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: 7

Life Science

	Standards	Guiding Questions
LS1	**S:LS1:8:1.2** Describe or compare how different organisms have mechanisms that work in a coordinated way to obtain energy, grow, move, respond, provide defense, enable reproduction, or maintain internal balance (e.g., cells, tissues, organs and systems). **S:LS1:6:2.2** Explain the way in which cells function is similar in all organisms. **S:LS1:8:2.4** Explain relationships between or among the structure and function of the cells, tissues, organs, and organ systems in an organism. **S:LS1:8:2.5** Using data and observations about the biodiversity of an ecosystem make predictions or draw conclusions about how the diversity contributes to the stability of the ecosystem **S:LS1:6:3.3** Recognize that reproduction is a characteristic of all living things and is essential to the continuation of a species. **S:LS1:8:3.6** Compare and contrast sexual reproduction with asexual reproduction.	In what ways are all organisms similar? How is biodiversity healthy for an ecosystem? How do living things make more of themselves?

GRADE: 7

Life Science

LS1	**S:LS1:8:3.7** Using data provided, select evidence that supports the concept that genetic information is passed on from both parents to offspring. *(See also "Human Identity")*	
LS2	**S:LS2:8:1.3** Using data and observations, predict outcomes when abiotic/biotic factors are changed in an ecosystem. **S:LS2:8:2.2** Given a scenario, trace the flow of energy through an ecosystem, beginning with the sun, through organisms in the food web, and into the environment (includes photosynthesis and respiration). **S:LS2:6:2.3** Describe the process of photosynthesis and explain that plants can use the food they make immediately or store it for later use. **S:LS2:8:3.6** Given an ecosystem, trace how matter cycles among and between organisms and the physical environment (includes water, oxygen, food web, decomposition, recycling but not carbon cycle or nitrogen cycle).	What happens when the environment changes? How does energy move from the sun, through organisms, and into the environment? How does matter move from the environment, through organisms, and back into the environment?
LS3	**S:LS3:8:2.3** Use a model, classification system, or dichotomous key to illustrate, compare, or interpret possible relationships among groups of organisms (e.g., internal and external structures, anatomical features)	How can organizing organisms into groups help us understand more about their evolution?

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LS3	**S:LS3:6:3.1** Recognize that there are genetic variations among individuals in groups of organisms and provide examples of how these variations affect the survival of an organism. **S:LS3:8:3.5** Cite examples supporting the concept that certain traits of organisms may provide a survival advantage in a specific environment and therefore, an increased likelihood to produce offspring.	How do heredity and genetic variation affect survival?
LS4	**S:LS4:6:1.1** Recognize that learning requires more than just storage and retrieval of information and that prior knowledge needs to be tapped in order to make sense out of new experiences or information. **S:LS4:8:2.4** Use data and observations to support the concept that environmental or biological factors affect human body systems (biotic & abiotic) **S:LS4:6:3.1** Recognize that the length and quality of human life are influenced by many factors, including sanitation, diet, medical care, gender, genes, environmental conditions, and personal health behaviors.	Why is experience important to learning? What is disease? How do we get diseases? How does a single cell become a fully formed baby by birth?

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LS4	**S:LS4:8:3.3** Describe the major changes that occur over time in human development from single cell through embryonic development to new born (i.e., trimesters: 1st – group of cells, 2nd – organs form, 3rd – organs mature) **S:LS4:8:3.4** Using data provided, select evidence that supports the concept that genetic information is passed on from both parents to offspring.	Why are we like our parents?
LS5	None at this level	None at this level

GRADE: 7

Life Science

Essential Vocabulary	
CONTENT	**INQUIRY**
Cells	Describe
Organisms	Compare
Biodiversity	Explain
Ecosystem	Make predictions
Stability	Draw conclusions
Tissues /Organs	Compare and contrast
Organ systems	Select evidence
Grow	Support
Move	Use data and observations
Respond	Predict outcomes
Provide defense	Interpret
Reproduce	Cite examples
Maintain internal balance	
Characteristics of all living things	
Sexual reproduction	
Asexual reproduction	
Genetic information	
Abiotic/biotic factors	
Food web	
Decomposition	
Photosynthesis	
Respiration	
Classification system Dichotomous key	
Genetic variation	
Survival advantage	
Offspring	
Embryonic development	

GRADE: 7

Life Science

Suggested Resources/ Activities
Selected Chapter projects and activities as described in the textbook. DVD: National Geographic, “In The Womb” 2006. 2011 NECAP released inquiry task: “Fox and Rabbits.” 2009 NECAP released inquiry task: “Pond Weeds.” *(Not a hands on activity.)* 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) Science Matters: http://science-mattersblog.blogspot.com/ Middle School Science: http://www.middleschoolscience.com/