

NEW HAMPSHIRE ALIGNMENT FOR NIH SUPPLEMENT HUMAN GENETIC VARIATION

<b>HUMAN GENETIC VARIATION</b>		
<b>New Hampshire Science GSEs: Grades 9 – 11</b>		
<b>Activity</b>	<b>Standard</b>	<b>GSE</b>
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:SPS1:11:3.3	Compile and organize data, using appropriate units.
1, 2, 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.
1, 2, 3	S:SPS1:11:5.1	Explain how data support or refute the hypothesis or prediction.
2, 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.
2, 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).
2, 3, 4	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.
2, 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.
2	S:SPS2:11:4.1	Recognize that things can change in detail, but remain the same in general (e.g., the players change but the team remains, the cells are replaced but the organism remains); sometimes counterbalancing changes are necessary for a thing to retain its essential constancy in the presence of changing conditions.
2	S:SPS2:11:4.4	Describe how in evolutionary change, the present arises from the materials and forms of the past, more or less gradually, and in ways that can be explained.
2	S:SPS2:11:5.6	Demonstrate that a variety of biological, chemical and physical phenomena can be explained by changes in the arrangement and motion of atoms and molecules.
2, 3, 4, 5	S:SPS3:11:2.4	Apply basic logic and reasoning skills to evaluate completeness and reliability in a variety of information sources.
1, 2, 3, 4	S:SPS3:11:2.7	Use to evidence and logic in developing proposed explanations that address their initial questions and hypotheses.
2, 4, 5	S:SPS3:11:2.8	Analyze global, social, cultural, political, economic and environmental linkages.
2, 3, 4	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.

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1, 2, 3, 4	S:SPS4:12:1.2	Collect and use qualitative and quantitative data and information, seek evidence and sources of information to identify flaws such as errors and bias, and explain how the evidence supports or refutes an initial hypothesis.
5	S:SPS4:12:1.3	Analyze data and information gathered to clarify problems or issues identifying costs and benefits from a social, cultural, and/or environmental perspective; predict the consequences of action or inaction; and propose possible solutions.
1, 2, 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.
All activities	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.
2, 5	S:SPS4:12:3.3	Apply scientific knowledge and skills to make reasoned decisions about the use of science and scientific innovations.
3	S:SPS4:12:4.2	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, 4	S:SPS4:12:4.3	Develop models and explanations to fit evidence obtained through investigations.
2, 3, 5	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.
1, 2	S:LS1:11:3.2	Recognize that new heritable characteristics can only result from new combinations of existing genes or from mutations of genes in an organism’s sex cells; and explain why other changes in an organism cannot be passed on.
1, 2, 3, 5	S:LS1:11:3.4	Explain or justify with evidence how the alteration of the DNA sequence may produce new gene combinations that make little difference, enhance capabilities, or can be harmful to the organism (e.g., selective breeding, genetic engineering, mutations).
2, 3, 4, 5	S:LS3:11:2.2	Recognize that the abilities and behaviors an organism has, and likelihood of its survival strongly depend on its heritable characteristics, which can be biochemical and anatomical.
2	S:LS3:11:2.4	Explain evolution in terms of how the Earth’s present-day life forms evolved from earlier, distinctly different species as a consequence of the interactions of (1) the potential for a species to increase its numbers, (2) the genetic variability of offspring due to mutation and recombination of genes, (3) a finite supply of the resources required for life, and (4) the ensuing selection.
2	S:LS3:11:2.5	Explain how evidence from technological advances supports or refutes the genetic relationships among groups of organisms (e.g., DNA analysis, protein analysis).
2	S:LS3:11:3.1	Explain the concept of natural selection.
2	S:LS3:11:3.3	Recognize how a species’ chance of survival increases with each variation of an organism within the species; and explain how, in the event of a major global change, the greater the diversity of species on Earth, the greater the chance for survival of life.

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2, 3, 5	S:LS3:11:3.4	Analyze present day data and research in areas, including antibiotic resistance in bacteria, changes in viral genomes, such as bird flu, and DNA sequencing; and relate it to the concepts of natural selection.
2	S:LS3:11:3.5	Identify and describe ways genes may be changed and combined to create genetic variation within a species.
1, 2, 3, 5	S:LS3:11:3.6	Explain that gene mutations and new combinations may have a variety of effects on the organism, including positive and negative ones, or none at all.
2	S:LS4:11:1.2	Describe how the functions of all the human body systems are interrelated at a chemical level and how they maintain homeostasis.
2, 4, 5	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.
2, 3, 5	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.
5	S:LS4:11:2.5	Explain that gene mutation in a cell can result in uncontrolled division, which is called cancer; and describe how exposure of cells to certain chemicals and radiation increase mutation, and thus the chance for cancer.
2, 3, 4, 5	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 or heredity (e.g., pathogens, diseases, medical advances, pollution, mutations).
2, 3, 4, 5	S:LS4:11:3.1	Describe how the length and quality of human life are influenced by many factors, including sanitation, diet, medical care, gender, genes, and environmental conditions and personal health behaviors
2, 3	S:LS5:11:1.1	Describe ways in which technology has increased our understanding of the life sciences.
2, 3, 5	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.
2, 5	S:LS5:11:3.2	Describe aspects of the medical system available to help people in New Hampshire, including: prevention programs, vaccines and pharmaceuticals, hospitals and rehabilitation facilities.
2, 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**

Activity	Standard	GSE
2	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, 2, 3, 4	M:N&O:HS:4	Accurately solves problems involving rational numbers within mathematics, across content strands, disciplines or contexts (with emphasis on, but not limited to, proportions, percents, ratios, and rates).
1, 2, 3, 4	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, 2, 3	M:N&O:HS:7	Makes estimates in a given situation (e.g., tips, discounts, tax, the value of a non-perfect square root or cube root) by

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		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; evaluating the reasonableness of solutions appropriate to GSEs across content strands.
1	<b>M:G&amp;M:10:7</b>	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.
3	<b>M:F&amp;A:10:1</b>	Identifies, extends, and generalizes a variety of patterns (linear and nonlinear) represented by models, tables, sequences, or graphs in problem solving situations.
1	<b>M:DSP:10:1</b>	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).
3	<b>M:DSP:HS:6</b>	In response to a teacher or student generated question or hypothesis decides the most effective method (e.g., survey, observation, research, experimentation) and sampling techniques (e.g., random sample, stratified random sample) to collect the data necessary to answer the question; collects, organizes, and appropriately displays the data; analyzes the data to draw conclusions about the questions or hypotheses being tested while considering the limitations of the data that could effect interpretations; and when appropriate makes predications, asks new questions, or makes connections to real-world situations.
3, 4	<b>M:PRP:HS:1</b>	Use problem-solving strategies to investigate and understand increasingly complex mathematical content and be able to: <ul style="list-style-type: none"> <li>▪ Expand the repertoire of problem-solving strategies and use those strategies in more sophisticated ways.</li> <li>▪ 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).</li> <li>▪ Formulate and redefine problem situations as needed to arrive at appropriate conclusions</li> </ul>
2, 3, 4	<b>M:CCR:HS:1</b>	Communicate their understanding of mathematics and be able to: <ul style="list-style-type: none"> <li>▪ Explain and justify their thinking and develop increasingly sophisticated questions for given problem-situations.</li> <li>▪ Critique and follow the logic of arguments presented within mathematics and across disciplines.</li> </ul>
1, 2, 3, 4	<b>M:CCR:HS:2</b>	Create and use representations to communicate mathematical ideas and to solve problems and be able to: <ul style="list-style-type: none"> <li>▪ 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.</li> <li>▪ 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 <math>f(x) = ax^2</math>).</li> <li>▪ Find representations that model essential features of a mathematical situation (e.g., cost of postage can be modeled by a step-function).</li> <li>▪ Use representations as a primary means for expressing and understanding more abstract mathematical concepts.</li> </ul>

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2, 3, 4	<b>M:CCR:HS:3</b>	<p>Recognize, explore, and develop mathematical connections and be able to:</p> <ul style="list-style-type: none"> <li>▪ 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).</li> <li>▪ Explain multiple approaches that lead to equivalent results when solving problems.</li> </ul>
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**New Hampshire Reading GSEs: Grade 10**

Activity	Standard	GSE
All activities	R—10—1.1	Identifying multi-syllabic words by using knowledge of sounds, syllable division, and word patterns
All activities	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).
All activities	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.
All activities	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.
All activities	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].
All activities	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.
All activities	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.
All activities	R—10—7.4	Generating questions before, during, and after reading to enhance understanding and recall; expand understanding and/or gain new information.
All activities	R:IT:10:2.1	Explaining connections about information within a text, across texts, or to related ideas
All activities	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).
All activities	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.
All activities	R:IT:10:2.4	Distinguishing fact from opinion, and evaluating possible bias/propaganda or conflicting information within or across texts.
All activities	R:IT:10:2.5	Making inferences about causes and/or effects.

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All activities	R—10—13	Uses comprehension strategies (flexibly and as needed) before, during, and after reading literary and informational text.
All activities	R—10—15.1	Identifying and evaluating potential sources of information.
All activities	R—10—15.3	Organizing, analyzing, and interpreting the information.
All activities	R—10—15.4	Drawing conclusions/judgments and supporting them with evidence.
All activities	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**

Activity	Standard	GSE
All activities	W—10—11.4	Writing in a variety of genres.
All activities	W:SL:10:1.1	Using varied sentence length and structure to enhance meaning (e.g., including phrases and clauses).
All activities	W:SL:10:1.4	Applying a format and text structure appropriate to purpose, audience, and context.
All activities	W:RC:10:1.1	Selecting and summarizing key ideas to set context, appropriate to audience.
All activities	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.
All activities	W:RC:10:2.1a	Establishing an interpretive claim/assertion in the form of a thesis (purpose), when responding to a given prompt.
All activities	W:RC:10:2.2	Making inferences about the relationship(s) among content, events, characters, setting, theme, or author's craft.
All activities	W:RC:10:2.3	Using specific details and references to text or relevant citations to support thesis, interpretations, or conclusions.
All activities	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).
All activities	E:EW:10:5.1	Engaging the reader by establishing context (purpose).
All activities	E:EW:10:5.4	Using a range of elaboration techniques (i.e., questioning, comparing, connecting, interpreting, analyzing, or describing) to establish a focus.
All activities	W:IW:10:1.1	Using a text structure appropriate to focus/controlling idea or thesis (e.g., purpose, audience, context).
All activities	W:IW:10:1.2	Selecting appropriate and relevant information (excluding extraneous details) to set context.
All activities	W:IW:10:2.1	Establishing a topic.
All activities	W:IW:10:2.2	Stating and maintaining a focus/controlling idea/thesis.
All activities	W:IW:10:2.3	Writing with a sense of audience, when appropriate.
All activities	W:IW:10:2.5	Using precise and descriptive language that clarifies and supports intent.
All activities	W:IW:10:3.1	Including facts and details relevant to focus/controlling idea or thesis, and excluding extraneous information.
All activities	W:IW:10:3.2	Including sufficient details or facts for appropriate depth of information: naming, describing, explaining, comparing,

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		contrasting, or using visual images to support intended purpose.
<b>All activities</b>	<b>W:IW:10:3.4</b>	Commenting on the significance of the information (in reports, throughout the piece; in procedural or persuasive writing, as appropriate).
<b>All activities</b>	<b>W:C:10:1.1</b>	Applying rules of standard English usage to correct grammatical errors.
<b>All activities</b>	<b>W:C:10:1.4</b>	Applying appropriate punctuation to various sentence patterns to enhance meaning.
<b>All activities</b>	<b>OC—10—1.1</b>	Following verbal instructions, to perform specific tasks, to answer questions, or to solve problems.
<b>All activities</b>	<b>OC—10—1.2</b>	Summarizing, paraphrasing, questioning, or contributing to information presented.
<b>All activities</b>	<b>OC—10—1.4</b>	Participating in large and small group discussions showing respect for a range of individual ideas.
<b>All activities</b>	<b>OC—10—1.5</b>	Reaching consensus to solve a problem, make a decision, or achieve a goal.
<b>All activities</b>	<b>OC—10—2.1</b>	Exhibiting logical organization and language use, appropriate to audience, context, and purpose.

**New Hampshire Health Education GSEs: High School**

<b>Activity</b>	<b>Standard</b>	<b>Descriptor</b>
<b>3</b>	<b>AOD:1.2</b>	Know the importance of taking medicines as described (dosage, duration, need for food).
<b>4</b>	<b>NUT:1.1</b>	Know the benefits of healthful eating (short-term and long-term benefits and risks).
<b>4</b>	<b>PA:1.1</b>	Know the benefits and risks of physical activity.
<b>4</b>	<b>TOB:1.2</b>	Know the short-term and long-term effects of tobacco use.
<b>All activities</b>	<b>MH:3.2</b>	Know skills for effective speaking, e.g., I-statements, eye contact, assertiveness.
<b>All activities</b>	<b>MH:3.3</b>	Know skills for effective listening, e.g., reflective listening.
<b>2, 3, 4, 5</b>	<b>PCH:2.3</b>	Know the role of genetics in the family history of disease.
<b>5</b>	<b>PCH:2.4</b>	Know prevention strategies associated with primary health care, e.g., BSE, testicular self-exam, Pap smear.