basic facts about major features of earth's surface and natural changes in these features (e.g., plate tectonics, continental drift, vulcanism, earthquakes, glaciation, erosion and weathering.)
- Cite evidence supporting the (old) age of the earth
- Identify surface features of the earth using maps and globes
- List fresh water conservation measures
- Cite evidence that our fresh water supply is essential for life and for most industrial processes

Earth Science at CVHS is a NH Standards-Based and Inquiry-Centered Investigation of the five Spheres of Influence that make-up our physical environment. It is a required, one semester program for all Freshman and is offered at three levels

### **Important Skills**

- Identify the nine planets in our solar system by name and size relative to the earth
- Relate seasonal changes to earth's tilt and orbital positions
- Identify factors and forces that cause weather changes
- Explain origin and development of major weather systems, including: thunderstorms, tornadoes, hurricanes, blizzards

- Describe atmospheric the water cycle, including changes of phase, precipitation types, energy exchanges
- Demonstrate knowledge of use of certain weather instruments, including: thermometers, barometers, anemometers, hydrometers
- Diagram, label and describe the layers of regions of planet earth
- Diagram, label and describe the layers or regions of the atmosphere
- Explain the green House effect and relate impact of air pollution
- Cite the physical and chemical properties of water
- Explain Lunar influence on earth

#### **Nice to Know Skills**

- Current events, causes and consequences
- Navigation
- Physical geography

Unexplained phenomena, e.g., Bermuda triangle, Atlantis, Stonehenge (Mystery Hill in NH). Bib Bang theory, Black Holes)

### **Grade Eleven**

#### **Oceanography**

- This course stresses physical, chemical, geological, biological and ecological aspects of the world's oceans.
- Oceanography is the scientific study of all aspects of the oceans, their boundaries and contents, involving the largest environment on earth.
- By studying this massive area, we hope to answer about weather, energy, mineral resources, environment, food and our origin and to learn about our connection to all things in the sea.
- Some dissection should be expected

### **Grade Twelve**

#### **Oceanography**

- This course stresses physical, chemical, geological, biological and ecological aspects of the world's oceans.
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- By studying this massive area, we hope to answer about weather, energy, mineral resources, environment, food and our origin and to learn about our connection to all things in the sea.
- Some dissection should be expected.

#### **Oceanography (Advanced)**

- The same content area above but assumes a higher level of lab and thinking skills.
- Good reading and writing skills are helpful, and nightly homework should be expected.
- Dissection is an integral part of the course.