

Biology Q1

Unit: Core: Science, Grade(s) 9-10th Grade
Biology Q1 Duration: 10 Weeks

Unit		
Scope and Sequence		
PROGRESS MONITORING		
Suggestions:		
<ul style="list-style-type: none"> Frequently track short term mastery of different instructional targets utilizing exit- slip, bell work, short cycle test, formative and summative assessments. NWEA: subject science grade 9th and 10th 		
ADDITIONAL RESOURCES	<ul style="list-style-type: none"> highered.mcgraw-hill.com/sites/0072919183/student_view0/johnson_explorations.html www.rpd.net/sciencetips_v2/L12B1.h School Net Infoho and ABC-CLIO www.fofweb.com/activelink2.asp?ItemID=WE40&SID=3&Topic=Biology. The Annenberg Media series "Teaching High School Science" is a six-video program that highlights a variety of classroom activities that foster inquiry-based learning. Section 7 & 8 	
INSTRUCTIONAL ALIGNMENT		
DIGITAL / PRINT TEXT <i>(*updated 8/15)</i>	ESSENTIAL QUESTIONS	DIFFERENTIATION
<p>Biology: The Dynamics of Life and Additional Resources</p> <ul style="list-style-type: none"> Chapter 1: The Science of Life. Chapter 1: Developing and testing hypothesis lab. Chapter 8: A view of the cell (pp. 189-213) Chapter 8: Minilab (pp. 191) Chapter 8: Energy in Cell Biolab (pp. 246-247) Chapter 8: Cell Reproduction Biolab (pp. 274-275) Chapter 9: Homeostasis and the Plasma Membrane (pp. 215-235) Chapter 9: Biolab (pp. 208-209) <p>*Honors: Modern Biology</p> <ul style="list-style-type: none"> Chapter 4: Structure and Function of the Cell (pp. 68-92) Chapter 5: Homeostasis and Transport Chapter 6: Photosynthesis (pp. 110-125) Chapter 7: Cellular Respiration (pp. 126-143) <p>*Additional Resources: Glencoe Biology</p> <ul style="list-style-type: none"> Chapter 7: Cellular Structure & Function (pp. 182-207) Chapter 8: Cellular Energy (pp. 218-233) Chapter 9: Cellular Reproduction(pp. 244-257) How does Cell Theory help us understand living things? If a cell is like a human being, what kinds of things does it need to do in order to stay alive? How does the structure of an organelle serve its function? How do organelles know what to do? How do materials and organelles move around within the cell? Does a plant need to eat and breath to stay alive like humans do? If so, how do they do it? If our cells need certain compounds to survive (ex. Carbohydrates, lipids, proteins), where do we get them and how do we get these compounds to our cells? How is it that energy in neither created or destroyed in organisms 		<p><i>The following can be used for gifted & struggling students with teacher modification & according to the needs of the student.</i></p> <ul style="list-style-type: none"> Strategies and free resources based on the Universal Design for Learning principles are available for meeting the needs of all learners including gifted students, English Language Learners (ELL) & students with disabilities can be found at www.cast.org. <p>Glencoe: Reading Essentials An interactive Student text Book</p> <ul style="list-style-type: none"> Chapter 7: Sections 1, 2 and 3 (pp. 69-82) Chapter 8: Sections 1, 2 and 3 (pp. 83-92) Chapter 9: Sections 1, 2and 3 (pp. 93-102) Chapter 10: Sections1, 2 and 3 (pp. 103-114) <p>Lexile level supplemental material:</p> <ul style="list-style-type: none"> www.lessonplansinc.com/biology_lesson_plans_cell_organelles.php teachers.sd43.bc.ca/DCharles/Classroom Documents/Chapter 1.pdf highered.mcgraw-hill.com/sites/0072919183/student_view0/chapter3/testing_your_knowledge.html
PERFORMANCE TASKS		
<p><i>This section provides examples of tasks that students may perform; this includes guidance for developing classroom performance tasks. It is not an all-inclusive checklist of what should be done, but is a springboard for generating innovative ideas.</i></p>		

<ul style="list-style-type: none"> • Construct a model that illustrates the difference between prokaryotic and eukaryotic cells • Investigate the effect of different chemicals on the growth of algal colonies. • Use mathematics to explain why under ideal situations the colonies cannot continue exponential growth. • Design and carry out investigations demonstrating how cells transport materials in and out of the cell • Group Activity - Creating a Plasma Membrane • Identify cell organelles and their functions. • Experimental Design: In this Investigation, prepare a wet mount of onion cells. Use slide to identify structures in plant cells. Then use a prepared slide to identify the structures in animal cells. • Project: Create an edible cell model • Describe significant similarities and differences in the basic structure of plant and animal cell • Plan and design an investigation to determine the factors that affect the activity of enzymes on their substrates. • Research and provide a written explanation of how unicellular organisms are used for industrial purposes. • Surface area to volume ratio of a cell (introduction to mitosis as well) www.biologyjunction.com/cell_size.htm • Lab - Osmosis and Diffusion Through an Egg Membrane • Diffusion Lab biologycorner.com/worksheets/diffusionlab.html • Potato Osmosis Lab www.biologyjunction.com/potato_osmosis_bi_lab.htm • chromatography lab www.biologyjunction.com/chromatography_plant_pigments • Developing and testing hypothesis lab: www.lessoncorner.com/l/amfroehle/VitruvianManDataCollection • Properties of life lab: serendip.brynmawr.edu/sci_edu/waldron/pdf/lsYeastAliveProtocol.pdf 	<p>Students will develop and perform an experiment to prove each of the following:</p> <ul style="list-style-type: none"> • Elodea Photosynthesis/Cell Respiration Lab. • Plan and design an investigation to determine the factors that affect the activity of enzymes on their substrates • Examine the role of bacteria in food production. Determine types of bacteria & how it impacts production of the product. • Students use textbook-based information to prepare to explain the relationship between respiration and photosynthesis. • Use graphs to interpret differences in cell cycle duration • Project: Cell Cycle Flip-Books • Lab on onion root to identify the stages of mitosis. • Construct a model of the stages of mitosis • Cancer and Cell Cycle Project: How can cell cycle and uncontrolled cell growth cause cancer • Explore an issue : The ethics of stem cell research
VOCABULARY	eukaryote, prokaryote, organelle, cytoplasm, golgi body, cell wall, mitochondria, chloroplast, cell membrane, endoplasmic reticulum, vacuole, nucleus, lysosome, ribosome, diffusion, osmosis, plasma, membrane, endocytosis, exocytosis, atp, cellular respiration, metabolism, photosynthesis, pigment, fermentation, chromosome, cell cycle, interphase, mitosis, diploid, stem cell, cancer, grana, stroma, aerobic respiration, anaerobic respiration, glycolysis
ASSESSMENTS	
ACADEMIC	ELA: RST.9-10.2, RST.9-10.4, W.9-10.1c, W.9-10.4, SL.9-10.4, RST.9-10.2, RST.9-10.3, RST.9-10.4
CONNECTIONS	SEL: Core Competency: Self-Management; Working toward achieving academic goals.

Standards Covered

Core: Science

Biology

SCI.9-12.: Cells

- SCI.9-12.: **Cell structure and function**
 - SCI.9-12.: **Eukaryotic cells and prokaryotic cells**
 - SCI.9-12.: **Structure, function and interrelatedness of cell organelles**
- SCI.9-12.: **Cellular processes**
 - SCI.9-12.: **Cell division and differentiation**
 - SCI.9-12.: **Characteristics of life regulated by cellular processes**
 - SCI.9-12.: **Photosynthesis, chemosynthesis, cellular respiration**

Materials

For a closer look at the materials list below, log onto <https://cleveland.schoolnet.com>

- Lessons:**
1. Bio: Reproduction sc
 2. BIO: Cell Structure and Function SC
 3. BIO: Cellular Transport
 4. Bio: Cellular processes sc
 5. Bio: Osmosis in elodea sc
 6. BIO: Mounting of cheek cell
 7. Bio:Cell and Organelles sc
 8. BIO:Cell Division-Mitosis sc
 9. BIO:Cellular Energy Photosynthesis/Respiration sc
 10. Bio:Fermentation in yeast sc
 11. BIO.Movement across the membrane/Lab sc
 12. Cancer Risks
 13. Cells 2: The Cell as a System
 14. Bio: Lab To compare an animal and plant cell sc
 15. Bio:Prokaryotic and Eukaryotic Cells sc

Biology Q2

Unit: Core: Science, Grade(s) 9th Grade - 12th Grade

Biology Q2

Duration: 10 Weeks

Unit		
Scope and Sequence		
PROGRESS MONITORING		
Suggestions:		
<ul style="list-style-type: none"> Frequently track short term mastery of different instructional targets utilizing exit- slip, bell work, short cycle test, formative and summative assessments. NWEA: subject science grade 9th and 10th 		
ADDITIONAL RESOURCES	<ul style="list-style-type: none"> National Institute of Health provides stories, archival sites, & an interactive site about the development of genomes. www.genome.gov/Educators/ Dolan DNA Learning Center has a wealth of educational resources: www.dnalc.org/ Steve Spangler Science: Strawberry DNA Extraction: www.stevespanglerscience.com/lab/experiments/strawberry-dna PBS Learning Media offers numerous lesson plans and case studies on topics including genetic testing, breeding desirable traits, and expression of genetic information. www.pbslearningmedia.org/search/?q=&selected_facets=supplemental_curriculum_hierarchy_nodes%3A427&selected_facets=resource_distribution_type_exact%3A0 	
INSTRUCTIONAL ALIGNMENT		
DIGITAL / PRINT TEXT	ESSENTIAL QUESTIONS	DIFFERENTIATION
<p>Biology: The Dynamics of Life, Glencoe</p> <ul style="list-style-type: none"> Chapter 12 Mendel and Meiosis; (pp. 298-304) Chapter 13 Genes and Chromosomes; (pp. 309-323) Chapter 13 Genes and Chromosomes; (pp. 324-328) Chapter 14: Patterns of Heredity; (pp. 333-350) Chapter 15: Human Heredity; (pp. 355-370) <p>Honors: Modern Biology, Holt, Rinehart and Winston</p> <ul style="list-style-type: none"> Chapter 8: Cell Reproduction; (pp. 153-156) Chapter 9: fundamentals of Genetics; (pp. 170-178) Chapter 12: Inheritance Patterns and Human Genetics; (pp. 220-237) Additional relevant information found: Chapters 9, 10, and 11 <p>Khan Academy, Genetics 101 Part 1, What Are Genes? www.khanacademy.org/science/biology/heredity-and-genetics/v/genetics-101-part-1--what-are-genes</p> <p>Khan Academy video describes SNPS, single base pair substitutions, which can account for differences and variations in traits www.khanacademy.org/science/biology/heredity-and-genetics/v/genetics-101-part-2--what-are-snps</p>	<ul style="list-style-type: none"> Does biological information encoded in the DNA of an organism's genome relate to its characteristics and traits? Does the sequence of DNA bases in a chromosome determine the sequence of amino acids in the resulting protein? Do alterations in DNA affect the success of an offspring in its environment? Can non-Mendelian patterns of inheritance account for inherited traits? 	<p><i>The following can be used for gifted & struggling students with teacher modification & according to the needs of the student.</i></p> <ul style="list-style-type: none"> Strategies and free resources based on the Universal Design for Learning principles are available for meeting the needs of all learners including gifted students, English Language Learners (ELL) & students with disabilities can be found at www.cast.org. Glencoe ConnectED: connected.mcgraw-hill.com/connected/login.do This online resource has a section called "Reading Essentials" that is written 2-3 grade levels below the Student Edition. FuelEducation: Biology-Part A contains resources for students who may benefit from reinforcement on the basic concepts. Mendelian Genetics: provides more advanced readings and study questions appropriate for Honors Biology: www.ndsu.edu/pubweb/~mcclean/plsc431/mendel/mendel1.htm FuelEducation: AP Biology Semester 1-Unit 4 covers genetics and contains resources appropriate for advanced learners. Tour of Basic Genetics: provides English and Spanish translation: learn.genetics.utah.edu/content/basics/
PERFORMANCE TASKS		
<p><i>This section provides examples of tasks that students may perform; this includes guidance for developing classroom performance tasks. It is not an all-inclusive checklist of what should be done, but is a springboard for generating innovative ideas.</i></p>		
<ul style="list-style-type: none"> Design a timeline from Mendel's, Darwin's and Wallace's work to the present day www.learner.org/interactives/dna/history.html A Science Odyssey: DNA workshop- You Try It www.pbs.org/wgbh/aso/tryit/dna/index-nojs.html McGraw Hill: Biological Concepts & Connections; Interactivity that includes a review of protein synthesis through matching and a 2nd section that allows students to build a protein: www.mhhe.com/socscience/anthropology/fuentes_lab/03_1/fuentes_3_1.html Nobelprize.org: DNA The Double Helix; An interactive game that covers major concepts about the structure and function of DNA. This site also has many other related virtual labs and games. www.nobelprize.org/educational/medicine/dna_double_helix/ Design and implement an investigation to test the effects of low doses of common chemicals (boric acid, acetone or vinegar) on the development of a plant from seed to adult. Represent the data in a way that demonstrates the relationship, if any, between the chemical and changes in the developmental pattern. Explain how the investigation is similar to or different from the processes that occur in the natural environment. Annenberg Learner DNA Site Map. Link to five different sections, each containing interactive activities : Genetics:(Punnett Squares, sex linkage, and multiple allele)s; Discovery of DNA; Human Genome Project; Genetic Engineering; and Implications and Ethics (gene therapy and GMO's) www.learner.org/interactives/dna/sitemap.html 		
INSTRUCTIONAL ALIGNMENT cont.		
PERFORMANCE TASKS cont.		

Virtual Labs:	
<ul style="list-style-type: none"> Breeding mutations in fruit flies: www.classzone.com/books/hs/ca/sc/bio_07/virtual_labs/virtualLabs.html DNA and Genes. It engages students in the effects of point mutations and frameshift mutations on genetic sequences: www.mhhe.com/biosci/genbio/virtual_labs/BL_26/BL_26.html Blood typing: www.classzone.com/books/hs/ca/sc/bio_07/virtual_labs/virtualLabs.html Inheritance of sex-linked traits: www.mhhe.com/biosci/genbio/virtual_labs_2K8/labs/BL_06/index.html What is the Role of DNA and RNA in protein synthesis?: www.glencoe.com/sites/common_assets/science/virtual_labs/LS04/LS04.html DNA Extraction: learn.genetics.utah.edu/content/labs/extraction/ Causes of mutations: learn.genetics.utah.edu/content/variation/mutation/ Dolan Learning Center: DNA Extraction: labcenter.dnalc.org/labs/dnaextraction/dnaextraction_d.html 	
VOCABULARY	diybrid crosses, Chi-square, incomplete dominance, sex-linked traits, gene, mutation, dominant, recessive, allele, amino acid, polygenic inheritance, epistasis, pleiotroph, Mendel, chromosome, chromatid, DNA, RNA
ASSESSMENTS	
ACADEMIC CONNECTIONS	<p>ELA: RI.1-10, RL1-10, W 1 (a-e), 2 (a-e), 4-10</p> <p>SEL: Display a positive interest in learning. Recognize personal qualities and external supports. Analyze how making use of school and community supports and opportunities can contribute to school and life success. Analyze factors that create stress or motivate successful performance. Create positive group dynamics; Seek ways to interact with or engage in projects with people whose cultures or ethnicities are unlike yours. ;Describe responsible behaviors for working cooperatively in teams, in school and in the workplace</p>
FIELD EXPERIENCES	<p>Great Lakes Science Center: BIOMEDETECH Display; Videos and displays focusing on genomics and stem cells. Hands-on activities that allow the exploration of the genetic code</p> <p>Distance Learning-Cleveland Museum of Natural History. Can accommodate up to 30 students and is 40-50 minutes in length. Genetics in Action: Your Daily Dose of DNA Technology.</p> <p>"Review current applications of DNA research and find out how biotechnology may affect your life. Did you have some GMOs for breakfast today? Your class will team up to analyze DNA evidence from a crime scene and simulate DNA fingerprinting—will you identify the correct suspect? Use our attached scenarios to review case studies involving genetic information and discuss how this knowledge influences ethical decisions."</p>

Standards Covered

Core: Science

Biology

SCI.9-12.: Heredity

- SCI.9-12.: **Cellular genetics**
- SCI.9-12.: **Genetic mechanisms and inheritance**
- SCI.9-12.: **Modern genetics**
- SCI.9-12.: **Mutations**
- SCI.9-12.: **Structure and function of DNA in cells**

Materials

For a closer look at the materials list below, log onto <https://cleveland.schoolnet.com>

Lessons:

1. Bio Easter Egg:Genetics sc
2. Bio: DNA extraction Lab
3. Bio: Reproduction sc
4. Bio: Inheritance Pattern DNA sc
5. Bio: Mendelian Inheritance sc
6. Bio: Penny Genetics Lab sc
7. Bio:Genetics/ Mutations sc
8. Bio:Lab on Punnett Squares sc
9. DNA Chips
10. Bio:Genetics An Inventory of traits sc
11. Bio: Genetics Project sc
12. BIO: Genetics KMM
13. Bio: Genetics /Traits sc
14. Bio: genetics Variation worksheet sc
15. Does It Matter Who Has Your Data

PROGRESS MONITORING	
<p>Suggestions:</p> <ul style="list-style-type: none"> Frequently track short term mastery of different instructional targets utilizing exit- slip, bell work, short cycle test, formative and summative assessments. NWEA: subject science grade 9th and 10th 	
INSTRUCTIONAL ALIGNMENT	
<p>ADDITIONAL RESOURCES</p> <ul style="list-style-type: none"> KHAN Academy has a series of online videos that address the topics of evolution and natural selection and variation in a species: www.khanacademy.org/science/biology/evolution-and-natural-selection/v/introduction-to-evolution-and-natural-selection PBS Online course for Teachers: Teaching Evolution. "This eight-session professional development course for teachers will deepen your understanding of evolution and address obstacles to teaching it." www.pbs.org/wgbh/evolution/educators/course/index.html PBS allows teachers to register for a free online account. There are numerous links to lesson plans, videos, and web quests o topics that address evidence of evolution, natural selection, and other major concepts pertaining to evolution. ideastream.pbslearningmedia.org/search/?q=evolution 	<p>FIELD EXPERIENCES</p> <p>Cleveland Museum of Natural History:</p> <ul style="list-style-type: none"> <i>Evolution</i>-for grades 9-12 (program length: 90 min) Investigate the great diversity of vertebrates. Discover which traits allowed each vertebrate group to thrive & how vertebrate classes evolved over time. <i>Humans: A Field Guide</i> for grades 6-12 (program length: 90 minutes) Explore some of the adaptations that make us different from other primates and the effects on our health. We will discuss bipedalism, food-sharing, language, "race" and the role of genes in our differences and shared inheritance. Five Kingdoms or More? High School (program length: 2 hours)How can we organize the diversity of life on Earth? From bacteria to plants and animals, examples will be displayed for perusal, evaluation and discussion. Discover empires, domains, kingdoms and the most important rank, phyla.
DIGITAL / PRINT TEXT	DIFFERENTIATION
<p>Biology: The Dynamics of Life</p> <ul style="list-style-type: none"> Chapter 18: Theory of Evolution (pp. 422-451) Chapter 20: Organizing Life (pp. 480-501) <p>Honors: Modern Biology: Holt, Rinehart and Winston</p> <ul style="list-style-type: none"> Chapter 15: Evolution: Evidence & Theory (pp. 278-297) Chapter 16: The Evolution of Populations & Speciation (pp. 298- 317) 	<p><i>The following can be used for gifted & struggling students with teacher modification & according to the needs of the student.</i></p> <ul style="list-style-type: none"> Strategies and free resources based on the Universal Design for Learning principles are available for meeting the needs of all learners including gifted students, English Language Learners (ELL) & students with disabilities can be found at www.cast.org. Glencoe ConnectED: connected.mcgraw-hill.com/connected/login.doonline resource has a section called "Reading Essentials "that is written two to three grade levels below the Student Edition. FuelEducation: Biology Part A contains resources that provide the reinforcement of basic concepts related to evolution; and AP Biology Semester 1 - Unit 4 covers topics in evolution appropriate for advanced learners Annenberg/CPB: www.learner.org/courses/biology/casestudy/frog.html. For the more advanced learner, this interactive case study engages students in the study of the evolutionary changes of Physalaemus frogs. It also provides information on how scientists use molecular information to develop evolutionary trees based on sequence homology. Howard Hughes Medical Institute: It's time to meet your Inner fish; a new 3-part series about how the human body has evolved. pbs.bento.storage.s3.amazonaws.com/hostedbento-prod/filer_public/yif-static/docs/TeacherGuide_YourInnerFish.pdf For the more advanced learner, this link provides related to molecular evidence for evolutionary relationships. ideastream.pbslearningmedia.org/resource/tdc02.sci.life.gen.lp_cytoc/molecular-evidence-for-evolutionary-relationships/
ESSENTIAL QUESTIONS	
<ul style="list-style-type: none"> Can environmental changes determine the frequency of expressed traits in a population due to the biological mechanism of natural selection? Can mathematical reasoning be used to solve problems? Can real-world problems be solved based on our current understanding of natural selection, gene flow, and sexual selection? Can mutations, limited resources, and the differential survival and reproduction of individuals with specific phenotypes combine and act as a driving force in the evolution of populations? 	
PERFORMANCE TASKS	
<p><i>This section provides examples of tasks that students may perform; this includes guidance for developing classroom performance tasks. It is not an all-inclusive checklist of what should be done, but is a springboard for generating innovative ideas.</i></p>	
<ul style="list-style-type: none"> University of Colorado's PhET: interactive simulation of natural selection for a population of rabbits phet.colorado.edu/en/simulation/natural-selection BIOMAN Biology: The goal of the game on this link is to determine how adaptations and natural selection drive the evolution of different populations of "smurfles" living on the Smurfle Islands. www.biomanbio.com/GamesandLabs/EvoClassGames/evolution.html The Evolution and Nature of Science Institute (ENSI) hosts a website that has a vast collection of lessons and labs on numerous topics related to evolution: geological and paleontological patterns, classification and hierarchy relationships, variation and natural selection, speciation, and macroevolution are included in the list. www.indiana.edu/~ensiweb/evol.fs.html Pearson Lab Bench Activity: Population Genetics and Evolution. This interactive tutorial applies the Hardy-Weinberg law of genetic equilibrium to study evolutionary changes in the allelic frequency within a population. Includes sample problems and a self-quiz. www.phschool.com/science/biology_place/labbench/lab8/intro.html PBS: All in the Family; "Are you, your cat, and your lunch related? Since all organisms descended from a single bacterial ancestor, the answer is yes. Of course, some ..." www.pbs.org/wgbh/evolution/change/family/ Biology Corner peppered moth simulation: peppered moth simulation activity: www.biologycorner.com/worksheets/pepperedmoth.html 	<p>Virtual Labs:</p> <ul style="list-style-type: none"> Role of mutations in the evolution of a species and the effect of natural selection on characteristics of a population. www.glencoe.com/sites/common_assets/science/virtual_labs/LS06/LS06.html Classify organisms into six kingdoms based on behavioral and physical characteristics. www.glencoe.com/sites/common_assets/science/virtual_labs/E07/E07.html How does competition affect population growth? glencoe.mcgraw-hill.com/sites/dl/free/0078802849/383928/BL_04.html The Big Picture: Animation with self-check questions that reviews five lines of evidence that support evolution: comparative anatomy, the fossil record, biogeography, field experiments, and molecular biology. www.sumanasinc.com/webcontent/animations/content/evolution/evolution.html Evolution in Action: Animation with self-check questions that documents the evolution of a population of flies by conducting an experiment on their starvation resistance trait. www.sumanasinc.com/webcontent/animations/content/evolution/evolution.html

Standards Covered

Core: Science

Biology

SCI.9-12.: Evolution

- SCI.9-12.: **Diversity of Life**
 - SCI.9-12.: **Speciation and biological classification based on molecular evidence**
 - SCI.9-12.: **Variation of organisms within a species due to population genetics and gene frequency**
- SCI.9-12.: **Mechanisms**
 - SCI.9-12.: **Gene flow (immigration, emigration)**
 - SCI.9-12.: **Genetic drift**
 - SCI.9-12.: **History of life on Earth**
 - SCI.9-12.: **Mutation**
 - SCI.9-12.: **Natural selection**
 - SCI.9-12.: **Sexual selection**

Materials

For a closer look at the materials list below, log onto <https://cleveland.schoolnet.com>

Lessons:

1. Bio: Evolution sc
2. Bio: Evolution/Lab on genetic Drift sc
3. Bio: Evolution/Lab on Natural Selection sc
4. Bio: Darwin's Finch Adaptation Lab sc
5. Bio: Evolution /Genetic drift Q 3 sc
6. Bio: Evolution Breeding bunnies procedure sc
7. Bio: Evolution Natural Selection Q3 sc
8. Bio: Evolution Peppered Moth Simulation sc
9. Bio: Evolution/ Adaptation Q 3 sc
10. Bio: Fossil Record sc

Additional Properties

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Biology Q4

Unit: Core: Science , Grade(s) 9th Grade - 12th Grade

Biology Q4

Duration: 10 Weeks

Unit		
Scope and Sequence		
PROGRESS MONITORING		
Suggestions:		
<ul style="list-style-type: none"> Frequently track short term mastery of different instructional targets utilizing exit- slip, bell work, short cycle test, formative and summative assessments. NWEA: subject science grade 9th and 10th OGT practice test 		
<u>DIGITAL / PRINT TEXT</u> <i>(*updated 8/15)</i>	<u>ESSENTIAL QUESTIONS</u>	<u>DIFFERENTIATION</u>
<p>Biology: The Dynamics of Life and Additional Resources</p> <ul style="list-style-type: none"> Chapter 3: Principles of Ecology (pp. 52-82) Chapter 4: Community Distribution (pp. 83-111) Chapter 5: Population Biology: (pp. 112-131) <p>*Honors: Modern Biology</p> <ul style="list-style-type: none"> Chapter 19: Introduction to Ecology (pp. 358-377) Chapter 20: Populations (pp. 378-395) Chapter 21: Community Ecology (pp. 396-413) Chapter 22: Ecosystems and Biosphere (pp. 414-423) Chapter 23: Environmental Science (pp. 440-463) <p>*Additional Resources: Glencoe Biology</p> <ul style="list-style-type: none"> Chapter 2: Principles of Ecology Chapter 3: Communities, Biomes and Ecosystem Chapter 4: Population Ecology Chapter 5: Biodiversity and Conservation How do different ecosystems determine the environment of your neighborhood? How is it possible that a decaying log feeds you? Describe how you and different populations are interconnected? How do we decide which scientific claim best supports the disappearance of dinosaurs? How will the population explosion affect the world in 2020? 2030? What are the effects of populations of different species on each other? 		<p><i>The following can be used for gifted & struggling students with teacher modification & according to the needs of the student.</i></p> <ul style="list-style-type: none"> Strategies & free resources based on the Universal Design for Learning principles are available for meeting the needs of all learners including gifted students, English Language Learners (ELL) & students with disabilities can be found at www.cast.org. Glencoe Biology: Glencoe Biology Reading Essentials: An Interactive e-Text that provides differentiated reading levels, interactive tables and enrichment materials connected.mcgraw-hill.com/connected/browseCourse.do?id=ZGLZOE23S9Z7PCEEP59RGM.8Chapter 2 (pp. 11-22), Chapters 4 and 5 Holt Modern Biology: text and resources for AP & Honors Energy in an Ecosystem Webquest Simple interactive lessons and worksheet: www.zephyrus.co.uk/puzzlesmaster.html Research and present a model that demonstrates how ecosystems are reasonably stable over hundreds or thousands of years, dependent on climate, limiting factors, carrying capacities and biogeochemical cycles Free resources based on the Universal Design for Learning principles are available at www.cast.org/learningtools/index.html
PERFORMANCE TASKS		
<i>This section provides examples of tasks that students may perform; this includes guidance for developing classroom performance tasks. It is not an all-inclusive checklist of what should be done, but is a springboard for generating innovative ideas.</i>		
Visions into Practice:		

- | | |
|--|---|
| <ul style="list-style-type: none"> • Construct a model that illustrates biomagnifications • Quantify the distribution and buildup of the molecule being studied • Predict and explain the consequences at each trophic level as the relative concentration of the chemical rises. Include in your justification the changes in the number of organisms at each trophic level, matter cycling & energy transfer from level to another. • To illustrate the flow of energy through simple food chain. • To create a food web of organisms in a given community. • Sequence the stages of succession in different communities • Study the effects of the introduction of an invasive species in an ecosystem • Predict the effects of changing one or two factors in an ecosystem, giving reasons for their predictions. • Calculate the ability of a population to survive in a theoretical habitat • Design a spreadsheet or graph to illustrate population growth, competition, and carrying capacity. | <ul style="list-style-type: none"> • Study patterns of population in ecosystems • Describe the factors that affect the carrying capacity of the environment. • Explain how change in population density is affected by emigration, immigration, birth rate and death rate, and relate these factors to the exponential growth of human populations. • Explain how technological advances have affected the size and growth rate of human populations throughout history. • Investigate causes for endangered species • Explain how change in population density is affected by emigration, immigration, birth rate and death rate, and relate these factors to the exponential growth of human populations. • Explain how technological advances have affected the size and growth rate of human populations throughout history. • Human activities that impact our environment: pollution, habitat destruction, non-native species introduction, deforestation • Interpreting chart on population change <p>Biology Dynamics of Life Laboratory Manual: Eagle Population Lab</p> |
|--|---|

INSTRUCTIONAL ALIGNMENT *cont.*

PERFORMANCE TASKS *cont.*

Virtual Labs:

- To explore the number of different biomes & ecosystem and to classify the organisms trophic level: connected.mcgraw-hill.com/media/repository/protected_content/COMPOUND/50000025/29/75/BL_23/player.html
- To trace the energy flow through an ecosystem: connected.mcgraw-hill.com/media/repository/protected_content/COMPOUND/50000025/14/14/BL_02/player.htm
- Construction of Food Web: [projects/Chinook park/curriculum links/grade6/food chains](#)
- Interactive Ecology Lab: www.learner.org/courses/envsci/interactives/ecology/producers_2.php
- Predator prey simulation: www.biologycorner.com/worksheets/pred_prey.html#U17U0YkpAeE
- Practice work sheets & videos on food chain: teachers.oregon.k12.wi.us/sundstrom/EnvironmentalSci/EcosystemEnergyWebQuest
- Interactive ecology lab: www.learner.org/courses/envsci/interactives/ecology/food_web_1.php
- Examining the stages in ecological succession: www.biologycorner.com/worksheets/examining_stages_succession.html#U1bhtokpA5s
- Interactive carbon cycle lab: www.learner.org/courses/envsci/interactives/carbon/feedback_effects_fyc.php
- Cycling of matter self-study and vocabulary acquisition: www.ck12.org/book/CK-12-Biology/r10/section/11.2
- Projects on environmental issues: toxics.usgs.gov/
- Power point on Biomes: docs.google.com/presentation/d/... www.biologycorner.com/worksheets/predator_prey_graphing
- Conservation of bald eagle: www.learner.org/north/eagle/index.html
- Interpret graph on human population: www.biologycorner.com/worksheets/humanpop_graph.html
- Investigate the causes for endangered species: www.biologycorner.com/lesson-plans/ecology/

VOCABULARY	biogeochemical cycle, trophic level, ecological succession, food chain, eutrophication, biomagnification, denitrification, transpiration, ecosystems, homeostasis, carrying capacity, equilibrium and disequilibrium, ecology, carrying capacity, population, immigration, emigration, limiting factor
ASSESSMENTS	
ACADEMIC CONNECTIONS	<p>ELA: RST.9-10.2, RST.9-10.4, W.9-10.1c, W.9-10.4, SL.9-10.4, RST.9-10.2, RST.9-10.3, RST.9-10.4;</p> <p>SOC: World Geography-Environment and Society: 6. There are costs and benefits of using renewable, nonrenewable, and flow resources;</p> <p>SEL: Core Competency: Self-Management; Working toward achieving academic goals.</p>

Standards Covered

Core: Science

Biology

SCI.9-12.: Diversity and Interdependence of Life

- SCI.9-12.: **Classification systems are frameworks created by scientists for describing the vast diversity of organisms indicating the degree of relatedness between organisms.**
- SCI.9-12.: **Ecosystems**
 - SCI.9-12.: **Homeostasis**
 - SCI.9-12.: **Carrying capacity**
 - SCI.9-12.: **Equilibrium and disequilibrium**

Materials

For a closer look at the materials list below, log onto <https://cleveland.schoolnet.com>

Lessons:

1. Bio: Ecology /Lab sc

2. Bio: Ecology sc
3. Bio: Ecosystem sc
4. Bio: Lab on Random Sampling with Dandelions sc
5. Bio: Design a mini Ecosystem sc
6. Bio: Ecological imbalance Q4 sc
7. Bio: Mark and Recapture Lab sc
8. Bio: Nitrogen Cycle sc
9. Bio: Resources and Industry sc
10. BIO:Ecosystems: Organisms And Their Environments
11. ENV - Alternative Energy Project
12. ENV - Deforestation Research Assignment
13. ENV - CFCs and the Ozone project
14. ENV - Habitat Analysis

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