

UTAH ALIGNMENT FOR NIH SUPPLEMENT HUMAN GENETIC VARIATION

<b>HUMAN GENETIC VARIATION</b>		
<b>Utah Biology Core Curriculum Standards</b>		
<b>Activity</b>	<b>Standard</b>	<b>Objective</b>
2, 3, 4, 5	4:1.c	Formulate, defend, and support a perspective of a bioethical issue related to intentional or unintentional chromosomal mutations.
3	4:2.d	Analyze bioethical issues and consider the role of science in determining public policy.
4	4:3.d	Describe how mutations may affect genetic expression and cite examples of mutagens.
2, 5	4:3.e	Relate the historical events that lead to our present understanding of DNA to the cumulative nature of science knowledge and technology.
2, 3, 5	4:3.f	Research, report, and debate genetic technologies that may improve the quality of life (e.g., genetic engineering, cloning, gene splicing).
2	5:1.a	Describe the effects of environmental factors on natural selection.
2	5:1.b	Relate genetic variability to a species' potential for adaptation to a changing environment.
<b>Utah Science Intended Learning Outcomes: High School</b>		
<b>Activity</b>	<b>ILO</b>	<b>Descriptor</b>
1, 2, 3, 4	1.a	Observe objects, events and patterns and record both qualitative and quantitative information.
All activities	1.b	Use comparisons to help understand observations and phenomena.
1, 2, 3, 4	1.c	Evaluate, sort, and sequence data according to given criteria.
2, 5	1.d	Select and use appropriate technological instruments to collect and analyze data.
3	1.e	Plan and conduct experiments in which students may: Identify a problem, formulate research questions and hypotheses, predict results of investigations based upon prior data, identify variables and describe the relationships between them, plan procedures to control independent variables, collect data on the dependent variable(s), select the appropriate format (e.g., graph, chart, diagram) and use it to summarize the data obtained, analyze data, check it for accuracy and construct reasonable conclusions, and prepare written and oral reports of investigations.
All activities	1.f	Distinguish between factual statements and inferences.
3	1.h	Construct models, simulations and metaphors to describe and explain natural phenomena.
2, 3, 4	1.i	Use mathematics as a precise method for showing relationships.
2, 3, 4, 5	1.j	Form alternative hypotheses to explain a problem.
2, 3, 4	2.b	Raise questions about objects, events and processes that can be answered through scientific investigation.

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<b>All activities</b>	<b>2.c</b>	Maintain an open and questioning mind toward ideas and alternative points of view.
<b>5</b>	<b>2.d</b>	Accept responsibility for actively helping to resolve social, ethical and ecological problems related to science and technology.
<b>2, 3, 4</b>	<b>2.e</b>	Evaluate scientifically related claims against available evidence.
<b>All activities</b>	<b>3.a</b>	Know and explain science information specified for the subject being studied.
<b>All activities</b>	<b>3.c</b>	Apply principles and concepts of science to explain various phenomena.
<b>2, 3, 4, 5</b>	<b>3.d</b>	Solve problems by applying science principles and procedures.
<b>All activities</b>	<b>4.a</b>	Provide relevant data to support their inferences and conclusions.
<b>All activities</b>	<b>4.b</b>	Use precise scientific language in oral and written communication.
<b>All activities</b>	<b>4.c</b>	Use proper English in oral and written reports.
<b>2, 3, 4</b>	<b>4.e</b>	Use mathematical language and reasoning to communicate information.
<b>2, 3, 5</b>	<b>5.a</b>	Cite examples of how science affects human life.
<b>2, 3, 5</b>	<b>5.b</b>	Give instances of how technological advances have influenced the progress of science and how science has influenced advances in technology.
<b>2, 3, 5</b>	<b>5.c</b>	Understand the cumulative nature of scientific knowledge.
<b>2</b>	<b>5.d</b>	Recognize contributions to science knowledge that have been made by both women and men.
<b>2, 3, 4, 5</b>	<b>6.a</b>	Science is a way of knowing that is used by many people, not just scientists.
<b>2, 3, 5</b>	<b>6.b</b>	Understand that science investigations use a variety of methods and do not always use the same set of procedures; understand that there is not just one "scientific method."
<b>2, 3, 4, 5</b>	<b>6.c</b>	Science findings are based upon evidence.
<b>2, 3, 4, 5</b>	<b>6.d</b>	Understand that science conclusions are tentative and therefore never final. Understandings based upon these conclusions are subject to revision in light of new evidence.
<b>2, 3, 4, 5</b>	<b>6.e</b>	Understand that scientific conclusions are based on the assumption that natural laws operate today as they did in the past and that they will continue to do so in the future.
<b>2, 3, 4, 5</b>	<b>6.f</b>	Understand the use of the term "theory" in science, and that the scientific community validates each theory before it is accepted. If new evidence is discovered that the theory does not accommodate, the theory is generally modified in light of this new evidence.
<b>2, 3, 5</b>	<b>6.g</b>	Understand that various disciplines of science are interrelated and share common rules of evidence to explain phenomena in the natural world.
<b>All activities</b>	<b>6.h</b>	Understand that scientific inquiry is characterized by a common set of values that include logical thinking, precision, open-mindedness, objectivity, skepticism, replicability of results and honest and ethical reporting of findings. These values function as criteria in distinguishing between science and non-science.
<b>4, 5</b>	<b>6.i</b>	Understand that science and technology may raise ethical issues for which science, by itself, does not provide solutions.

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<b>Utah Algebra I Core Curriculum Standards</b>		
<b>Activity</b>	<b>Standard</b>	<b>Objective</b>
2, 3, 4	1:2.c	Compute solutions to problems, represent answers in exact form, and determine the reasonableness of answers.
3	4:1.a	Collect, record, organize, and display a set of data with at least two variables.
<b>Utah Mathematics Intended Learning Outcomes: High School</b>		
<b>Activity</b>	<b>ILO</b>	<b>Descriptor</b>
2, 3, 4	2	Become proficient problem-solvers by posing appropriate questions, selecting appropriate methods, employing a variety of strategies, and exploring alternative approaches.
2, 3, 4	3	Think logically, using inductive reasoning to formulate reasonable conjectures and using deductive reasoning for justification, formally and informally.
2, 3, 4	4	Cooperatively and independently explore mathematics, using inquiry and technological skills.
2, 3, 4	5	Make connections between mathematical ideas, between mathematics and other disciplines, and to life.
2, 3, 4	6	Communicate mathematics through verbal, written, and visual representations, using precise mathematical language and symbolic notation.
<b>Utah Language Arts Core Curriculum Standards: Grades 9 &amp; 10</b>		
<b>Activity</b>	<b>Standard</b>	<b>Objective</b>
2, 3, 4, 5	1:2.a	Analyze the purpose of external text features and structures in a variety of informational texts (e.g., textbooks, advertisements, posters, graphs, charts, maps, schedules, product instructions) (9). Analyze the purpose of external text features and structures in a variety of electronic texts (e.g., e-mail, electronic newspapers, web pages) (10).
2, 3, 4, 5	1:2.c	Infer meaning from implicit information in text (9). Use explicit and implicit information to arrive at conclusions (10).
2, 3, 4, 5	1:2.d	Distinguish relevant from merely interesting information (9). Evaluate text for reliability and accuracy (10).
2, 3, 4, 5	2:1.a	Compare/contrast significant or essential ideas, facts, or events (9).
All activities	2:1.b	Analyze facts, events, or ideas to create meaning (10).
2, 3, 4, 5	2:1.c	Compare/contrast connections between texts, between texts and self, and between texts and different world connections. (9 & 10)
2, 3, 4, 5	2:2.a	State a thesis that clearly takes a position (9). Experiment with varied organizational patterns and forms of writing (e.g., memos, letters, reports, essays, brochures) (10).
2, 3, 4, 5	2:2.b	Organize writing effectively using leads, details, transitions, conclusions, personal experience, facts, anecdotes, examples, and paraphrased ideas (9). Support arguments with personal experience, detailed evidence, examples, and

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		reasoning (10).
<b>Utah Language Arts Intended Learning Outcomes: Grades 9 &amp; 10</b>		
<b>Activity</b>	<b>ILO</b>	<b>Descriptor</b>
All activities	2.c	Develop thinking and language acquisition together through interactive learning.
All activities	4.a	Give and seek information in conversations, in group discussions, and in oral presentations.
All activities	4.b	Use questioning techniques to gain information.
All activities	4.c	Participate in and report on small group learning activities.
4	4.d	Develop and deliver individual presentations.
All activities	5.b	Access background knowledge to prepare to read and enjoy texts.
All activities	5.c	Use meta-cognition strategies during reading to monitor comprehension.
All activities	5.d	Improve comprehension by using strategies when meaning breaks down.
All activities	5.e	Retain information from and respond to text after reading.
All activities	6.e	Develop collaborative writing skills to prepare for workplace writing.
All activities	6.f	Understand that writing is a tool for thinking: solving problems, exploring issues, constructing questions, addressing inquiry.
All activities	6.g	Understand that reading and writing are interrelated: writers approach new reading experiences with enhanced appreciation for the text.
<b>Utah Health Education Core Curriculum Standards: High School</b>		
<b>Activity</b>	<b>Standard</b>	<b>Objective</b>
4	1:4.b	Predict the short- and long-term effects of risks.
5	1:4.d	Identify steps in decision making.
5	1:4.e	Weigh ethical implications of decisions.
5	3:4.e	Explain the importance of health maintenance, including breast and testicular self-exams, pap smears, and annual physical examinations.
3, 5	4:1.a	Identify common chronic illnesses; e.g., asthma, diabetes, cancer, Alzheimer's, schizophrenia, depression.
5	4:1.b	Predict the impact of chronic illness on economic, social, mental, emotional, and physical well-being.
5	4:1.c	Explain the positive and negative results of living with health challenges.
5	4:1.d	Determine the benefits of assisting those living with chronic illness for individuals, volunteers, family, and community.
4	6:2.e	Strategize ways to manage influences of heredity and prevent disease; e.g., body type, diabetes, hypertension, heart disease, cancer, or osteoporosis.

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<b>3, 5</b>	<b>7:2.a</b>	Identify various professions that contribute to, or advocate for, health.
<b>4, 5</b>	<b>7:2.b</b>	Identify health needs, opportunities to be proactive, related community resources, and available services.