

INTRODUCTION

The Hinsdale School District PreK-12 science curriculum is a coordinated program built around science education and the expectations of the New Hampshire Curriculum Frameworks. It proceeds sequentially; introducing, expanding, and further exploring content at appropriate grade levels with increasing degrees of depth and complexity. The Common Core State Standards for English Language Arts include standards pertaining to all content areas.

Teachers are responsible for incorporating the Common Core State Standards into their science instruction.

IMPORTANT NOTE TO ALL TEACHERS

It is important for teachers to follow the curriculum for each grade level or class as described in this guide; the integrity of the PreK-12 sequence has been carefully considered in its creation. Grade levels and individual classes have some degree of flexibility in designing the sequence of topics through the year, but *addressing the provided scope is required*. At the elementary level, the topics for each grade level have been carefully planned so as to address necessary content without redundancy or omission to meet the expectations of the NH frameworks and high stakes testing. At the middle school and high school levels the curricula are also constructed to fully meet the expectations of the NH frameworks and high stakes testing. The guiding questions in each section make clear the topics of inquiry (scope) for each grade. These topics change and build on each other through the grades (sequence), making it imperative that each teacher use the guiding questions to plan instruction.

SCIENCE INQUIRY

Science Inquiry!

Actual doing!

Capture student interest and motivate continued learning!

Inquiry involves QUESTIONING. Inquiry requires being able to identify assumptions, to use critical and logical thinking, and the ability to consider alternative explanations. Inquiry might be highly structured where known outcomes are clear, or students may be free to explore with unanticipated results!

Students engaged in Inquiry:

- make observations
- pose questions
- propose answers
- examine what they may already know
- review already researched information
- explain / communicate results
- use tools to
 - gather
 - analyze
 - interpret data

Students use journals to record observations, thoughts, ideas, and models, create diagrams, and represent data and observations with plots and tables. Students present their work to others with models, graphs, reports, posters, etc.

Asking students questions to guide continued exploration provides opportunities for discussion, further reflection, and student decision-making.

Appropriate activities are safe, developmentally appropriate, and directly related to the curriculum. Sufficient tools and materials must be available and science inquiry vocabulary (provided in guide) used.

Essential Understandings

The Science Curriculum for Hinsdale Elementary, Middle and High School is built around the standards listed in the New Hampshire Curriculum Framework. Science is divided into three content domains (Earth Space Science, Life Science, and Physical Science) and one Science Process Skills domain. The three content domains should encompass the Scientific Process Skills of Inquiry and Critical Thinking Skills. The following list of Essential Understandings or Enduring Knowledge Statements are used across all grade levels.

**Essential Understandings
Earth Space Science**

Strand (Enduring Knowledge Statements)	Stem (rows) in GSEs
ESS1– The Earth and Earth materials, as we know them today, have developed over long periods of time, through constant change processes.	1. Atmosphere, Climate, and Weather
	2. Composition and Features
	3. Fossils
	4. Observation Of The Earth From Space
	5. Processes and Rates Of Change
	6. Rock Cycle
	7. Water
ESS2– The Earth is part of a solar system, made up of distinct parts, which have temporal and spatial interrelationships.	1. Earth, Sun And Moon
	2. Energy
	3. Solar System
	4. View From Earth
ESS3– The origin and evolution of galaxies and the universe demonstrate fundamental principles of physical science across vast distances and time.	1. Size And Scale
	2. Stars And Galaxies
	3. Universe
ESS4– The growth of scientific knowledge in Earth Space Science has been advanced through the development of technology and is used (alone or in combination with other sciences) to identify, understand and solve local and global issues.	1. Design Technology
	2. Tools
	3. Local And Global Environmental Issues
	4. Career and Technical Education

(NH Department of Education- NH Curriculum Framework 2006)

Essential Understandings Life Science

Strand (Enduring Knowledge Statements)	Stem (rows) in GSEs
LS1– All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, and species).	1. Classification
	2. Living Things And Organization
	3. Reproduction
LS2– Energy flows and matter recycles through an ecosystem.	1. Environment
	2. Flow Of Energy
	3. Recycling Of Materials
LS3– Groups of organisms show evidence of change over time (e.g. evolution, natural selection, structures, behaviors, and biochemistry).	1. Change
	2. Evolution
	3. Natural Selection
LS4– Humans are similar to other species in many ways, and yet are unique among Earth’s life forms.	1. Behavior
	2. Disease
	3. Human Identity
LS5– The growth of scientific knowledge in Life Science has been advanced through the development of technology and is used (alone or in combination with other sciences) to identify, understand and solve local and global issues.	1. Design Technology
	2. Tools
	3. Social Issues (Local And Global) Medical Technology and Biotechnology
	4. Career Technical Education Connections

(NH Department of Education- NH Curriculum Framework 2006)

**Essential Understandings
Physical Science**

Strand (Enduring Knowledge Statements)	Stem (rows) in GSEs
PS1– All living and nonliving things are composed of matter having characteristic properties that distinguish one substance from another (independent of size/amount of substance).	1. Composition
	2. Properties
PS2– Energy is necessary for change to occur in matter. Energy can be stored, transferred and transformed, but cannot be destroyed.	1. Change
	2. Conservation
	3. Energy
PS3– The motion of an object is affected by force.	1. Forces
	2. Motion
PS4– The growth of scientific knowledge in Physical Science has been advanced through the development of technology and is used (alone or in combination with other sciences) to identify, understand and solve local and global issues.	1. Design Technology
	2. Tools
	3. Social Issues (Local and Global) Energy, Power, and Transportation Manufacturing
	4. Career Technical Education Connections

(NH Department of Education- NH Curriculum Framework 2006)

Essential Understandings Science Process Skills

Strand (Enduring Knowledge Statements)	Stem (rows) in GSEs
SPS1– Scientific Inquiry and Critical Thinking Skills	1. Making observations and asking questions
	2. Designing scientific investigations
	3. Conducting scientific investigations
	4. Representing and Understanding results of Investigations
	5. Evaluating Scientific Investigations
	NECAP Science Assessment Targets for Inquiry (INQ) <i>May subject of performance component</i>
SPS2– Unifying Concepts of Science (including NECAP Science Assessment Targets by Big Idea)	1. Nature of Science (NOS)
	2. Systems and Energy (SAE)
	3. Models and Scale (MAS)
	4. Patterns of Change (POC)
	5. Form and Function (FAF)
SPS3– Personal, Social, and Technological Perspectives	1. Collaboration in Scientific Endeavors
	2. Environment, Natural Resources, and Conservation
	3. Science, Technology, and Design
SPS4– Science Skills for Information, Communication and Media Literacy	1. Information and Media Literacy
	2. Communication Skills
	3. Critical Thinking and Systems Thinking
	4. Problem Identification, Formulation, and Solution
	5. Creativity and Intellectual Curiosity
	6. Interpersonal and Collaborative Skills
	7. Self Direction
	8. Accountability and Adaptability
	9. Social Responsibility

(NH Department of Education- NH Curriculum Framework 2006)

Earth Science

	Standards	Guiding Questions
ES1	<p>S:ESS1:6:1.5 Describe how clouds affect weather and climate, including precipitation, reflecting light from the sun, and retaining heat energy emitted from the Earth’s surface.</p> <p>S:ESS1:6:2.1 Differentiate between renewable and nonrenewable resources.</p> <p>S:ESS1:8:2.2 Use geological evidence provided to support the idea that Earth’s crust/lithosphere is composed of plates that move.</p> <p>S:ESS1:8:5.2 Explain how Earth events, abruptly and over time, can bring about changes in Earth’s surface: landforms, ocean floor, rock features, or climate.</p> <p>S:ESS1:8:5.3 Explain the role of differential heating or convection in ocean currents, winds, weather and weather patterns, atmosphere, or climate.</p> <p>S:ESS1:8:6.4 Using data about a rock’s physical characteristics make and support an inference about the rock’s history and connection to the rock cycle.</p> <p>S:ESS1:8:7.3 Explain the processes that cause cycling of water into and out of the atmosphere and their connections to our planet’s weather patterns.</p>	<p>What is the difference between weather and climate?</p> <p>Why will we run out of some resources?</p> <p>How do we know that earth’s crust moves?</p> <p>Why do different parts of the earth look so different from each other?</p> <p>What causes weather?</p> <p>Where do rocks come from?</p> <p>What does water have to do with weather?</p>

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<p>ES2</p>	<p>S:ESS2:8:1.4 Explain the temporal or positional relationships between or among the Earth, Sun and Moon (e.g., night/day, seasons, year, tide).</p> <p>S:ESS2:8:3.4 Compare and contrast planets based on data provided about size, composition, location, orbital movement, atmosphere, or surface features (includes moons).</p> <p>S:ESS2:8:3.5 Explain how gravitational force affects objects in the Solar System (e.g., moons, tides, orbits, satellites).</p> <p>S:ESS2:6:4.2 Describe man’s perception of the constellations throughout history; and explain how he has used them to his advantage, including navigational purposes and to explain historical events.</p> <p>S:ESS2:8:4.1 Explain how technological advances have allowed scientists to re-evaluate or extend existing ideas about the Solar System.</p>	<p>How do the earth, sun, and moon interact with each other?</p> <p>How are the planets different from each other?</p> <p>Is there gravity everywhere?</p> <p>How has our understanding of space changed over time?</p>
<p>ES3</p>	<p>None at this level</p>	<p>None at this level</p>
<p>ES4</p>	<p>None at this level</p>	<p>None at this level</p>

Earth Science

Essential Vocabulary

CONTENT

Weather
Climate
Heat energy
Renewable resources
Nonrenewable resources
Geological
Evidence
Crust/lithosphere
Differential heating or convection
Ocean currents
Winds
Weather patterns
Atmosphere
Rock cycle
Temporal relationships
Positional relationships
Earth, Sun and Moon
Planets
Composition
Location
Orbital movement
Gravitational force
Solar System
Moons
Tides
Orbits
Satellites
Constellations

INQUIRY

Describe
Differentiate
Use evidence
Support
Explain
Make and support an inference
Explain processes
Compare and contrast
Re-evaluate

GRADE: 6

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Suggested Resources/ Activities

Selected chapter projects and activities as described in the textbook.

<http://www.education.nh.gov/instruction/curriculum/science/index.htm>

(Science Curriculum Website)

<http://www.education.nh.gov/instruction/assessment/necap/released/index.htm>

(Science NECAP- Released items)

(2008 NECAP released inquiry task: "Colliding Plates.")

Science Matters: <http://science-mattersblog.blogspot.com/>

Middle School Science: <http://www.middleschoolscience.com/>