

LOOKING GOOD, FEELING GOOD: FROM THE INSIDE OUT – EXPLORING BONE, MUSCLE, AND SKIN		
New Hampshire Science GSEs: Grades 6 & 8		
Grade 6		
Lesson	Standard	GSE
2, 3, 4, 5, 6	S:SPS1:6:1.1	Make observations and record measurements using a variety of tools and instruments.
2, 3, 4, 5, 6	S:SPS1:6:1.2	Plan observations based on a given purpose.
1, 2, 3, 4, 5, 6	S:SPS1:6:1.3	Identify and investigate similarities and differences among observations and sets of observations.
1, 2, 3, 4, 5, 6	S:SPS1:6:1.8	Ask questions about relationships between and among observations.
1, 2, 3, 4, 5, 6	S:SPS1:6:1.9	Determine which observations will be helpful to a given investigation.
2, 6	S:SPS1:6:2.1	Design and record a simple step-by-step procedure to follow in order to carry out a fair test of a scientific question.
2, 4, 5, 6	S:SPS1:6:2.2	Identify and utilize appropriate tools/technology for collecting data in designing investigations.
2, 6	S:SPS1:6:2.3	Incorporate components of good experimental design, such as controls and multiple trials, into investigations.
2, 3, 4, 5, 6	S:SPS1:6:3.1	Carry out simple student or teacher-developed procedures or experiments.
2, 6	S:SPS1:6:3.2	Use appropriate tools to collect and record data.
2, 6	S:SPS1:6:3.3	Follow the teacher's instructions in performing experiments, following all appropriate safety rules and procedures.
2, 3, 4, 5, 6	S:SPS1:6:4.1	Use appropriate tools to organize, represent, analyze and explain data.
1, 2, 3, 4, 5, 6	S:SPS1:6:4.2	Make and record observations using a pre-determined format.
3, 4, 5, 6	S:SPS1:6:4.3	Compare and display data in a variety of student or computer generated formats (such as diagrams, flow charts, tables, bar graphs, line graphs, scatter plots, and histograms).
2, 3, 4, 5, 6	S:SPS1:6:4.4	Identify patterns and relationships in data and formulate basic explanations.
2, 3, 4, 5, 6	S:SPS1:6:4.5	Draw appropriate conclusions based on data collected.
2, 4, 5, 6	S:SPS1:6:5.1	Determine if the results of an experiment support or fail to support the scientific idea tested.
2, 4, 5, 6	S:SPS1:6:5.2	Explain how a hypothesis is a direct extension of a scientific idea and therefore makes that idea "testable."
2, 4, 5, 6	S:SPS2:6:1.2	Describe how results of similar and repeated investigations may vary and suggest possible explanations for variations.
2, 4, 5, 6	S:SPS2:6:1.3	Explain that sometimes similar investigations get different results because of unexpected differences in the things being investigated, the methods used, or the circumstances in which the investigation is carried out, and sometimes just because of uncertainties of observations.
2, 4, 5, 6	S:SPS2:6:1.4	Realize that if more than one variable changes at the same time in an experiment, the outcome of the experiment may not be clearly attributable to any one of the variables.
All lessons	S:SPS2:6:2.1	Recognize that thinking about things as systems means looking for how every part relates to others.

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2, 3, 4, 5, 6, 7	S:SPS2:6:2.3	Estimate or predict the effect that making a change in one part of the system will have on other parts, and on the system as a whole.
4	S:SPS2:6:2.4	Compare a variety of forms of energy, including heat, light, sound, mechanical, electrical, and chemical energy.
2, 4, 6	S:SPS2:6:3.1	Understand that models are often used to think about processes that happen too slowly, too quickly, or on too small a scale to observe directly; or that are too vast to be changed deliberately; or that are potentially dangerous.
2, 4, 5, 6	S:SPS2:6:4.1	Understand that things change in steady, repetitive, or irregular ways, or sometimes in more than one way at the same time; often the best way to tell which kinds of change are happening is to make a table or graph of measurements.
2, 3, 4, 5, 6, 7	S:SPS2:6:4.2	Discover how a system may stay the same because nothing is happening or because things are happening that exactly balance each other out.
All lessons	S:SPS2:6:5.1	Describe the structure and function of organs.
All lessons	S:SPS3:6:1.1	Work effectively within a cooperative group setting, accepting and executing assigned roles and responsibilities.
All lessons	S:SPS3:6:1.2	Work collectively within a group toward a common goal.
All lessons	S:SPS3:6:1.3	Demonstrate respect of one another's abilities and contributions to the group.
6	S:SPS3:6:2.1	Develop, focus and explain questions about the environment and do environmental investigations.
6	S:SPS3:6:2.2	Design environmental investigations to answer particular questions.
6	S:SPS3:6:2.3	Explore evidence that human-caused changes have consequences for the immediate environment as well as for other places and future times.
6	S:SPS3:6:2.4	Explore how humans shape and control the environment while creating knowledge and developing new technologies.
1, 2	S:LS1:6:2.2	Explain that the way in which cells function is similar in all organisms.
4, 5	S:LS1:6:2.3	Recognize that cells use energy obtain from food, to conduct the functions necessary to sustain life, such as cell growth.
All lessons	S:LS1:6:2.4	Recognize and describe the hierarchical organization of living systems, including cells, tissues, organs, organ systems, whole organisms, and ecosystems.
2, 3, 4, 5, 6	S:LS1:6:2.5	Explain that multicellular organisms have specialized cells, tissues, organs and organ systems that perform certain necessary functions, including digestion, respiration, reproduction, circulation, excretion, movement, control and coordination and protection from disease.
6	S:LS3:6:1.2	Explain how changes in environmental conditions can affect the survival of individual organisms and the entire species.
All lessons	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.
All lessons	S:LS4:6:1.2	Explain that people can learn about others from direct experience, from the media, and from listening to others talk about their life and work.
4, 5, 6	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.

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2, 3, 4, 5, 6	S:LS5:6:2.1	Demonstrate the appropriate use of tools, such as thermometers, probes, microscopes and computers to gather, analyze and interpret data in the life sciences.
4, 5, 6	S:LS5:6:3.3	Recognize that the quality of personal health can be influenced by society and technology.
Grade 8		
Lesson	Standard	GSE
2, 6	S:SPS1:8:1.1	Use appropriate tools to accurately collect and record both qualitative and quantitative data gathered through observations (e.g., temperature probes, electronic balances, spring scales, microscopes, stop watches).
1, 2, 3, 4, 5, 6	S:SPS1:8:1.3	Investigate similarities and differences noted when making observations.
2, 4, 5, 6	S:SPS1:8:1.6	Rephrase questions so that they can be tested or investigated using scientific methodologies.
1, 2, 3, 4, 5, 6	S:SPS1:8:1.7	Ask questions about relationships between and among observable variables.
2, 4, 5, 6	S:SPS1:8:2.1	Identify the manipulated, responding and controlled variables in an experiment.
6	S:SPS1:8:2.2	Design a controlled experiment, identifying and controlling the major variables.
2, 3, 4, 5, 6	S:SPS1:8:3.1	Use appropriate laboratory techniques to carry out student- or teacher-developed procedures or experiments.
2, 6	S:SPS1:8:3.2	Use appropriate tools to gather data as part of an investigation (e.g., ruler, meter stick, thermometer, spring scale, graduated cylinder, calipers, balance, probes, and microscopes).
2, 4, 5, 6	S:SPS1:8:3.3	Follow the teacher's instructions in performing experiments, following all appropriate safety rules and procedures.
2, 3, 4, 5, 6	S:SPS1:8:4.1	Use appropriate tools (including computer hardware and software) to collect, organize, represent, analyze and explain data.
2, 6	S:SPS1:8:4.2	Identify sources of error in experiments.
2, 3, 4, 5, 6	S:SPS1:8:4.3	Draw appropriate conclusions regarding the scientific question under investigation, based on the data collected.
2, 3, 4, 5, 6	S:SPS1:8:5.1	Determine if the results of an experiment support or refute the scientific idea tested.
2, 3, 4, 5, 6	S:SPS1:8:5.2	Evaluate whether the information and data collected allows an evaluation of the scientific idea under investigation.
2, 3, 4, 5, 6	S:SPS1:8:5.3	Determine what additional information would be helpful in answering the scientific question.
2, 3, 4, 5, 6	S:SPS2:8:1.1	Describe how scientific investigations usually involve the collection of relevant evidence, the use of logical reasoning, and the application of imagination in devising hypotheses and explanations to make sense of the collected evidence.
2, 6	S:SPS2:8:1.2	Realize that when similar investigations give different results, the scientific challenge is to judge whether the differences are trivial or significant, and this often requires more investigations.
3, 4, 5, 6	S:SPS2:8:1.3	Realize that knowledge, based on science, is subject to modification as new information challenges prevailing theories and as a new theory leads to looking at old observations in a new way.
4, 5, 6	S:SPS2:8:1.4	Provide examples that show how some scientific knowledge is very old and yet is still applicable today.
2, 3, 4, 5, 6, 7	S:SPS2:8:2.1	Understand that any system is usually connected to other systems, both internally and externally; thus a system may be thought of as containing subsystems and as being a subsystem of a larger system.
2, 3, 4, 5, 6, 7	S:SPS2:8:2.2	Analyze how the output of one part of a system, which can include materials, energy or information, can become the

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		input to other parts.
4	S:SPS2:8:2.4	Explain that when energy is transformed or converted from one type to another, there is no net loss of energy.
1, 2, 4, 6	S:SPS2:8:3.2	Know that different models can be used to represent the same thing; what kind of model is used and how complex it should be depends on its purpose; and the usefulness of a model is one of the instances in which intuition and creativity come into play in science, mathematics and engineering.
2, 3, 4, 5	S:SPS2:8:4.1	Analyze how physical and biological systems tend to change until they become stable and then stay that way unless their surroundings change.
2, 4	S:SPS2:8:4.2	Recognize how many systems contain feedback mechanisms that serve to keep changes within specified limits.
2, 3, 4, 5, 6, 7	S:SPS2:8:5.1	Describe the relationship between structure and function of organ systems in plants and animals.
2, 3, 4, 5, 6, 7	S:SPS2:8:5.2	Describe the structure and function of various organ systems (i.e., digestion, respiration, circulation, nervous, protection and support) and how these systems contribute to homeostasis of the organism.
All lessons	S:SPS3:8:1.1	Work effectively within a cooperative group setting, accepting and executing assigned roles and responsibilities.
All lessons	S:SPS3:8:1.2	Work collectively within a group toward a common goal.
All lessons	S:SPS3:8:1.3	Demonstrate respect of one another's abilities and contributions to the group.
4	S:SPS3:8:1.4	Demonstrate an understanding of the ethics involved in scientific inquiry.
6	S:SPS3:8:2.1	Locate and collect reliable information about the environment and environmental topics using a variety of methods and sources.
6	S:SPS3:8:2.2	Judge the weaknesses and strengths of the information they are using.
1, 2, 4, 6	S:SPS3:8:2.3	Explore the uses and limitations of models.
3, 4, 5, 6, 7	S:SPS4:8:1.1	Use a variety of information access tools to locate, gather, and organize potential sources of scientific information to answer questions.
6	S:SPS4:8:1.2	Collect real-time observations and data, synthesizing and building upon existing information (e.g., online databases, NOAA, EPA, USGS) to solve problems.
4, 5, 6	S:SPS4:8:1.3	Use appropriate tools to analyze and synthesize information (e.g., diagrams, flow charts, frequency tables, bar graphs, line graphs, stem-and-leaf plots) to draw conclusions and implications based on investigations of an issue or question.
2, 4, 5, 6	S:SPS4:8:3.1	Execute steps of scientific inquiry to engage in the problem-solving and decision making processes.
2, 3, 4, 5, 6, 7	S:SPS4:8:3.2	Apply new and unusual applications of existing knowledge to new and different situations.
2, 3, 7	S:SPS4:8:3.3	Make sketches, graphs, and diagrams to explain ideas and to demonstrate the interconnections between systems.
2, 6	S:SPS4:8:4.1	Formulate a scientific question about phenomena, a problem, or an issue and using a broad range of tools and techniques; and plan and conduct an inquiry to address the question.
1, 2, 3, 4, 5, 6	S:SPS4:8:4.2	Use evidence collected from observations or other sources and use them to create models and explanations.
3, 4, 5, 6, 7	S:SPS4:8:5.1	Use a variety of media tools to make oral and written presentations, which include written notes and descriptions, drawings, photos, and charts to communicate the procedures and results of an investigation.

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All lessons	S:SPS4:8:6.1	Work in diverse pairs/teams to answer questions, solve problems and make decisions.
7	S:SPS4:8:6.2	Plan and develop team science projects.
All lessons	S:SPS4:8:6.3	Articulate understanding of content through personal interaction and sharing with peers.
2, 6, 7	S:SPS4:8:8.1	Develop and execute a plan to collect and record accurate and complete data from various sources to solve a problem or answer a question; and gather and critically analyze data from a variety of sources.
2, 3, 4, 5, 6	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).
3, 4, 5, 6, 7	S:LS1:8:2.1	Identify the functions of the human body's systems, including digestion, respiration, reproduction, circulation, excretion, movement, control and coordination and protection from disease; and describe how they interact with one another.
2, 3, 7	S:LS1:8:2.3	Explain why it is beneficial for an organism to be able to regulate its internal environment while living in a constantly changing external environment.
2, 3, 4, 5, 6, 7	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.
6	S:LS3:8:1.1	Describe the type of impact certain environmental changes, including deforestation, invasive species, increased erosion, and pollution containing toxic substances, could have on local environments.
2, 4, 5, 6	S:LS4:8:2.1	Recognize that disease in organisms can be caused by intrinsic failures of the system or infection from other organisms.
2, 4, 5, 6, 7	S:LS4:8:2.4	Use data and observations to support the concept that environmental or biological factors affect human body systems (biotic and abiotic).
2, 5, 6, 7	S:LS5:8:2.1	Recognize and provide examples of how technology has enhanced the study of life sciences, as in the development of advanced diagnosing equipment improving medicine.
4, 5, 6	S:LS5:8:4.1	Understand that some scientific jobs/careers involve the application of life science content knowledge and experience in specific ways that meet the goals of the job.

New Hampshire Mathematics GSEs: Grades 6 – 8

Grade 6

Lesson	Standard	GSE
4, 5, 6	M:N&O:6:1	Demonstrates conceptual understanding of rational numbers with respect to ratios (comparison of two whole numbers by division a/b , $a : b$, and $a \div b$, where $b \neq 0$); and rates (e.g., a out of b, 25%) using models, explanations, or other representations.
4, 5, 6	M:N&O:6:3	Demonstrates conceptual understanding of mathematical operations by adding and subtracting positive fractions and integers; and multiplying and dividing fractions and decimals.
4, 5, 6	M:N&O:6:4	Accurately solves problems involving single or multiple operations on fractions (proper, improper, and mixed), or

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		decimals; and addition or subtraction of integers; percent of a whole; or problems involving greatest common factor or least common multiple.
4, 5, 6	M:N&O:6:6	Uses a variety of mental computation strategies to solve problems (e.g., using compatible numbers, applying properties of operations, using mental imagery, using patterns) and to determine the reasonableness of answers
2	M:N&O:6:7	Makes estimates in a given situation by identifying when estimation is appropriate, selecting the appropriate method of estimation, determining the level of accuracy needed given the situation, analyzing the effect of the estimation method on the accuracy of results, and evaluating the reasonableness of solutions appropriate to grade level GLEs across content strands.
4, 5, 6	M:N&O:6:8	Applies properties of numbers (odd, even, positive, negative, remainders, divisibility, and prime factorization) and field properties (commutative, associative, identity [including the multiplicative property of one, e.g., $1 = 2/2$ and $2/2 \times 3/4 = 6/8$, so $3/4 = 6/8$], distributive, and additive inverses) to solve problems and to simplify computations.
2, 6	M:G&M:6:7	Measures and uses units of measures appropriately and consistently, and makes conversions within systems when solving problems across the content strands.
4, 5, 6	M:F&A:6:1	Identifies and extends to specific cases a variety of patterns (linear and nonlinear) represented in models, tables, sequences, graphs, or in problem situations
4, 5, 6	M:DSP:6:1	Interprets a given representation (circle graphs, line graphs, or stem-and-leaf plots) to answer questions related to the data, to analyze the data to formulate or justify conclusions, to make predictions, or to solve problems.
4, 5, 6	M:DSP:6:3	Organizes and displays data using tables, line graphs, or stem-and-leaf plots to answer questions related to the data, to analyze the data to formulate or justify conclusions, to make predictions, or to solve problems.
4, 5, 6	M:DSP:6:6	In response to a teacher or student generated question or hypothesis decides the most effective method (e.g., survey, observation, experimentation) to collect the data (numerical or categorical) necessary to answer the question; collects, organizes, and appropriately displays the data; analyzes the data to draw conclusions about the question or hypothesis being tested, and when appropriate makes predictions; and asks new questions and makes connections to real world situations.
4, 5, 6	M:PRP:8:1	Students will use problem-solving strategies to investigate and understand increasingly complex mathematical content and be able to: <ul style="list-style-type: none"> ▪ Use problem-solving strategies appropriately and effectively for a given situation. ▪ Determine, collect and organize the relevant information needed to solve real-world problems. ▪ Apply integrated problem-solving strategies to solve problems in the physical, natural, and social sciences and in pure mathematics. ▪ Use technology when appropriate to solve problems. ▪ Reflect on solutions and the problem-solving process for a given situation and refine strategies as needed.
4, 5, 6	M:PRP:8:2	Students will use mathematical reasoning and proof and be able to: <ul style="list-style-type: none"> ▪ Draw logical conclusions and make generalizations using deductive and inductive reasoning. ▪ Formulate, test, and justify mathematical conjectures and arguments. ▪ Construct and determine the validity of a mathematical argument or a solution. ▪ Apply mathematical reasoning skills in other disciplines.
4, 5, 6	M:CCR:8:1	Students will communicate their understanding of mathematics and be able to:

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		<ul style="list-style-type: none"> ▪ Articulate ideas clearly and logically in both written and oral form. ▪ Present, share, explain, and justify thinking with others and build upon the ideas of others to solve problems. ▪ Use mathematical symbols and notation. ▪ Formulate questions, conjectures, definitions, and generalizations about data, information, and problem situations.
4, 5, 6	M:CCR:8:2	<p>Students will create and use representations to communicate mathematical ideas and to solve problems and be able to:</p> <ul style="list-style-type: none"> ▪ Use models and technology to develop equivalent representations of the same mathematical concept. ▪ Use and create representations to solve problems and organize their thoughts and ideas. ▪ Convert between representations (e.g., a table of values, an equation, and a graph may all be representations of the same function).
Grade 7		
Lesson	Standard	GSE
4, 5, 6	M:N&O:7:1	Demonstrates conceptual understanding of rational numbers with respect to square roots of perfect squares, rates, and proportional reasoning.
4, 5, 6	M:N&O:7:1	Demonstrates conceptual understanding of rational numbers with respect to percents as a means of comparing the same or different parts of the whole when the wholes vary in magnitude (e.g., 8 girls in a classroom of 16 students compared to 8 girls in a classroom of 20 students, or 20% of 400 compared to 50% of 100); and percents as a way of expressing multiples of a number (e.g., 200% of 50) using models, explanations, or other representations.
4, 5, 6	M:N&O:7:3	Demonstrates conceptual understanding of operations with integers and whole number exponents (where the base is a whole number) using models, diagrams, or explanations.
4, 5, 6	M:N&O:7:4	Accurately solves problems involving the addition or subtraction of integers
4, 5, 6	M:N&O:7:5	Accurately solves problems involving proportional reasoning; percents involving discounts, tax, or tips; and rates.
4, 5, 6	M:N&O:7:6	Uses a variety of mental computation strategies to solve problems (e.g., using compatible numbers, applying properties of operations, using mental imagery, using patterns) and to determine the reasonableness of answers
2	M:N&O:7:7	Makes estimates in a given situation (including tips, discounts, and tax) by identifying when estimation is appropriate, selecting the appropriate method of estimation, determining the level of accuracy needed given the situation, analyzing the effect of the estimation method on the accuracy of results, and evaluating the reasonableness of solutions appropriate to grade level GLEs across content strands.
4, 5, 6	M:N&O:7:8	Applies properties of numbers (odd, even, positive, negative, remainders, divisibility, and prime factorization) and field properties (commutative, associative, identity, distributive, inverses) to solve problems and to simplify computations, and demonstrates conceptual understanding of field properties as they apply to subsets of the real numbers (e.g., the set of whole numbers does not have additive inverses, the set of integers does not have multiplicative inverses).
4, 5, 6	M:F&A:7:1	Identifies and extends to specific cases a variety of patterns (linear and nonlinear) represented in models, tables, sequences, graphs, or in problem situations
4, 5, 6	M:DSP:7:1	Interprets a given representation (circle graphs, scatter plots that represent discrete linear relationships, or

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		histograms) to analyze the data to formulate or justify conclusions, to make predictions, or to solve problems.
4, 5, 6	M:DSP:7:3	Organizes and displays data using tables, line graphs, scatter plots, and circle graphs to answer questions related to the data, to analyze the data to formulate or justify conclusions, to make predictions, or to solve problems.
4, 5, 6	M:DSP:7:6	In response to a teacher or student generated question or hypothesis decides the most effective method (e.g., survey, observation, experimentation) to collect the data (numerical or categorical) necessary to answer the question; collects, organizes, and appropriately displays the data; analyzes the data to draw conclusions about the question or hypothesis being tested while considering the limitations that could affect interpretations; and when appropriate makes predictions; and asks new questions and makes connections to real world situations.
4, 5, 6	M:PRP:8:1	Students will use problem-solving strategies to investigate and understand increasingly complex mathematical content and be able to: <ul style="list-style-type: none"> ▪ Use problem-solving strategies appropriately and effectively for a given situation. ▪ Determine, collect and organize the relevant information needed to solve real-world problems. ▪ Apply integrated problem-solving strategies to solve problems in the physical, natural, and social sciences and in pure mathematics. ▪ Use technology when appropriate to solve problems. ▪ Reflect on solutions and the problem-solving process for a given situation and refine strategies as needed.
4, 5, 6	M:PRP:8:2	Students will use mathematical reasoning and proof and be able to: <ul style="list-style-type: none"> ▪ Draw logical conclusions and make generalizations using deductive and inductive reasoning. ▪ Formulate, test, and justify mathematical conjectures and arguments. ▪ Construct and determine the validity of a mathematical argument or a solution. ▪ Apply mathematical reasoning skills in other disciplines.
4, 5, 6	M:CCR:8:1	Students will communicate their understanding of mathematics and be able to: <ul style="list-style-type: none"> ▪ Articulate ideas clearly and logically in both written and oral form. ▪ Present, share, explain, and justify thinking with others and build upon the ideas of others to solve problems. ▪ Use mathematical symbols and notation. ▪ Formulate questions, conjectures, definitions, and generalizations about data, information, and problem situations.
4, 5, 6	M:CCR:8:2	Students will create and use representations to communicate mathematical ideas and to solve problems and be able to: <ul style="list-style-type: none"> ▪ Use models and technology to develop equivalent representations of the same mathematical concept. ▪ Use and create representations to solve problems and organize their thoughts and ideas. ▪ Convert between representations (e.g., a table of values, an equation, and a graph may all be representations of the same function).
Grade 8		
Lesson	Standard	GSE
4, 5, 6	M:N&O:8:4	Accurately solves problems involving proportional reasoning (percent increase or decrease, interest rates, markups, or rates); multiplication or division of integers.
4, 5, 6	M:N&O:8:6	Uses a variety of mental computation strategies to solve problems (e.g., using compatible numbers, applying

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		properties of operations, using mental imagery, using patterns) and to determine the reasonableness of answers
2	M:N&O:8:7	Makes estimates in a given situation (including tips, discounts, tax, and the value of a non-perfect square root as between two whole numbers) by identifying when estimation is appropriate, selecting the appropriate method of estimation; determining the level of accuracy needed given the situation; analyzing the effect of the estimation method on the accuracy of results; and evaluating the reasonableness of solutions appropriate to grade level GLEs across content strands.
4, 5, 6	M:N&O:8:8	Applies properties of numbers (odd, even, positive, negative, remainders, divisibility, and prime factorization) and field properties (commutative, associative, identity [including the multiplicative property of one, e.g., $20 \times 23 = 20+3 = 23$, so $20 = 1$], distributive, inverses) to solve problems and to simplify computations, and demonstrates conceptual understanding of field properties as they apply to subsets of real numbers when addition and multiplication are not defined in the traditional ways.
4, 5, 6	M:F&A:8:1	Identifies and extends to specific cases a variety of patterns (linear and nonlinear) represented in models, tables, sequences, graphs, or in problem situations.
4, 5, 6	M:DSP:8:1	Interprets a given representation (line graphs, scatter plots, histograms, or box-and-whisker plots) to analyze the data to formulate or justify conclusions, to make predictions, or to solve problems.
4, 5, 6	M:DSP:8:6	In response to a teacher or student generated question or hypothesis decides the most effective method (e.g., survey, observation, experimentation) to collect the data (numerical or categorical) necessary to answer the question; collects, organizes, and appropriately displays the data; analyzes the data to draw conclusions about the question or hypothesis being tested while considering the limitations that could affect interpretations; and when appropriate makes predictions; and asks new questions and makes connections to real world situations.
4, 5, 6	M:PRP:8:1	Students will use problem-solving strategies to investigate and understand increasingly complex mathematical content and be able to: <ul style="list-style-type: none"> ▪ Use problem-solving strategies appropriately and effectively for a given situation. ▪ Determine, collect and organize the relevant information needed to solve real-world problems. ▪ Apply integrated problem-solving strategies to solve problems in the physical, natural, and social sciences and in pure mathematics. ▪ Use technology when appropriate to solve problems. ▪ Reflect on solutions and the problem-solving process for a given situation and refine strategies as needed.
4, 5, 6	M:PRP:8:2	Students will use mathematical reasoning and proof and be able to: <ul style="list-style-type: none"> ▪ Draw logical conclusions and make generalizations using deductive and inductive reasoning. ▪ Formulate, test, and justify mathematical conjectures and arguments. ▪ Construct and determine the validity of a mathematical argument or a solution. ▪ Apply mathematical reasoning skills in other disciplines.
4, 5, 6	M:CCR:8:1	Students will communicate their understanding of mathematics and be able to: <ul style="list-style-type: none"> ▪ Articulate ideas clearly and logically in both written and oral form. ▪ Present, share, explain, and justify thinking with others and build upon the ideas of others to solve problems. ▪ Use mathematical symbols and notation. ▪ Formulate questions, conjectures, definitions, and generalizations about data, information, and problem situations.

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4, 5, 6	M:CCR:8:2	<p>Students will create and use representations to communicate mathematical ideas and to solve problems and be able to:</p> <ul style="list-style-type: none"> ▪ Use models and technology to develop equivalent representations of the same mathematical concept. ▪ Use and create representations to solve problems and organize their thoughts and ideas. ▪ Convert between representations (e.g., a table of values, an equation, and a graph may all be representations of the same function).
New Hampshire Reading GSEs: Grades 6 – 8		
Lesson	Standard	GSE
All lessons	R:V:6:1.1 R:V:7:1.1 R—8—2.1	Students identify the meaning of unfamiliar vocabulary by using strategies to unlock meaning (e.g., knowledge of word structure, including prefixes/suffixes and base words; or context clues; or other resources, such as dictionaries, glossaries, thesauruses; or prior knowledge).
All lessons	R:V:6:2.2 R:V:7:2.2 R—8—3.2	Selecting appropriate words or explaining the use of words in context, including content specific vocabulary, words with multiple meanings, or precise vocabulary.
All lessons	R:IT:6:1.1 R:IT:7:1.1 R—8—7.1	Obtaining information from text features (e.g., table of contents, glossary, index, transition words /phrases, bold or italicized text, headings, subheadings, graphic organizers, charts, graphs, or illustrations).
All lessons	R:IT:6:1.2 R:IT:7:1.2 R—8—7.2	Using information from the text to: answer questions related to main/central ideas or key details (6); answer questions, to state the main/central ideas, or to provide supporting details (7 & 8).
All lessons	R:IT:6:1.3 R:IT:7:1.3 R—8—7.3	Organizing information to show understanding (e.g., representing main/central ideas or details within text through charting, mapping, paraphrasing, summarizing, or comparing/contrasting [6 & 7] or outlining [8]).
All lessons	R—6—7.4 R—7—7.4 R—8—7.4	Generating questions before, during, and after reading to enhance understanding and recall; expand understanding and/or gain new information.
All lessons	R:IT:6:2.1 R:IT:7:2.1 R—8—8.1	Connecting information within a text, across texts (6), or to related ideas (7 & 8).
All lessons	R:IT:6:2.2 R:IT:7:2.2 R—8—8.2	Synthesizing information within or across text(s) (e.g., constructing appropriate titles; or formulating assertions or controlling ideas.
All lessons	R:IT:6:2.3 R:IT:7:2.3 R—8—8.3	Drawing inferences about text, including author’s purpose (e.g., to inform, explain, entertain, persuade) or message; or forming and supporting opinions/judgments and assertions about central ideas that are relevant.
All lessons	R:IT:6:2.4	Distinguishing fact from opinion, and identifying possible bias/propaganda (6) or conflicting information within or

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	R:IT:7:2.4 R—7—8.4	across texts (7 & 8).
All lessons	R:IT:6:2.5 R:IT:7:2.5 R—8—8.5	Making inferences about causes or effects.
All lessons	R—6—13 R—7—13 R—8—13	Uses comprehension strategies (flexibly and as needed) before, during, and after reading literary and informational text.
All lessons	R—6—15.2 R—7—15.2 R—8—15.2	Evaluating information presented, in terms of relevance.
All lessons	R—6—15.3 R—7—15.3 R—8—15.3	Gathering, organizing, and interpreting the information.
All lessons	R—6—15.4 R—7—15.4 R—8—15.4	Using evidence to support conclusions.
All lessons	R—6—17.2 R—7—17.2 R—8—17.2	Participating in in-depth discussions about text, ideas, and student writing by offering comments and supporting evidence, recommending books and other materials, and responding to the comments and recommendations of peers, librarians, teachers, and others.
New Hampshire Writing & Oral Communication GSEs: Grades 6 – 8		
Lesson	Standard	GSE
All lessons	W—6—1.1 W:SL:7:1.1 W—8—1.1	Using varied sentence length and structure to enhance meaning (e.g., including phrases and clauses).
All lessons	W—6—1.2 W:SL:7:1.2 W—8—1.2	Using the paragraph form: indenting, main idea, supporting details.
All lessons	W—6—1.4 W:SL:7:1.4 W—8—1.4	Applying a format and text structure appropriate to the purpose of the writing
All lessons	W—6—2.1 W:RC:7:1.1 W—8—2.1	Selecting appropriate information to set context/background (6). Selecting and summarizing key ideas to set context (7 & 8).
All lessons	W—6—2.3 W:RC:7:1.3 W—8—2.3	Connecting what has been read (plot/ideas/concepts) to prior knowledge, other texts (6), or the broader world of ideas (7 & 8) by referring to (6) and explaining (7 & 8) relevant ideas.

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All lessons	W—6—3.1 W:RC:7:2.1 W—8—3.1	Stating and maintaining a focus (purpose), a firm judgment, or point of view when responding to a given question.
All lessons	W—6—3.3 W:RC:7:2.3 W—8—3.3	Using specific details and references to text or relevant citations to support focus or judgment.
All lessons	W—6—3.4 W:RC:7:2.4 W—8—3.4	Organizing ideas, using transition words/phrases and writing a conclusion that provides closure.
All lessons	W—6—6.1 W:IW:7:1.1 W—8—6.1	Using an organizational text structure appropriate to focus/controlling idea.
All lessons	W—6—7.1 W:IW:7:2.1 W—8—7.1	Establishing a topic.
All lessons	W—6—7.2 W:IW:7:2.2 W—8—7.2	Stating and maintaining a focus/controlling idea.
All lessons	W:IW:7:2.3 W—8—7.3	Writing with a sense of audience, when appropriate.
All lessons	W—6—8.1 W:IW:7:3.1 W—8—8.1	Including facts and details relevant to focus/controlling idea, and excluding extraneous information.
All lessons	W—6—8.2 W:IW:7:3.2 W—8—8.2	Including sufficient details or facts for appropriate depth of information: naming, describing, explaining, comparing, use of visual images.
All lessons	W:IW:7:3.4 W—8—8.4	Commenting on the significance of information, when appropriate.
All lessons	W—6—9.4	Using punctuation to clarify meaning.
All lessons	W:C:7:1.1 W—8—9.4	Applying rules of standard English usage to correct grammatical errors.
All lessons	W—6—9.5 W:C:7:2.5 W—8—9.5	Correctly spelling grade-appropriate, high-frequency words, including homonyms and homophones and applying syllables and affix spelling patterns/rules (6). Correctly spelling grade-appropriate, high-frequency words and applying conventional spelling patterns/rules (7). Applying conventional and word-derivative spelling patterns/rules (8).
All lessons	W—6—11.4 W—7—11.4 W—8—11.4	Writing in a variety of genres.

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All lessons	OC—6—1.1 OC—7—1.1 OC—8—1.1	Following verbal instructions to perform specific tasks, to answer questions, or to solve problems.
All lessons	OC—6—1.2 OC—7—1.2 OC—8—1.2	Summarizing, paraphrasing, questioning, or contributing to information presented.
All lessons	OC—6—1.4 OC—7—1.4 OC—8—1.4	Participating in large and small group discussions showing respect for a range of individual ideas.

New Hampshire Health Education GSEs: Middle School

Lesson	Standard	Descriptor
4, 5	NUT:1.1	Know the benefits of healthful eating (short-term and long-term benefits and risks).
5	NUT:1.3	Know the benefits of consuming more water, fruits, vegetables, grains, and calcium-rich foods.
5	NUT:1.6	Know how to assess personal nutritional needs, preferences, and practices.
4, 5	NUT:4.2	Know how energy is expended during exercise/physical activity.
4, 5	PA:1.1	Know the benefits and risks of physical activity, including mental and social benefits.
4, 5	PA:1.5	Know the physiological responses to physical activity (energy expenditure, heart rate, respiratory rate, resting heart rate).
4, 5, 6, 7	FLS:1.1	Know ways to communicate respect for self and others.
All lessons	MH:3.2	Know skills for effective speaking, e.g., I-statements, eye contact, assertiveness.
All lessons	MH:3.3	Know skills for effective listening, e.g., reflective listening.
6	PCH:2.2	Know the importance of using sunscreen.
7	CEH:1.1	Know home, school, and community resources to promote health, e.g., library, Internet, health department, voluntary agencies.
6	CEH:2.1	Know environmental health risks.