

USING TECHNOLOGY TO STUDY CELLULAR AND MOLECULAR BIOLOGY		
New Hampshire Science GSEs: Grades 9 – 11		
Lesson	Standard	GSE
2, 3	S:SPS1:11:1.1	Ask questions about relationships among variables that can be observed directly as well as those that cannot.
3	S:SPS1:11:2.1	Apply scientific theories and laws to new situations to generate hypotheses.
3	S:SPS1:11:2.2	State a hypothesis and prediction based on available evidence and background information.
1, 2, 3	S:SPS1:11:3.1	Select and use apparatus and material safely.
1, 2, 3	S:SPS1:11:3.2	Use instruments effectively and accurately for collecting data.
1, 2, 3	S:SPS1:11:3.3	Compile and organize data, using appropriate units.
1, 3	S:SPS1:11:4.1	Compile and display data, evidence and information by hand and computer, in a variety of formats, including diagrams, flow charts, tables, graphs and scatter plots.
3	S:SPS1:11:5.1	Explain how data support or refute the hypothesis or prediction.
3	S:SPS1:11:5.2	Provide a statement that addresses and answers the question investigated in light of the evidence generated in the investigation.
3	S:SPS2:11:1.1	Explore new phenomena through investigations conducted for different reasons, or to check on previous results.
3	S:SPS2:11:1.4	Show how hypotheses are widely used in science for choosing what data to pay attention to and what additional data to seek, and for guiding the interpretation of the data (both new and previously available).
1, 2	S:SPS2:11:1.6	Show how the usefulness of a model can be tested by comparing its predictions to actual observations in the real world; but a close match does not mean that the model is the only “true” model or the one that would work.
3	S:SPS2:11:1.7	Realize that in science, the testing, revising, and occasional discarding of theories, new and old, never ends; this ongoing process leads to an increasingly better understanding of how things work in the world but not to absolute truth.
3	S:SPS2:11:2.1	Realize that systems may be so closely related that there is no way to draw boundaries that separate all parts of one from all parts of the others.
2	S:SPS2:11:4.2	Describe how graphs and equations are useful (and often equivalent) ways for depicting and analyzing patterns of change.
3	S:SPS2:11:5.5	Discover how the shape of large molecules affects the interaction with other molecules.
All lessons	S:SPS3:11:2.4	Apply basic logic and reasoning skills to evaluate completeness and reliability in a variety of information sources.
3	S:SPS3:11:2.7	Use to evidence and logic in developing proposed explanations that address their initial questions and hypotheses.
All lessons	S:SPS4:12:1.1	Select and analyze information from various sources (including electronic resources, print resources, and community resources) and personally collected data to answer questions being investigated.
3	S:SPS4:12:1.2	Collect and use qualitative and quantitative data and information, seek evidence and sources of information to

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		identify flaws such as errors and bias, and explain how the evidence supports or refutes an initial hypothesis.
3, 4	S:SPS4:12:2.1	Select and use appropriate scientific vocabulary to orally share and communicate scientific ideas, plans, results, and conclusions resulting from investigations.
3, 4	S:SPS4:12:2.2	Create written reports and journals to share and communicate scientific ideas, plans, results, and conclusions resulting from observations and investigations.
1, 2, 3	S:SPS4:12:3.1	Pursue scientific inquiry such as observation, measurement, hypothesis formation and analysis, and value “habits of mind” such as persistence, accuracy, and collaboration.
3	S:SPS4:12:3.2	Generate solutions to scientific questions and challenges through developing, modeling and revising investigations.
3, 4	S:SPS4:12:3.3	Apply scientific knowledge and skills to make reasoned decisions about the use of science and scientific innovations.
3	S:SPS4:12:4.1	Formulate scientific questions about an issue and define experimental procedures for finding answers.
3	S:SPS4:12:4.2	Plan and conduct practical tests to solve problems or answer a question, collect and analyze data using appropriate instruments and techniques safely and accurately.
3	S:SPS4:12:4.3	Develop models and explanations to fit evidence obtained through investigations.
3	S:LS1:11:2.2	Recognize how cell functions are regulated through changes in the activity of the functions performed by proteins, and through the selective expression of individual genes; and explain how this regulation allows cells to respond to their environment and to control and coordinate cell growth and division.
3	S:LS4:11:2.1	Explain that disease in organisms can be caused by intrinsic failures of the system or infection by other organisms, and describe as well as provide examples of how some diseases are caused by: the breakdown in cellular function, congenital conditions, genetic disorders, malnutrition, and emotional health, including stress.
1, 3, 4	S:LS4:11:2.3	Describe and provide examples of how new medical techniques, efficient health care delivery systems, improved sanitation, and a more complete understanding of the nature of disease provides today’s humans a better chance of staying healthier than their forebears.
1, 3, 4	S:LS5:11:1.1	Describe ways in which technology has increased our understanding of the life sciences.
1, 3, 4	S:LS5:11:1.2	Understand that technology is designed with a particular function in mind, and principles of life science are useful in creating technology for the life sciences.
1, 3	S:LS5:11:2.1	Describe the use and benefits of equipment such as light microscopes, transmission electron microscopes, scanning electron microscopes, spectrophotometers, probes, and robotics to the study of the life sciences.
3	S:LS5:11:4.1	Explain the kinds of applications of knowledge and skills necessary for jobs/careers specific to the life sciences.

New Hampshire Mathematics GSEs: High School

Lesson	Standard	GSE
1	M:N&O:HS:2	Demonstrates understanding of the relative magnitude of real numbers by solving problems that involve ordering or comparing elements of any subset of the real numbers.
1	M:N&O:HS:4	Accurately solves problems involving rational numbers within mathematics, across content strands, disciplines or

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		contexts (with emphasis on, but not limited to, proportions, percents, ratios, and rates).
1	M:N&O:HS: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.
1	M:G&M:10:7	Uses units of measure appropriately and consistently when solving problems across content strands; makes conversions within or across systems and makes decisions concerning an appropriate degree of accuracy in problem situations involving measurement in other GSEs.
1	M:F&A:10:1	Identifies, extends, and generalizes a variety of patterns (linear and nonlinear) represented by models, tables, sequences, or graphs in problem solving situations.
2	M:DSP:10:1	Interprets a given representation(s) (e.g., box-and-whisker plots, scatter plots, bar graphs, line graphs, circle graphs, histograms, frequency charts) to make observations, to answer questions, to analyze the data to formulate or justify conclusions, critique conclusions, make predictions, or to solve problems within mathematics or across disciplines or contexts (e.g., media, workplace, social and environmental situations).
1	M:PRP:HS:1	Use problem-solving strategies to investigate and understand increasingly complex mathematical content and be able to: <ul style="list-style-type: none"> ▪ Expand the repertoire of problem-solving strategies and use those strategies in more sophisticated ways. ▪ Use technology whenever appropriate to solve real-world problems (e.g., personal finance, wages, banking and credit, home improvement problems, measurement, taxes, business situations, purchasing, and transportation). ▪ Formulate and redefine problem situations as needed to arrive at appropriate conclusions
1	M:CCR:HS:1	Communicate their understanding of mathematics and be able to: <ul style="list-style-type: none"> ▪ Explain and justify their thinking and develop increasingly sophisticated questions for given problem-situations. ▪ Critique and follow the logic of arguments presented within mathematics and across disciplines.
1	M:CCR:HS:2	Create and use representations to communicate mathematical ideas and to solve problems and be able to: <ul style="list-style-type: none"> ▪ Choose appropriate representations and mathematical language (e.g., spreadsheets, geometric models, algebraic symbols, tables, graphs, matrices) to present ideas clearly and logically for a given situation. ▪ See a common structure in mathematical phenomena that come from very different contexts (e.g., the sum of the first n odd natural numbers, the areas of square gardens, and the distance traveled by a vehicle that starts at rest and accelerates at a constant rate can be represented by functions of the form $f(x) = ax^2$). ▪ Find representations that model essential features of a mathematical situation (e.g., cost of postage can be modeled by a step-function). ▪ Use representations as a primary means for expressing and understanding more abstract mathematical concepts.
1, 2	M:CCR:HS:3	Recognize, explore, and develop mathematical connections and be able to: <ul style="list-style-type: none"> ▪ Explain in oral or written form how mathematics connects to other disciplines, to daily life, careers, and society (e.g., geometry in art and literature, data analysis in social studies, and exponential growth in finance). ▪ Explain multiple approaches that lead to equivalent results when solving problems.

New Hampshire Reading GSEs: Grade 10		
Lesson	Standard	GSE
2, 3, 4	R—10—1.1	Identifying multi-syllabic words by using knowledge of sounds, syllable division, and word patterns
2, 3, 4	R:V:10:1.1	Using strategies to unlock meaning (e.g., prior knowledge of word structure) including prefixes/suffixes, common roots, or word origins; or context clues; or resources including dictionaries, glossaries, or thesauruses to determine definition, pronunciation, etymology, or usage of words).
2, 3, 4	R:V:10:1.2	Using strategies to unlock meaning including base words, general and specialized print or electronic resources to determine definition, pronunciation, etymology, or usage of words; or prior knowledge.
2, 3, 4	R:V:10:2.2	Selecting appropriate words or explaining the use of words in context, including connotation or denotation shades of meanings of words/nuances, or idioms; or use of content-specific vocabulary, words with multiple meanings, precise language, or technical vocabulary.
2, 3, 4	R:IT:10:1.1	Obtaining information from text features [e.g., table of contents, glossary, index, transition words/phrases, transitional devices (including use of white space), bold or italicized text, headings, subheadings, graphic organizers, charts, graphs, or illustrations].
2, 3, 4	R:IT:10:1.2	Using information from the text to answer questions; to state the main/central ideas; to provide supporting details; to explain visual components supporting the text; or, to interpret maps, charts, timelines, tables, or diagrams.
2, 3, 4	R:IT:10:1.3	Organizing information to show understanding or relationships among facts, ideas, and events (e.g., representing main/central ideas or details within text through charting, mapping, paraphrasing, summarizing, comparing/contrasting, outlining.
2, 3, 4	R—10—7.4	Generating questions before, during, and after reading to enhance understanding and recall; expand understanding and/or gain new information.
2, 3, 4	R:IT:10:2.1	Explaining connections about information within a text, across texts, or to related ideas
2, 3, 4	R:IT:10:2.2	Synthesizing and evaluating information within or across text(s) (e.g., constructing appropriate titles; or formulating assertions or controlling ideas).
2, 3, 4	R:IT:10:2.3	Drawing inferences about text, including author's purpose (e.g., to inform, explain, entertain, persuade) or message; or explaining how purpose may affect the interpretation of the text; or using supporting evidence to form or evaluate opinions/judgments and assertions about central ideas that are relevant.
2, 3, 4	R:IT:10:2.4	Distinguishing fact from opinion, and evaluating possible bias/propaganda or conflicting information within or across texts.
2, 3, 4	R:IT:10:2.5	Making inferences about causes and/or effects.
2, 3, 4	R —10—13	Uses comprehension strategies (flexibly and as needed) before, during, and after reading literary and informational text.
2, 3, 4	R—10—15.1	Identifying and evaluating potential sources of information.
2, 3, 4	R—10—15.3	Organizing, analyzing, and interpreting the information.

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2, 3, 4	R—10—15.4	Drawing conclusions/judgments and supporting them with evidence.
2, 3, 4	R—10—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: Grade 10		
Lesson	Standard	GSE
3, 4	W—10—11.4	Writing in a variety of genres.
3, 4	W:SL:10:1.1	Using varied sentence length and structure to enhance meaning (e.g., including phrases and clauses).
3, 4	W:SL:10:1.4	Applying a format and text structure appropriate to purpose, audience, and context.
3, 4	W:RC:10:1.1	Selecting and summarizing key ideas to set context, appropriate to audience.
3, 4	W:RC:10:1.3	Connecting what has been read (plot/ideas/concepts) to prior knowledge, other texts, or the broader world of ideas, by referring to and explaining relevant ideas or themes.
3, 4	W:RC:10:2.1a	Establishing an interpretive claim/assertion in the form of a thesis (purpose), when responding to a given prompt.
3, 4	W:RC:10:2.2	Making inferences about the relationship(s) among content, events, characters, setting, theme, or author’s craft.
3, 4	W:RC:10:2.3	Using specific details and references to text or relevant citations to support thesis, interpretations, or conclusions.
3, 4	W:RC:10:2.4	Organizing ideas, using transitional words/phrases and drawing a conclusion by synthesizing information (e.g., demonstrate a connection to the broader world of ideas).
3, 4	E:EW:10:5.1	Engaging the reader by establishing context (purpose).
3, 4	E:EW:10:5.4	Using a range of elaboration techniques (i.e., questioning, comparing, connecting, interpreting, analyzing, or describing) to establish a focus.
3, 4	W:IW:10:1.1	Using a text structure appropriate to focus/controlling idea or thesis (e.g., purpose, audience, context).
3, 4	W:IW:10:1.2	Selecting appropriate and relevant information (excluding extraneous details) to set context.
3, 4	W:IW:10:2.1	Establishing a topic.
3, 4	W:IW:10:2.2	Stating and maintaining a focus/controlling idea/thesis.
3, 4	W:IW:10:2.3	Writing with a sense of audience, when appropriate.
3, 4	W:IW:10:2.5	Using precise and descriptive language that clarifies and supports intent.
3, 4	W:IW:10:3.1	Including facts and details relevant to focus/controlling idea or thesis, and excluding extraneous information.
3, 4	W:IW:10:3.2	Including sufficient details or facts for appropriate depth of information: naming, describing, explaining, comparing, contrasting, or using visual images to support intended purpose.
3, 4	W:IW:10:3.4	Commenting on the significance of the information (in reports, throughout the piece; in procedural or persuasive writing, as appropriate).
3, 4	W:C:10:1.1	Applying rules of standard English usage to correct grammatical errors.

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3, 4	W:C:10:1.4	Applying appropriate punctuation to various sentence patterns to enhance meaning.
3, 4	OC—10—1.1	Following verbal instructions, to perform specific tasks, to answer questions, or to solve problems.
All lessons	OC—10—1.2	Summarizing, paraphrasing, questioning, or contributing to information presented.
All lessons	OC—10—1.4	Participating in large and small group discussions showing respect for a range of individual ideas.
All lessons	OC—10—1.5	Reaching consensus to solve a problem, make a decision, or achieve a goal.
All lessons	OC—10—2.1	Exhibiting logical organization and language use, appropriate to audience, context, and purpose.
New Hampshire Health Education GSEs: High School		
Lesson	Standard	Descriptor
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.