HUMAN GENETIC VARIATION

Minnesota Academic Standards and Benchmarks: Science – Grades 9 – 12

Activity	Standard	Benchmark
2	I.A.2	Be able to explain how scientific and technological innovations as well as new evidence can challenge portions of or entire accepted theories and models including but not limited to cell theory, atomic theory, theory of evolution, plate tectonic theory, germ theory of disease and big bang theory.
2, 3	I.A.3	Recognize that in order to be valid, scientific knowledge must meet certain criteria including that it: be consistent with experimental, observational and inferential evidence about nature; follow rules of logic and reporting both methods and procedures; and, be falsifiable and open to criticism.
2, 5	I.A.5	Recognize that some scientific ideas are incomplete, and opportunity exists in these areas for new advances.
3	I.B.1	Design and complete a scientific experiment using scientific methods by determining a testable question, making a hypothesis, designing a scientific investigation with appropriate controls, analyzing data, making conclusions based on evidence and comparing conclusions to the original hypothesis and prior knowledge.
1, 2, 3, 4	I.B.2	Distinguish between qualitative and quantitative data.
2, 3, 4	I.B.3	Apply mathematics and models to analyze data and support conclusions.
2, 3	I.B.4	Identify possible sources of error and their effects on results.
2, 3	I.B.5	Know that professional scientists and engineers have ethical codes.
2, 3	I.B.6	Give examples of how different domains of science use different bodies of scientific knowledge and employ different methods to investigate questions.
2, 3, 5	I.C.2	Provide an example of a need or problem identified by science and solved by engineering or technology.
2, 3, 5	I.C.3	Provide an example of how technology facilitates new discoveries and the development of scientific knowledge.
2, 3	I.C.4	Know that technological changes and scientific advances are often accompanied by social, political, environmental and economic changes.
2, 3	I.D.1	Be able to trace the development of a scientific advancement, invention or theory and its impact on society.
2, 3, 4, 5	IV.D.1	Explain that the instructions for the characteristics of all organisms are carried in nucleic acids.
2	IV.E.2	Use the principles of natural selection to explain the differential survival of groups of organisms as a consequence of: o The potential for a species to increase its numbers; o The genetic variability of offspring due to mutation and recombination of genes; o A finite supply of the resources required for life; and, o The ensuing selection based on environmental factors of those offspring better able to survive and produce reproductively successful offspring.

Minnesota Academic Standards and Benchmarks: Mathematics – Grades 9 – 12 (11/2006 Draft Version)		
Activity	**Standard**	**Benchmark**
1, 2, 3, 4	**Data & Probability A.3**	Display sets of data using appropriate charts, plots, and graphs, including box and whisker plots.
	Information & Technology Literacy A.1	Use a computer with appropriate software, Internet applications or a graphing calculator to investigate data including graphs and statistical measures; explore geometry theorems and postulates including right triangle trigonometry; identify function properties such as inverses, asymptotes, domain, and range.
1, 2, 3	**Information & Technology Literacy B.1**	Generate research questions based on observations, information, assigned topics and/or interests, gather data, organize, display and evaluate information, draw conclusions, make predictions, present results to an audience, and reflect on and summarize the results and process.
1, 2, 3	**Algebra B.1**	Translate a problem described verbally or by tables, diagrams or graphs, into suitable mathematical language, solve the problem mathematically and interpret the result in the original context. Determine whether or not relevant information is missing from a problem and if so, decide how to best express the results that can be obtained without that information.
Minnesota Academic Standards and Benchmarks: Language Arts – Grades 9 – 12		
Activity	**Standard**	**Benchmark**
All activities	**I.B.1**	Acquire, understand and use vocabulary by learning words through explicit vocabulary instruction and independent reading, and appropriately use these words in writing.
All activities	**I.C.1**	Monitor comprehension and know when and how to use strategies to clarify the understanding of a selection.
All activities	**I.C.2**	Comprehend and evaluate the purpose, accuracy, comprehensiveness, and usefulness of informational materials.
All activities	**I.C.5**	Summarize and paraphrase main idea and supporting details.
All activities	**I.C.7**	Make inferences and draw conclusions based on explicit and implied information from texts.
All activities	**I.C.8**	Evaluate clarity and accuracy of information, as well as the credibility of sources.
2, 3, 5	**I.C.10**	Synthesize information from multiple selections in order to draw conclusions, make predictions, and form interpretations.
All activities	**II.A.1**	Plan, organize and compose narrative, expository, descriptive, persuasive, critical and research writing to address a specific audience and purpose.
All activities	**II.B.3**	Make generalizations and use supporting details.

MINNESOTA ALIGNMENT FOR NIH SUPPLEMENT HUMAN GENETIC VARIATION

All activities	II.C.1	Understand the differences between formal and informal language styles and use each appropriately.
All activities	II.C.2	Use an extensive variety of correctly punctuated sentences for meaning and stylistic effect.
2, 5	II.D.1	Use print, electronic databases and online resources to access information, organize ideas, and develop writing.
2, 5	III.A.1	Distinguish between speaker's opinion and verifiable facts and analyze the credibility of the presentation.
All activities	III.A.3	Understand the relationship between nonverbal, interpersonal, and small group communication.
2, 5	III.C.1	Evaluate the accuracy and credibility of information found on Internet sites.
All activities	III.C.2	Evaluate the logic of reasoning in both print and non-print selections.
2, 5	III.C.3	Evaluate the source's point of view, intended audience and authority.
2, 5	III.C.7	Critically analyze the messages and points of view employed in different media, including advertising, news programs, web sites, and documentaries.
All activities	III.C.8	Formulate critical, evaluative questions relevant to a print or non-print selection.
National Health Education Standards – Grades 9 – 12: cited from pre-publication document of National Health Education Standards, Pre K-12, American Cancer Society, December 2005 – August 2006		
Activity	**Standard**	**Performance Indicator**
4, 5	1.12.1	Predict how healthy behaviors can impact health status.
2, 3, 4, 5	1.12.4	Analyze how genetics and family history can impact personal health.
4, 5	1.12.5	Propose ways to reduce or prevent injuries and health problems.
4, 5	1.12.7	Compare and contrast the benefits and barriers to practicing a variety of healthy behaviors.
4	1.12.8	Analyze personal susceptibility to injury, illness, or death if engaging in unhealthy behaviors.
4	1.12.9	Analyze the potential severity of injury or illness if engaging in unhealthy behaviors.
4, 5	2.12.1	Analyze how family influences the health of individuals.
4	2.12.3	Analyze how peers influence healthy and unhealthy behaviors.
4, 5	2.12.8	Analyze the influence of personal values and beliefs on individual health practices and behaviors.
4	2.12.9	Analyze how some health risk behaviors can influence the likelihood of engaging in unhealthy behaviors.
5	2.12.10	Analyze how public health policies and government regulations can influence health promotion and disease.
5	3.12.1	Evaluate the validity of health information, products, and services.
5	3.12.4	Determine when professional health services may be required.
4, 5	5.12.1	Examine barriers that can hinder healthy decision-making.
4, 5	5.12.2	Determine the value of applying a thoughtful decision-making process in health related situations.

5	5.12.3	Justify when individual or collaborative decision-making is appropriate.
5	5.12.5	Predict the potential short and long-term impact of each alternative on self and others.
4, 5	5.12.6	Defend the healthy choice when making decisions.
4, 5	5.12.7	Evaluate the effectiveness of health-related decisions.
4, 5	7.12.1	Analyze the role of individual responsibility for enhancing health.
4	7.12.2	Demonstrate a variety of healthy practices and behaviors that will maintain or improve the health of self and others.
4	7.12.3	Demonstrate a variety of behaviors to avoid or reduce health risks to self and others.
4, 5	8.12.2	Demonstrate how to influence and support others to make positive health choices.
4, 5	8.12.4	Adapt health messages and communication techniques to a specific target audience.