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

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) *May subject of performance component*
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)

Grade: 11

Environmental Science

	Standards	Guiding Questions
LS1	NA covered in Biology	
LS2	**S:LS2:11:1.1 and 1.3** Carrying Capacity of the environment. **S:LS2:11:1.2** Interrelationships and interdependencies among organisms. Ecosystems stability and fluctuations. **S:LS2:11:1.4** Analyze and describe how environmental disturbances, such as climate changes, natural events, human activity and the introduction of invasive species, can affect the flow of energy or matter in an ecosystem. **S:LS2:11:1.5** Using data from a specific ecosystem, explain relationships or make predictions about how environmental disturbance (human impact or natural events) affects the flow of energy or cycling of matter in an ecosystem. **S:LS2:11:2.1** Trophic levels. Energy flow in an ecosystem **S:LS2:11:3.1** Explain that as matter and energy flow through different levels of organization in living systems and between living systems and the environment, elements, such as carbon and nitrogen, are recombined in different ways. **S:LS2:11:3.2** Biogeochemical cycles of different elements (Carbon, Nitrogen, etc.)	How is the amount of life an environment can sustain restricted by the availability of matter and energy? What are the factors that affect the stability of an ecosystem? What happens when a part of the ecosystem is disrupted? What are the factors that affect the carrying capacity of the environment? How do Human activities affect the environment? How do matter and energy get recycled in nature?

Grade: 11

Environmental Science

LS3	**S:LS3:11:1.1** Identify ways humans can impact and alter the stability of ecosystems, such as habitat destruction, pollution, and consumption of resources; and describe the potentially irreversible effects these changes can cause. **S:LS3:11:1.2** Identify ways of detecting, and limiting or reversing environmental damage. **S:LS3:11:1.3** Analyze the aspects of environmental protection, habitat management, species conservation and environmental agencies and regulations; and evaluate and justify the need for public policy in guiding the use and management of the environment	What happens when habitats are destructed? Can environmental degradation be reversed? How did NH forests look like 100 years ago? What are the government (federal and state) agencies that are in charge of environmental issues?
LS4	**S:LS4:11:2.6** Use evidence to make and support conclusions about the ways that humans or other organisms are affected by environmental factors (pollution, environmental toxicity, etc.)	How is our health affected by environmental factors? How does pollution affect our well being?
LS5	**S:LS5:11:3.1** Describe ways technology can support and improve our understanding of environmental issues.	How can technology help us solve environmental issues?

Grade: 11

Environmental Science

Essential Vocabulary	
CONTENT	**INQUIRY**
Environment	Describe
Population	Identify
Community	Differentiate
Ecosystem	Recognize
Biosphere	Explain
Biome	Justify
Carrying Capacity	Compare/contrast
Pollution	Evidence
Ecology	Interrelations
Environmental Science	Interdependence
Trophic levels, chains and webs	Inquiry
Energy flow	Scientific method
Biogeochemical cycles	Observation
Environmental Policy	Hypothesis
Impact	Prediction
Alteration	Variable
Conservation	Experiment
	Data
	Measurement
	Analyze
	Infer
	Conclude
	Graph

Grade: 11

Environmental Science

Suggested Resources/ Activities
EPA http://www.epa.gov/enviroed/ Fish and wildlife service: http://www.wildlife.state.nh.us/Kids/kids.htm http://apps.exploratorium.edu/10cool/index.php?category=6&cmd=browse 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)