

**LABORATORY-BASED
BIOLOGY SCIENCE CURRICULUM**

The goal of this curriculum is to increase the number of students meeting state science standards at the high school level. This can be done through this course of study in biology, which is aligned with state science standards and meets the entrance requirements of post-secondary institutions.

Numbers in parentheses reference the Nebraska Twelfth-Grade Science Standards.

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SECTION I

SCIENTIFIC INQUIRY

Concepts and Skills	Suggested Activities Note: 1 Day~45-50 Minute Period	Suggested Assessments
<p>SC12.2.1 Basic Inquiry (5 days initially & 3-5 days per section)</p> <p>SC12.1.1.a Formulate a testable hypothesis supported by prior knowledge to guide an investigation</p> <p>SC12.1.1.b Design and conduct logical and sequential scientific investigations with repeated trials and apply findings to new investigations</p> <p>SC12.1.1.c Identify and manage variables and constraints</p> <p>SC12.1.1.d Select and use lab equipment and technology appropriately and accurately</p> <p>SC12.1.1.e Use tools and technology to make detailed qualitative and quantitative observations</p> <p>SC12.1.1.f Represent and review collected data in a systematic, accurate, and objective manner</p> <p>SC12.1.1.g Analyze and interpret data, synthesize ideas, formulate and evaluate models, and clarify concepts and explanations</p> <p>SC12.1.1.h Use results to verify or refute a hypothesis</p> <p>SC12.1.1.i Propose and/or evaluate possible revisions and alternate explanations</p> <p>SC12.1.1.j Share information, procedures, results, conclusions, and defend findings to a scientific community (peers, science fair audience, policy makers)</p> <p>SC12.1.1.k Evaluate scientific investigations and offer revisions and new ideas as appropriate</p> <p>SC12.1.1.l Use appropriate mathematics in all aspects of scientific inquiry</p>		
A. Features of Inquiry		
<p>1. Engaging in Scientifically Oriented Questions</p> <p>a. Questioning</p> <p>b. Predicting</p> <p>c. Forming Hypotheses</p> <p>2. Responding to Questions using Evidence</p> <p>a. Identifying Variables</p> <p>b. Designing Experiments</p> <p>i. Understand that larger well-chosen samples produce more accurate estimates of the characteristics of the total population. [SC12.1.1.b]</p> <p>c. Making Qualitative and Quantitative Observations</p> <p>i. Understand that measurement errors may affect results of calculations. [SC12.1.1.e]</p> <p>d. Recording Data</p> <p>3. Formulating Explanations from Evidence</p> <p>a. Organizing Data</p> <p>i. Understand that the way data are displayed affects interpretation. [SC12.1.1.f]</p> <p>1) Graphs</p> <p>2) Tables</p> <p>3) Calculations</p> <p>a) Uses of powers of ten to represent large and small numbers. [SC12.1.1]</p> <p>4) Schematics</p> <p>b. Manipulating Data</p>	<ul style="list-style-type: none"> • Logical arguments • Science versus what is not scientific (belief based) • Sample size and validity • Communicate results in a scientific format <p><i>How many drops of water on a penny?</i></p> <p>This lab involves student's use of the scientific method to find the number of water drops that can be placed on a penny. Students will then test different variables that may affect the number of drops that the penny can hold.</p> <p><i>Fermentation</i></p> <p>Investigate carbon dioxide production using molasses (or different sugars) and yeast.</p>	<p>Directed Project</p> <ul style="list-style-type: none"> • Discuss examples of final projects. • Discuss possible topics • Formulate a project proposal • Establish a timeline for components completion. • Complete sample inquiry projects as a class. • Keep a journal of project progress. • Communicate about final project • Present PowerPoint, paper, etc.

<p align="center">Concepts and Skills</p>	<p align="center">Suggested Activities Note: 1 Day~45-50 Minute Period</p>	<p align="center">Suggested Assessments</p>
<ul style="list-style-type: none"> c. Interpreting Evidence <ul style="list-style-type: none"> i. Evaluate the reasonableness of answers to problems. [SC12.1.1.g] ii. Understand that a correlation between two variables does not mean that either one causes the other. [SC12.1.1.g] iii. Compare data for two groups by using averages and ranges of values. [SC12.1.1.h] iv. Describe rate of change by comparing one measured quantity to another measured quantity. [SC12.1.1.g] v. Investigate and describe how different characteristics, properties, or relationships within a system change as their dimensions increase or decrease. [SC12.1.1.g] d. Creating Models <ul style="list-style-type: none"> i. Create a physical, mental, or mathematical model to show how objects and processes are connected. [SC12.1.1.j] 4. Connecting Explanations to Scientific Knowledge <ul style="list-style-type: none"> a. Inferring b. Connecting to Existing Models <ul style="list-style-type: none"> i. Test the usefulness of the model by comparing its predictions to actual observations. [SC12.1.1.h] c. Defending Findings <ul style="list-style-type: none"> i. Evaluate the reasonableness of answers to problems. [SC12.1.1.k] 5. Communicating and Justifying Explanations <ul style="list-style-type: none"> a. Communicating Explanations b. Defending Explanations c. Publishing d. Determining Applications e. Asking Further Questions 		

Concepts and Skills	Suggested Activities Note: 1 Day~45-50 Minute Period	Suggested Assessments
<p>Evidence, models, and explanation [SC12.1.1.1]</p> <ul style="list-style-type: none"> a. Understand that the way data are displayed affects interpretation. b. Understand that larger well-chosen samples produce more accurate estimates of the characteristics of the total population. c. Sample Activity: Collect data from hay infusion <ul style="list-style-type: none"> i. Create a physical, mental, or mathematical model to show how objects and processes are connected. ii. Test the usefulness of the model by comparing its predictions to actual observations. iii. Understand that a correlation between two variables does not mean that either one causes the other. 		
<p>Science as a Human Endeavor [SC12.1.2.b, SC12.1.2.c, SC12.1.2.d]</p> <ul style="list-style-type: none"> a. Demonstrate ethical scientific practices (e.g., informing research subjects about risks and benefits, humane treatment of animals, truthful reporting, public disclosure of work, and peer review). b. Examine and understand the societal, cultural, and personal beliefs that influence scientists. E.g.: Investigate gender and ethnic issues. c. Recognize science as one way of answering questions and explaining the natural world. <ul style="list-style-type: none"> i. Ethics 		
<p>Nature of Scientific Knowledge (SC12.1.2.a)</p> <ul style="list-style-type: none"> a. Demonstrate the use of empirical standards, logical arguments, and skepticism in science. b. Create scientific explanations consistent with experimental and observational evidence; make accurate predictions; strive to be logical; respect the rules of evidence; accept criticism; report methods and procedures; and make knowledge public. c. Understand that all scientific knowledge is, in principle, subject to change as new evidence becomes available. 		

SECTION II

THE CELL

Concepts and Skills	Suggested Activities and Resources	Suggested Assessments
<p>SC12.3.1 Cell</p> <p>SC12.3.1.a Identify the complex molecules (carbohydrates, lipids, proteins, nucleic acids) that make up living organisms</p> <p>SC12.3.1.b Identify the form and function of sub-cellular structures that regulate cellular activities</p> <p>SC12.3.1.c Describe the cellular functions of photosynthesis, respiration, cell division, protein synthesis, transport of materials, and energy capture/release</p> <p>SC12.3.1.d Describe how an organism senses changes in its internal or external environment and responds to ensure survival</p>		
<p>A. Cell Structure (3-4 days)</p>		
<p>1. Cytoplasm [SC12.3.1.b]</p>	<p>Review the use and care of the microscope, identify cell structures, and discuss differences between prokaryotes and eukaryotes.</p> <p>Interactive Lab Tutorial of the Microscope – The web site has many links to interactive microscope tutorials. Lots of pictures and instructions on how to use the microscope.</p> <p>Basic Microscopy – This web page has microscope basics and contains beginner information.</p> <p>Ready-To-Use Life Science Activities – Mark J. Handwerker, Ph.D. (ISBN 0-87628-439-x)</p> <p>Ready-To-Use Human Biology Health Activities – Mark J. Handwerker, Ph.D. (ISBN 0-87628-446-2)</p>	<p>Microscope Quiz</p> <p>Demonstrate proper use and care in the lab.</p>
<p>2. Carbohydrates, lipids, proteins, and nucleic acids [SC12.3.1.a]</p>	<p>Biology Labs Online</p>	
<p>3. Historical Contributors (e.g. Schwann, Schleiden, & VanLeeuwenhoek) [SC12.1.2.c]</p> <p>a. Investigate and describe the contributions of diverse cultures to scientific knowledge and technological inventions.</p> <p>b. Understand that changes in scientific knowledge evolve over time and almost always build on earlier knowledge.</p> <p>c. Understand that some advancements in science and technology have long-lasting effects on society.</p>		<p>Oral Report</p>

Concepts and Skills	Suggested Activities and Resources	Suggested Assessments
B. Organelle Function (3-5 days) [SC12.3.1.b]		
1. Nucleus 2. Mitochondria 3. Ribosomes 4. Endoplasmic Reticulum 5. Vacuole 6. Golgi Apparatus 7. Lysosome 8. Chloroplast 9. Centriole	Review cell model, analogies, pictures Virtual tour through a cell	PowerPoint, poster, labeling model — example rubric
C. Cell Membrane (3 days) [SC12.3.1.b]		
1. Membrane transport 2. Structure	Identify structures, discuss transport, investigate osmosis-diffusion labs <i>The Great Egg Experiment</i> – This lab is based on the principles of osmosis and diffusion through a cell membrane. The lab takes about a week and various solutions (salt, sugar, etc.—students may bring liquids from home) may be used to test scientific hypotheses relating to osmosis and diffusion.	Lab write up
D. Cell Function (14 days) [SC12.3.1]		
1. Photosynthesis [SC12.3.1.c] a. Formula of reaction b. Structures involved	Discussion, Photosynthesis Lab, Microscope activity, Internet Activity Fast Plants – High School Biology Labs Based on Plants. Multiple activities for various types of learning environments. Wonderful website!	Quiz Lab Write up
2. Respiration [sc12.3.1.Cc]	Discussion, Respiration Lab, Microscope activity, Internet Activity <i>Fermentation Lab</i> – Using yeast and glucose solutions, and measuring the amount of carbon dioxide, students will be able to measure respiration and how much respiration has occurred, using different variables, such as temperature, amount of yeast, and glucose. Probeware can be used to collect and compare data from germinating pea seeds in germinating and non-germinating plants. <i>Respiration of Sugars</i> – Probeware can be used to test and measure the respiration of various different types of sugars by yeast.	Quiz Lab Write up

Concepts and Skills	Suggested Activities and Resources	Suggested Assessments
3. Geochemical cycles [SC12.4.2.a] <ul style="list-style-type: none"> a. Water b. Carbon-Oxygen c. Nitrogen 	Discussion	Quiz
4. Cell division [SC12.3.2.d] <ul style="list-style-type: none"> a. Cell Cycle b. Mitosis c. Meiosis 	Discussion, view onion root tips, Internet Activity <i>Time for Mitosis</i> – Observing stained slides of onion root tips and estimating the length of time that it takes for each stage of the cell cycle. <i>Cell Reproduction Activity</i> – Mitosis and/or Meiosis Processes Using Yarn— Simulation of mitosis and/or meiosis using different colors of yarn to represent parts of cells to go through the changes and stages in mitosis or meiosis. Onion Root Tip Slides	Quiz Lab Write up

Concepts and Skills	Suggested Activities and Resources	Suggested Assessments
SC12.1.3 Technology SC12.1.3.a Propose designs and choose between alternative solutions of a problem SC12.1.3.b Assess the limits of a technical design SC12.1.3.c Implement the selected solution SC12.1.3.d Evaluate the solution and its consequences SC12.1.3.e Communicate the problem, process, and solution SC12.1.3.f Compare and contrast the reasons for the pursuit of science and the pursuit of technology SC12.1.3.g Explain how science advances with the introduction of new technology SC12.1.3.h Recognize creativity, imagination, and a good knowledge base are all needed to advance the work of science and engineering		
1. Research Current Technology [SC12.1.3.b] 2. Classroom Technology [SC12.1.2.b] a. Microscope	Comparative writing assignment Comparison of microscope technologies Microscope general knowledge and activities	Report
Technology in local, national, and global challenges (1 day) [SC12.1.2.b]		
1. Discussion of Current Events & Technology ^{****}	1 day research	Oral Report

SECTION III

HEREDITY

Concepts and Skills	Suggested Activities and Resources	Suggested Assessments
<p>SC12.3.2 Understanding Heredity</p> <p>SC12.3.2.a Identify that information passed from parents to offspring is coded in DNA molecules</p> <p>SC12.3.2.b Describe the basic structure of DNA and its function in genetic inheritance</p> <p>SC12.3.2.c Recognize how mutations could help, harm, or have no effect on individual organisms</p> <p>SC12.3.2.d Describe that sexual reproduction results in a largely predictable, variety of possible gene combinations in the offspring of any two parents</p>		
<p>A. Structure of Nucleic Acid (9-11 days)</p>		
<p>1. DNA [SC12.3.2.b]</p> <p>a. Structure</p> <p>b. Replication</p> <p>c. Base Pairing</p> <p>2. DNA Mutations [SC12.3.2.c]</p> <p>a. Deletion</p> <p>b. Insertion</p> <p>c. Inversion</p> <p>d. Translocation</p> <p>3. DNA translation [SC12.3.2.a]</p>	<p>Discussion, Electrophoresis Gel, Models</p> <p><i>Dropping Your Genes: A Genetics Simulation</i> – Students determine their genotypes for five inherited traits and determine their sex chromosomes. Gametogenesis is simulated by dropping their paper chromosomes with a person of the opposite sex. Students organize their resulting child's genotype and phenotype on a data table and create a birth announcement.</p> <p><i>DNA Activities</i></p> <p>www.quia.com/jfc/239046.html</p> <p>http://www.kumc.edu/gec/lessons.html</p> <p><i>Mutation</i></p> <p>http://gslc.genetics.utah.edu</p> <p>http://genetics-education-partnership.mbt.washington.edu</p> <p><i>DNA</i></p> <p>http://genetics-education-partnership.mbt.washington.edu</p> <p>www.kumc.edu</p> <p>www.quia.com</p> <p><i>Nobel Prize Games</i></p> <p>http://www.nobelprize.org/educational/</p> <ul style="list-style-type: none"> • DNA the Double Helix Game • DNA to RNA to protein 	<p>Identification Quiz</p>

Concepts and Skills	Suggested Activities and Resources	Suggested Assessments
<p>SC12.1.2 Historical Contributors (e.g. Watson, Crick, & Franklin)</p> <p>SC12.1.2.b Describe how society influences the work of scientists and how science, technology, and current scientific discoveries influence and change society</p> <p>SC12.1.2.c Recognize that the work of science results in incremental advances, almost always building on prior knowledge, in our understanding of the world</p> <p>SC12.1.2.d Research and describe the difficulties experienced by scientific innovators who had to overcome commonly held beliefs of their times to reach conclusions that we now take for granted</p>		
<p>4. Protein Synthesis [SC12.3.1.c, SC12.3.2.c]</p> <p>a. Effects of mutation on DNA translation</p>	<p>Discussion, Protein Synthesis Simulations</p> <p>Protein Synthesis – Protein synthesis activity for the classroom uses an analogy of protein synthesis and a candy factory. Complete lesson.</p> <p>Protein Synthesis Activities for the computer include a section about people and discoveries associated with the topic.</p>	<p>Quiz</p> <p>Writing Evaluation</p>
<p>B. Basic Genetics (5 days)</p>		
<p>1. Genetic Variation/Crossover [SC12.3.2.d, SC12.3.2.d]</p>	<p>Discussion, Modeling <i>Who Gets the Money?</i> – An investigation to solve a mystery involving genetics. Concepts involved are incomplete dominance, Punnett squares, sex-linked inheritance, monohybrid crosses, and codominance.</p> <p>Genetics</p>	<p>Quiz</p> <p>Model Explanation</p>
<p>C. Mutations (1 day) [SC12.3.2.c]</p>		
<p>1. Helpful mutations</p> <p>2. Harmful mutations</p> <p>3. Transmission</p>	<p>Allele Frequencies and Sickle Cell Anemia Lab</p> <p>Sickle Cell Anemia and Genetics: Background Link</p> <p>Allele Frequencies and Sickle Cell Anemia Lab</p>	

Concepts and Skills	Suggested Activities and Resources	Suggested Assessments
<p>SC12.1.3 Interactions of Science & Technology (Implemented throughout unit)</p> <p>SC12.1.3.a Propose designs and choose between alternative solutions of a problem</p> <p>SC12.1.3.b Assess the limits of a technical design</p> <p>SC12.1.3.c Implement the selected solution</p> <p>SC12.1.3.d Evaluate the solution and its consequences</p> <p>SC12.1.3.e Communicate the problem, process, and solution</p> <p>SC12.1.3.f Compare and contrast the reasons for the pursuit of science and the pursuit of technology</p> <p>SC12.1.3.g Explain how science advances with the introduction of new technology</p> <p>SC12.1.3.h Recognize creativity, imagination, and a good knowledge base are all needed to advance the work of science and engineering</p>		
<p>1. Research Current Technology</p> <p>2. Classroom Technology</p> <p>a. Electrophoresis Gel</p>	<p>Discussions Implemented Throughout Unit</p> <p>Online Gel Electrophoresis Lab</p> <p>Very Good Flash Animation</p>	
<p>Technology in local, national, & global challenges (1 day) [SC12.1.2.b]</p> <p>a. Understand that knowledge of basic concepts about scientific and technological challenges should precede active debate.</p> <p>b. Investigate and understand that social issues and challenges may affect advancements in science and technology.</p> <p>c. Understand that science and technology are essential social enterprises that indicate what could happen, but not what should happen.</p>		
<p>1. Discussion of Current Events and Technology</p>	<p>1 day Research</p> <p>Stem Cell Research</p> <p>Cloning</p> <p>Genetically-modified Organisms</p>	<p>Oral report</p>

SECTION IV

INTERDEPENDENCE OF ORGANISMS

Concepts and Skills	Suggested Activities and Resources	Suggested Assessments
Interdependence of Organisms (28 days)		
<p>SC12.3.3 Interdependence of Organisms</p> <p>SC12.3.3.a Explain how the stability of an ecosystem is increased by biological diversity</p> <p>SC12.3.3.b Recognize that atoms and molecules cycle among living and nonliving components of the biosphere</p> <p>SC12.3.3.c Explain how distribution and abundance of different organisms in ecosystems are limited by the availability of matter and energy and the ability of the ecosystem to recycle materials</p> <p>SC12.3.3.d Analyze factors which may influence environmental quality</p>		
<p>Natural Resources [SC12.4.2.a, SC12.4.2.b]</p> <p>a. Investigate and explain how human populations use environmental resources to maintain and improve their existence.</p>		
<p>1. Energy Pyramid [SC12.3.3.c]</p> <p>2. Carrying Capacity [SC12.3.3.c]</p> <p>3. Cooperation and competition among organisms [SC12.3.3.a]</p> <p>4. Population Biology [SC12.3.3.a]</p> <p>a. Nutrition</p> <p>b. Disease</p> <p>c. Genetic Predisposition</p>	<p>Oh Deer! Game</p> <p>Online Game of Population and Carrying Capacity</p>	<p>Graph/analysis of graph</p> <p>Discussion</p> <p>Vocabulary Quiz</p>
<p>Effects of Population Change [SC12.3.a, SC12.3.c]</p> <p>a. Investigate and identify causes of population growth or decline.</p> <p>b. Investigate and explain how various factors influence birth rates and death rates.</p> <p>c. Investigate and predict how population change may impacts resource use and environments.</p>		

Concepts and Skills	Suggested Activities And Resources	Suggested Assessments
Environmental Quality [SC12.3.3.b, SC12.3.3.d, SC12.4.2.c] a. Investigate and describe how the positive and negative consequences of human intervention or nonintervention impact the ecosystem. b. Investigate and explain factors which may influence environmental quality.		
1. Human Impact	Carbon Dioxide Lessons Biochemical Cycles Carbon Cycle Carbon footprint calculators Build a Prairie	Data analysis (read a graph) Discussion Research project
SC12.1.2 Historical Contributors SC12.1.2.a Recognize that scientific explanations must be open to questions, possible modifications, and must be based upon historical and current scientific knowledge SC12.1.2.b Describe how society influences the work of scientists and how science, technology, and current scientific discoveries influence and change society SC12.1.2.c Recognize that the work of science results in incremental advances, almost always building on prior knowledge, in our understanding of the world		
	Research the contributions of individuals of cultural diversity like Aldo Leopold & E.O. Wilson	Oral Report
SC12.1.3 Interactions of Science & Technology SC12.1.3.f Compare and contrast the reasons for the pursuit of science and the pursuit of technology SC12.1.3.g Explain how science advances with the introduction of new technology		
1. Research Current 2. Technology 3. Classroom Technology		

SECTION V

EVOLUTION AND DIVERSITY

Concepts and Skills	Suggested Activities and Resources	Suggested Assessments
<p>Evolution and Diversity (12 days) Wondering How to Present Evolution? You are not alone in this matter... so the people at Berkley have a few ideas for you! Visit this wonderful website on how to present evolution to high school students. It is the most helpful resource we have seen yet in presenting the subject of evolution: Understanding Evolution</p>		
<p>SC12.3.4 Biological Evolution</p> <p>SC12.3.4.a Identify different types of adaptations necessary for survival (morphological, physiological, behavioral)</p> <p>SC12.3.4.b Recognize that the concept of biological evolution is a theory which explains the 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 by the environment of those offspring better able to survive and leave offspring</p> <p>SC12.3.4.c Explain how natural selection provides a scientific explanation of the fossil record and the molecular similarities among the diverse species of living organisms</p> <p>SC12.3.4.d Apply the theory of biological evolution to explain diversity of life over time</p>		
<p>SC12.1.2 Historical Contributors</p> <p>SC12.1.2.a Recognize that scientific explanations must be open to questions, possible modifications, and must be based upon historical and current scientific knowledge</p> <p>SC12.1.2.b Describe how society influences the work of scientists and how science, technology, and current scientific discoveries influence and change society</p> <p>SC12.1.2.c Recognize that the work of science results in incremental advances, almost always building on prior knowledge, in our understanding of the world</p> <p>SC12.1.2.d Research and describe the difficulties experienced by scientific innovators who had to overcome commonly held beliefs of their times to reach conclusions that we now take for granted</p>		
<p>A. Evolution (6 days) [SC12.3.4.b, SC12.3.4.c, SC12.3.4.d]</p>		
<p>1. Theory of Evolution</p> <p>a. Linking Evidences</p> <p>b. Mechanisms of Evolution</p>	<p>Darwin, Voyage of the Beagle, Discussion, Video</p> <p>Nine Day Lesson Plan for Teaching Human Evolution – This site contains a nine day, step-by-step, lesson plan for the teaching of evolution. It includes handouts and workbooks.</p> <p>The study of human evolution begins with your DNA – This Internet site, maintained by the Dolan DNA Learning Center at Cold Spring Harbor Laboratory, provides two complete lessons for studying evolution through DNA fingerprinting. Lesson titles include Mitochondrial (mt) Point Mutations and Alu Insertion Polymorphism.</p>	<p>Position Statement</p> <p>Personal Observation Paper</p>

Concepts and Skills	Suggested Activities and Resources	Suggested Assessments
	Explorations Through Time – This Internet site, from the University of California Museum of Paleontology, provides seven lesson plans, centered on web activities that explore the history of life on Earth. The lessons are divided into three groups based on age, although most overlap, and focus on teaching students content along with the process of science.	
2. Consequences of the Interaction between [SC12.3.4.b] <ol style="list-style-type: none"> a. Potential for species to increase numbers b. Genetic Variability c. Finite Supply of Resources d. Selection of the Fittest 	Genetic Variability Survival of the Fittest Lesson Plans	
B. Diversity (6 days)		
Behavior Patterns Evolved through Natural Selection [SC12.3.4.a, SC12.3.4.b]		
a. Investigate and explain how the behavioral patterns of organisms have evolved through natural selection.		
Respond to External and Internal Stimuli [SC12.3.1.d]		
a. Investigate and describe how organisms respond to internal changes and external stimuli.		
SC12.1.2 Historical Contributors <p>SC12.1.2.a Recognize that scientific explanations must be open to questions, possible modifications, and must be based upon historical and current scientific knowledge</p> <p>SC12.1.2.b Describe how society influences the work of scientists and how science, technology, and current scientific discoveries influence and change society</p> <p>SC12.1.2.c Recognize that the work of science results in incremental advances, almost always building on prior knowledge, in our understanding of the world</p> <p>SC12.1.2.d Research and describe the difficulties experienced by scientific innovators who had to overcome commonly held beliefs of their times to reach conclusions that we now take for granted</p>		
1. Natural Selection [SC12.3.4.b]	Biodiversity	
2. Adaptations	The Best Beak for the Job	

Concepts and Skills	Suggested Activities and Resources	Suggested Assessments
SC12.1.3 Interactions of Science & Technology SC12.1.3.f Compare and contrast the reasons for the pursuit of science and the pursuit of technology SC12.1.3.g Explain how science advances with the introduction of new technology SC12.1.3.h Recognize creativity, imagination, and a good knowledge base are all needed to advance the work of science and engineering		
1. Research Current Technology 2. Classroom Technology	Research	Reporting Research Lab Write up
Technology in local, national, & global challenges [SC12.1.2.d] a. Understand that knowledge of basic concepts about scientific and technological challenges should precede active debate. b. Investigate and understand that social issues and challenges may affect advancements in science and technology. c. Understand that science and technology are essential social enterprises that indicate what could happen, but not what should happen.		
1. Discussion of Current Events & Technology	Research	Oral Report