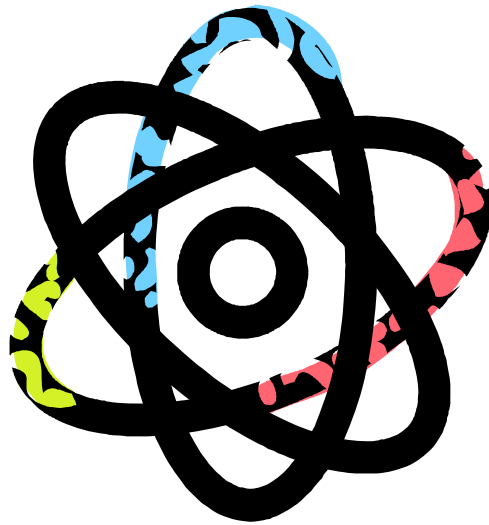


10th Grade Biology Curriculum



Bridgeport Public Schools

Aresta L. Thompson
Director Science/ Life Skills

Bridgeport Public Schools 06/08 - Draft



Bridgeport Board of Education Public Schools

John J. Ramos Sr. Ed.D., Superintendent

Henry R. Kelly, Deputy Superintendent of Schools

Robert Henry, Chief of Staff

Teresa A. Carroll, Assistant Superintendent of Elementary Education

Douglas Hiscox, Assistant Superintendent of Secondary Education

John Di Donato, Assistant Superintendent for Youth Development

Cynthia Fernandes, Director of Learning and Teaching

Aresta L. Thompson, Director of Science



Bridgeport Board of Education Members

Maximino Medina - President

Barbara Bellinger - Vice President

Alice B. Nealon - Secretary

Nereyda Robles

Bobby Simmons

John Olson

Sauda Baraka

Thomas Cunningham

Delores Fuller

10th Grade Science Curriculum Committee

Lea Catherman- Teacher Central High School

Donna Constantini - Teacher Central High School

Deanna DiLuggo - Teacher Central High School

Dr. Jeanette Pagan - Teacher Central High School

Marilyn Pearson - Teacher Central High School

COURSE: Biology
UNIT 1: Introduction to Biology
CONTACT: athompson@bridgeportedu.net
TIME FRAME: 3 Weeks-1st Marking Period

CODE:
MAP LEVEL: 4
GRADE: 10

PERFORMANCE STANDARDS

SCIENCE - SCIENTIFIC INQUIRY (I)

- 27.1.1.9.1 Students will identify questions that can be answered through scientific investigation.
- 27.1.1.9.2 Students will read, interpret and examine the credibility and validity of scientific claims in different sources of information.
- 27.1.1.9.3 Students will formulate a testable hypothesis and demonstrate logical connections between the scientific concepts guiding the hypothesis and the design of the experiment.
- 27.1.1.9.4 Students will design and conduct appropriate types of scientific investigations to answer different questions.
- 27.1.1.9.5 Students will identify independent and dependent variables, including those that are kept constant and those used as controls.
- 27.1.1.9.6 Students will use appropriate tools and techniques to make observations and gather data.

SCIENCE - SCIENTIFIC INQUIRY (I)

- 27.1.1.9.7 Students will assess the reliability of the data that was generated in the investigation.
 - 27.1.1.9.8 Students will use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.
 - 27.1.1.9.9 Students will articulate conclusions and explanations based on the results of the research, and assess their validity based on the design of the investigation.
 - 27.1.1.9.10 Students will communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.
-

ESSENTIAL/FOCUS QUESTIONS

- What is the scope and meaning of Biology?
 - What are the branches of Biology?
 - What is a scientist?
 - How do scientists investigate questions and solve problems?
 - Why do scientists classify organisms?
-

CONTENT

Scientific method
Themes
Classification

SKILLS

Discuss the importance of lab safety and proper lab procedures (2)
Solve problems using the scientific method (3)
Develop a lab report (5)
Collect and graph data (3)
Explain the themes that unify life (2)
Measure using the appropriate SI units (2)
Perform a controlled experiment (5)
Classify organisms (2)

ASSURED EXPERIENCES

Lab Safety and procedures activity
Design a controlled experiment
Graphing activity
Science Fair Project

ASSESSMENTS

Pre-assessment
Post-assessment
Tests
Quizzes
Lab reports
Cooperative group activities
Homework
Open-ended questions
Oral questioning presentations
Inquiry-based activities & questions
Concept maps
Portfolios
Bio journal
Rubrics in preparation for CAPT testing
Self-assessment

OPTIONAL ACTIVITIES

Corn Lab Activity
Thumb Wrestling Activity

RESOURCES

Textbook:

Exploring Life

Modern Biology (Magnet Only)

Lab Manual:

Exploring Life

Modern Biology (Magnet Only)

Cybered Software

Internet Resources

Steps of the Scientific Method

http://www.sciencebuddies.org/mentoring/project_scientific_method.shtml

Flinn Scientific - Lab Safety <http://www.flinnsci.com/Sections/Safety/safety.asp>

SI Units <http://physics.nist.gov/cuu/Units/>

Graphing <http://nces.ed.gov/nceskids/createagraph/> (students can create different types of graphs online)

<http://staff.tuhsd.k12.az.us/gfoster/standard/bgraph2.htm>

Themes of Biology

<http://www.slideshare.net/heasulli/section-1-1-1-themes-of-biology/> (slide show on themes of biology with engaging images)

<http://mtwow.org/major-themes-biology.htm> (notes on themes of biology)

www.isd77.k12.mn.us/~cklase1/CH1/HTML%201.1/1.1ThemesofBio.ppt (ppt on themes with notes and some visuals)

Classification of Life

<http://sciencespot.net/Pages/kdzbioclass.html> (website with links to activities, information, flashcards, crosswords puzzles, etc.)

Lab Report Writing

<http://staff.gps.edu/McConnell/Toolbox/labreport.htm> (info on lab report writing with a sample lab report)

<http://www.gacps.k12.md.us/cms/sci/tools/RADLABRP.HTM> (lab report writing, sample conclusions, checklists)

United Streaming:

"Biology: The Science of Life: The World of Living Things"

"The Basics of Biology: What Is Life?"

"The Basics of Biology: How Living Things Are Classified"

"How Scientists Work: What Is the Scientific Method?"

"Scientific Method and Measurement"

ADDITIONAL NOTES

Instructional Strategies

Create a climate for learning

Assess prior knowledge

Practice effective questioning techniques

Vary the structure of lessons

Vary the way students work

Use warm-up activities

Create and embed science, technology and society (STS) activities

Strengthen comprehension for content area text

Common assessments within and across all disciplines

Allow opportunities for peer review

Direct instruction

Classroom discussion

Graphic organizers

Cooperative learning strategies

Higher order level thinking skills

Outlines/drawings

Internet research

Integrate technology lessons/activities

Library research

Hands-on laboratory research skills

Laboratory activities

Audio-visual enhancements

VOCABULARY

Adaptation	Ecosystem	Observation
Animalia	Eukarya	Organism
Bacteria	Evolution	Plantae
Biology	Fungi	Producer
Cell	Generalization	Prokarya
Classification	Genes	Protista
Consumer	Hypothesis	Qualitative
Controlled experiment	Independent variable	SI units
Data	Inference	System
Dependent variable	Inquiry	Technology
DNA	Kingdom	Theory
Domain	Natural selection	Variable

COURSE: Biology
UNIT 2: Cell Structure and Function
CONTACT: athompson@bridgeportedu.net
TIME FRAME: 4/5 Weeks - 1st Marking Period

CODE:
MAP LEVEL: 4
GRADE: 10

PERFORMANCE STANDARDS

SCIENCE - SCIENTIFIC INQUIRY (I)

- 27.1.1.9.1 Students will identify questions that can be answered through scientific investigation.
- 27.1.1.9.2 Students will read, interpret and examine the credibility and validity of scientific claims in different sources of information.
- 27.1.1.9.3 Students will formulate a testable hypothesis and demonstrate logical connections between the scientific concepts guiding the hypothesis and the design of the experiment.
- 27.1.1.9.4 Students will design and conduct appropriate types of scientific investigations to answer different questions.
- 27.1.1.9.5 Students will identify independent and dependent variables, including those that are kept constant and those used as controls.
- 27.1.1.9.6 Students will use appropriate tools and techniques to make observations and gather data.

SCIENCE - SCIENTIFIC INQUIRY (I)

- 27.1.1.9.7 Students will assess the reliability of the data that was generated in the investigation.
- 27.1.1.9.8 Students will use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.
- 27.1.1.9.9 Students will articulate conclusions and explanations based on the results of the research, and assess their validity based on the design of the investigation.
- 27.1.1.9.10 Students will communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.

SCIENCE - LIFE SCIENCE (V,VI,VII)

- 27.3.6.10.27 Students will describe significant similarities and differences in the basic structure of plant and animal cells.
 - 27.3.6.10.29 Students will describe the flow of matter and energy in the processes of photosynthesis and cell respiration.
 - 27.3.6.10.30 Students will explain the role of the cell membrane in maintaining a constant internal environment.
-

ESSENTIAL/FOCUS QUESTIONS

What is the smallest possible unit that exhibits all of the characteristics of life?

How do cells communicate and maintain homeostasis?

What is the relationship between structure and function within the cell?

Focus Questions:

1. What are the characteristics of living things?
 2. What is the smallest possible unit that exhibits all of the characteristics of life?
 3. What is the difference between prokaryotic and eukaryotic cells?
 4. How are plant and animal cells similar and different?
 5. What is a phospholipid and how do its unique properties benefit the cell?
 6. Why is the cell membrane described as “semi-permeable” and “fluid mosaic”?
 7. How do water and other molecules move in and out of the cell?
 8. How do the organelles function together to produce proteins and enzymes?
-

CONTENT

Active and Passive Transport
Prokaryote cells
Eukaryote cells
Cell theory
Cell membrane

SKILLS

List and describe the “Seven Characteristics of Life” – Cells/Organization, Reproduction/Inheritance, Use of Energy/Metabolic Processes, Response to Environmental Stimuli (Movement), Growth & Development, Maintenance of Homeostasis, & Evolution (1)

Describe the three tenets of the cell theory and identify the scientists who contributed to its development (1)

Identifying the names and functions of the parts of a microscope (1)

Differentiate between electron and light microscopes in terms of magnification power and appropriate uses (4)

Compare and contrast prokaryotic and eukaryotic cells in terms of evolution, complexity, and representative organisms (6)

List and describe all eukaryotic cell organelles in terms of structure and function (1)

Differentiate between plant and animal cells visually and verbally by identifying variations in organelle types, amounts, and structural modifications (4)

Describe the fluid mosaic model of the cell membrane in terms of structure as related to function as a semipermeable bilayer (1)

Evaluate the flow of molecules across a membrane via diffusion, osmosis, facilitated diffusion, and active transport (6)

Describe the coordinated efforts of the organelles of the cell toward building molecules, maintaining homeostasis, and performing all the processes necessary to life (1)

ASSURED EXPERIENCES

Cell study using the microscope

Calculating and graphing data regarding surface area to volume ratios of cells

Diffusion/Osmosis lab

ASSESSMENTS

Pre-assessment

Post-assessment

Tests

Quizzes

Lab reports

Cooperative group activities

Homework

Open-ended questions

Oral questioning presentations

Inquiry-based activities & questions

Concept maps

Portfolios

Bio journal

Rubrics in preparation for CAPT testing

OPTIONAL ACTIVITIES

Stem cell research project

Cell project – build a model cell

Comparing the Effects of Cell Shape on Diffusion Rate

www.accessexcellence.com

- a. "Cell Analogies Collage"
 - b. "Biography of a Scientist"
 - c. "Journey into a Cell"
-

RESOURCES

Textbook:

Exploring Life

Modern Biology (Magnet Only)

Bridgeport Public Schools 06/08 - Draft

Lab Manual:
Exploring Life
Modern Biology (Magnet Only)

Cyber Ed Software

Internet resources <http://www.cellsalive.com/?Cells+Alive=>

<http://www.biologycorner.com/worksheets/cell-analogy.html>

<http://vilenski.org/science/safari/menu/index.html>

<http://www.biologycorner.com/bio1/microscope.html>

<http://www.biologycorner.com/resources/microscope-boxed.gif>

http://www.phschool.com/science/biology_place/labbench/lab1/intro.html

http://www.biology.arizona.edu/Cell_BIO/activities/cell_cycle/cell_cycle.html

http://www.wisc-online.com/objects/index_tj.asp?objID=AP11403

<http://www.scsc.k12.in.us/SMS/Teachers/Martin/intro.htm>

United Streaming

"Elements of Biology: The Cell: Structure and Function"

"Life Science: Cells"

"Life Science: Plants"

"Simply Science: A Close-up View of Growth"

ADDITIONAL NOTES

Instructional Strategies

Create a climate for learning

Assess prior knowledge

Practice effective questioning techniques

Vary the structure of lessons

Vary the way students work

Use warm-up activities

Create and embed science, technology and society (STS) activities

Strengthen comprehension for content area text

Common assessments within and across all disciplines

Allow opportunities for peer review

Direct instruction

Classroom discussion

Graphic organizers

Cooperative learning strategies

Bridgeport Public Schools 06/08 - Draft

Higher order level thinking skills
 Outlines/drawings
 Internet research
 Integrate technology lessons/activities
 Library research
 Hands-on laboratory research skills
 Laboratory activities
 Audio-visual enhancements

VOCABULARY

Active Transport	Endoplasmic Reticulum (smooth, rough)	Hypertonic	Osmosis
Asexual	Eukaryote	Hypotonic	Plasma (cell) membrane
Autotroph	Evolution	Isotonic	Phospholipid
Cell	Faciliated	Lysosome	Prokaryote
Cell wall	Diffusion	Metabolism	Protein synthesis
Cilia	Flagella	Mitochondria	Reproduction
Chloroplas	Fluid Mosaic Model	Multicellular	Response
Cholesterol	Golgi Apparatus	Nuclear membrane (envelope)	Ribosome
Chromatin	Heterotroph	Nucleus	Semi permeable
Concentration	Homeostasis	Nucleolus	Sexual
Gradient	Hydrophilic	Organic	Stimuli
Cytoplasm	Hydrophobic	Organelle	Transport protein
Cytoskeleton			Vacuole
Diffusion			Unicellular

COURSE: Biology
UNIT 3: Biochemistry
CONTACT: athompson@bridgeportedu.net
TIME FRAME: 2/3 weeks, 1st Marking Period

CODE:
MAP LEVEL: 4
GRADE: 10

PERFORMANCE STANDARDS

SCIENCE - SCIENTIFIC INQUIRY (I)

- 27.1.1.9.1 Students will identify questions that can be answered through scientific investigation.
- 27.1.1.9.2 Students will read, interpret and examine the credibility and validity of scientific claims in different sources of information.
- 27.1.1.9.3 Students will formulate a testable hypothesis and demonstrate logical connections between the scientific concepts guiding the hypothesis and the design of the experiment.
- 27.1.1.9.4 Students will design and conduct appropriate types of scientific investigations to answer different questions.
- 27.1.1.9.5 Students will identify independent and dependent variables, including those that are kept constant and those used as controls.
- 27.1.1.9.6 Students will use appropriate tools and techniques to make observations and gather data.

SCIENCE - SCIENTIFIC INQUIRY (I)

- 27.1.1.9.7 Students will assess the reliability of the data that was generated in the investigation.
- 27.1.1.9.8 Students will use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.
- 27.1.1.9.9 Students will articulate conclusions and explanations based on the results of the research, and assess their validity based on the design of the investigation.
- 27.1.1.9.10 Students will communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.

SCIENCE - LIFE SCIENCE (V, VI, VII)

- 27.3.6.10.29 Students will describe the flow of matter and energy in the processes of photosynthesis and cell respiration.

SCIENCE - PHYSICAL SCIENCE (II, III, IV)

- 27.2.2.6.1 Students will describe the properties of common elements such as oxygen, hydrogen, carbon, iron and aluminum.
- 27.2.2.9.10 Students will describe the general structure of the atom, and explain how the properties of the first 10 elements in the Periodic Table are related to their atomic structure.
- 27.2.2.9.11 Students will describe how atoms combine to form new substances by transferring electrons (ionic bonding) or sharing electrons (covalent bonding).

27.2.2.9.13 Students will explain how the structure of the carbon atom affects the type of bonds it forms in organic and inorganic molecules.

ESSENTIAL/FOCUS QUESTIONS

Essential Questions

What are organic compounds and what are they composed of?
What is a chemical reaction and how does a catalyst affect it?
How do waters' properties support life on Earth?

Focus Questions:

What is the relationship between elements, atoms and molecules?
What is water and how do its unique properties help to support life on Earth?
What are organic compounds?
What is a chemical reaction?
How do enzymes affect chemical reactions?

CONTENT

Organic molecules
Properties of water
Atoms and molecules
Catalysts

SKILLS

Explain the role of enzymes and how they affect the rate of chemical reactions by lowering the activation energy (2)

Compare and contrast the roles of Carbohydrates, Lipids, Proteins and Nucleic Acids in the cellular process (6)

Differentiate between carbohydrates in terms of complexity using the classifications of polysaccharide, disaccharide, and monosaccharide (4)

Compare and contrast the different forms of lipids in terms of their structure and function (6)

Recognize the relationship between proteins, polypeptides, peptide bonds, and amino acids (4)

Recognize DNA and RNA as nucleic acids as both have their nucleotide as their basic unit (4)

Apply basic chemistry concepts including the properties of water, PH, reactions, solutions, and bonding (2)

ASSURED EXPERIENCES

Embedded Task: Enzymes
Bridgeport Public Schools 06/08 - Draft

ASSESSMENTS

Pre-assessment
Post-assessment
Tests
Quizzes
Lab reports
Cooperative group activities
Homework
Open-ended questions
Oral questioning presentations
Inquiry-based activities & questions
Concept maps
Portfolios
Bio journal
Rubrics in preparation for CAPT testing
Self-assessment

OPTIONAL ACTIVITIES

The Demise of a Halloween Pumpkin, www.accessexcellence.com
Identifying Organic Compounds in Foods, found on page 64 in Modern Biology
Identify nutrient content of foods on the nutrition facts label
Calorimeter experiment – measuring energy content of food
Demonstrate properties of water and plants using celery and food coloring
Sketch or create a model of the structural formulas for organic compounds
Vitamin C Lab (2005 CAPT Lab)

RESOURCES

Textbook:
Exploring Life
Modern Biology (Magnet Only)

Lab Manual:
Exploring Life
Modern Biology (Magnet Only)

Cybered Software

Internet resources

<http://www.queenoflub.com/biochem/>

Biochem Basics for High School Students – written by a high school student

http://serendip.brynmawr.edu/sci_edu/chemsites.html Interactive Chemistry

United Streaming:

Elements of Chemistry: Carbon: The Element of Life
Energy and The Chemistry of Life

ADDITIONAL NOTES

Instructional Strategies

Create a climate for learning
Assess prior knowledge
Practice effective questioning techniques
Vary the structure of lessons
Vary the way students work
Use warm-up activities
Create and embed science, technology and society (STS) activities
Strengthen comprehension for content area text
Common assessments within and across all disciplines
Allow opportunities for peer review
Direct instruction
Classroom discussion
Graphic organizers
Cooperative learning strategies
Higher order level thinking skills
Outlines/drawings
Internet research
Integrate technology lessons/activities
Library research
Hands-on laboratory research skills
Laboratory activities
Audio-visual enhancements

VOCABULARY

Acids	Cohesion	Inorganic	Polypeptide
Activation Energy	Compounds	Ionic bonds	Polysaccharides
Adhesion	Covalent Bonds	Isotope	Products
Amino Acids	Denaturation	Lipids	Proteins
Atom	Density	Molecules	Proton
Atomic Number	Disaccharides	Monomers	Radioactive isotope
Bases	Electron	Monosaccharides	Reactants
Buffers	Enzymes	Neutron	Saturated fats
Capillary	Fats	Nitrogens	Solute
Carbohydrates	Functional groups	Nucleus	Solution
Carbons	Glycogen	Organic	Solvent
Catalyst	Hydrophilic	Oxygen	Starch
Cellulose	Hydrophobic	pH	Steroids
Chemical reactions	Hydrogen Bond	Polar molecules	Substrate
Cholesterol	Hydrogens	Polymers	Unsaturated fats

COURSE: Biology
UNIT 4: Photosynthesis and Respiration
CONTACT: athompson@bridgeportedu.net
TIME FRAME: 5-6 weeks, 2nd Marking Period

CODE:
MAP LEVEL: 4
GRADE: 10

PERFORMANCE STANDARDS

SCIENCE - SCIENTIFIC INQUIRY (I)

- 27.1.1.9.1 Students will identify questions that can be answered through scientific investigation.
- 27.1.1.9.2 Students will read, interpret and examine the credibility and validity of scientific claims in different sources of information.
- 27.1.1.9.3 Students will formulate a testable hypothesis and demonstrate logical connections between the scientific concepts guiding the hypothesis and the design of the experiment.
- 27.1.1.9.4 Students will design and conduct appropriate types of scientific investigations to answer different questions.
- 27.1.1.9.5 Students will identify independent and dependent variables, including those that are kept constant and those used as controls.
- 27.1.1.9.6 Students will use appropriate tools and techniques to make observations and gather data.

SCIENCE - SCIENTIFIC INQUIRY (I)

- 27.1.1.9.7 Students will assess the reliability of the data that was generated in the investigation.
- 27.1.1.9.8 Students will use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.
- 27.1.1.9.9 Students will articulate conclusions and explanations based on the results of the research, and assess their validity based on the design of the investigation.
- 27.1.1.9.10 Students will communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.

SCIENCE - LIFE SCIENCE (V, VI, VII)

- 27.3.6.1.13 Students will describe the different structures plants have for obtaining water and sunlight.
- 27.3.6.5.20 Students will describe how light absorption and reflection allow us to see the shapes and colors of objects.
- 27.3.6.10.27 Students will describe significant similarities and differences in the basic structure of plant and animal cells.
- 27.3.6.10.29 Students will describe the flow of matter and energy in the processes of photosynthesis and cell respiration.
- 27.3.6.10.33 Students will explain how bacteria and yeasts are used to produce foods for human consumption.

27.3.5.6.4 Students will describe how abiotic factors such as temperature, water and sunlight affect plants ability to create their own food through photosynthesis.

SCIENCE - LIFE SCIENCE (V, VI, VII)

27.3.7.4.10 Students will describe how animals, directly or indirectly, depend on plants to provide the food and energy they need in order to grow and survive.

SCIENCE - SCIENCE & TECHNOLOGY IN SOCIETY (XI)

27.5.11.10.43 Students will describe the factors that affect the carrying capacity of the environment.

27.5.11.10.44 Students will 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.

27.5.11.10.45 Students will explain how technological advances have affected the size and growth rate of human populations throughout history.

ESSENTIAL/FOCUS QUESTIONS

Essential Questions:

How does energy transform from the primary source through producers to consumers?
What is the function of ATP?

Focus Questions:

How do plants transform energy from the sun, CO₂ and H₂O into sugar and oxygen?
How do animals use the products of photosynthesis to produce ATP, CO₂ and H₂O?
How is ATP used in the cell?

What are some alternative paths for energy production?

CONTENT

Photosynthesis
Respiration
Fermentation
Transformation of Energy
ATP

SKILLS

Explain the transformation of energy from a non-living to a living source. (2)

Compare and contrast the reactants and products of photosynthesis and respiration. (6)

Explain the interactions between the reactants and products of photosynthesis and

respiration. (2)

Explain how ATP is used and manufactured in cells. (2)

Compare and Contrast the energy yields for photosynthesis, respiration, and fermentation. (6)

ASSURED EXPERIENCES

Embedded Task: Yeast Populations

Embedded Task: Human Populations

Sketch the cycles of photosynthesis and cellular respiration

ASSESSMENTS

Pre-assessment

Post-assessment

Tests

Quizzes

Lab reports

Cooperative group activities

Homework

Open-ended questions

Oral questioning presentations

Inquiry-based activities & questions

Concept maps

Portfolios

Bio journal

Rubrics in preparation for CAPT testing

Self-assessment

OPTIONAL ACTIVITIES

1. "Observing Cellular Respiration" page 142 Modern Biology

2. Cheese making fermentation lab NEO SCI kit

3. Muscle activity and lactic acid (see New York Times article from May 16, 2006)

4. Photosynthesis lab (<http://chem.lapeer.org/Bio1Docs/PhotoLab.html>)

5. Paper chromatography (http://www.yesmag.bc.ca/projects/paper_chroma.html)

RESOURCES

Textbook:

Exploring Life

Modern Biology (Magnet Only)

Lab Manual:

Bridgeport Public Schools 06/08 - Draft

Exploring Life
Modern Biology (Magnet Only)

Cybered Software

Internet resources:

Metabolism Animations: <http://www.stolaf.edu/people/giannini/biological%20anamations.html>

Photosynthesis

Photosynthesis activities:

http://wps.prenhall.com/esm_freeman_biosci_1/7/1947/498648.cw/index.html

Photosynthesis Games: <http://www.quia.com/jg/208263.html>

Respiration and fermentation

Overview of Respiration and Fermentation, with links to recipes!

<http://biology.clc.uc.edu/Courses/bio104/cellresp.htm>

Cellular respiration interactive tutorial:

http://www.phschool.com/science/biology_place/biocoach/cellresp/intro.html

Cellular respiration in detail:

<http://faculty.clintoncc.suny.edu/faculty/michael.gregory/files/bio%20101/bio%20101%20lectures/Cellular%20Respiration/cellular.htm>

Metabolism Animations: <http://www.stolaf.edu/people/giannini/biological%20anamations.html>

Photosynthesis

Photosynthesis activities:

http://wps.prenhall.com/esm_freeman_biosci_1/7/1947/498648.cw/index.html

Photosynthesis Games: <http://www.quia.com/jg/208263.html>

Respiration and fermentation

Overview of Respiration and Fermentation, with links to recipes!

<http://biology.clc.uc.edu/Courses/bio104/cellresp.htm>

Cellular respiration interactive tutorial:

http://www.phschool.com/science/biology_place/biocoach/cellresp/intro.html

Cellular respiration in detail:

<http://faculty.clintoncc.suny.edu/faculty/michael.gregory/files/bio%20101/bio%20101%20lectures/Cellular%20Respiration/cellular.htm>

United Streaming:

The World of Plants: Photosynthesis (13:27)

Photosynthesis looks at the critical role this process plays in providing food and oxygen. An explanation is given of the key steps involved, and the importance of the process to almost all other living organisms is stressed.

Biology: The Science of Life: The Flow of Matter and Energy in the Living World: Photosynthesis and Cellular Respiration (15:07)

The program begins by reviewing basic concepts such as matter, energy, elements, atoms, molecules, chemical bonds, chemical compounds, chemical reactions, and chemical equations. Then by focusing on photosynthesis, cellular respiration, and food chains, students discover how matter and energy flow through the living world.

Energy and the Chemistry of Life (39:48)

This two-part program explains the basic physical and chemical processes that allow energy to be stored and utilized by living things. The physical concepts of matter and energy are explained and the structure of atoms are described. Students learn how sub-atomic particles aggregate to form elements and then combine to form molecules and chemical compounds. Finally, some of the most important compounds essential to living organisms are discussed. The second part utilizes the physical and chemical concepts to analyze two metabolic processes: aerobic cellular respiration and photosynthesis.

Simply Science: Energy Converters (27:13)

A weight room setting is used to demonstrate how energy must be converted for activity and life functions to occur. Energy efficiency is examined by a sports physiologist and an athlete, and cellular respiration in hibernating animals is discussed by a hibernation expert.

Chemistry Connections: Energy from the Sun (29:05)

Photosynthesis and cellular respiration are examples of potential energy changes that can be calculated using Hess's Law. Students calculate the molar enthalpy of combustion of hydrocarbons and compare it to the molar enthalpy of respiration. Catalysts are explained and lab demonstrations are used to show how catalysts lower activation energy

ADDITIONAL NOTES

Instructional Strategies

Create a climate for learning

Assess prior knowledge

Practice effective questioning techniques

Vary the structure of lessons

Vary the way students work

Use warm-up activities

Create and embed science, technology and society (STS) activities

Strengthen comprehension for content area text

Common assessments within and across all disciplines

Allow opportunities for peer review

Direct instruction

Classroom discussion

Graphic organizers

Cooperative learning strategies

Higher order level thinking skills
 Outlines/drawings
 Internet research
 Integrate technology lessons/activities
 Library research
 Hands-on laboratory research skills
 Laboratory activities
 Audio-visual enhancements

VOCABULARY

Acetyl coenzyme A	Electron Transport Chain	NAD+
Activation energy	Electromagnetic spectrum	NADH
Active site	Ethyl alcohol	NADPH
Alcoholic Fermentation	FAD	PGA
Anaerobic Pathway	FADH ₂	Photosynthesis
Aerobic Pathway	Fermentation	Pigment
ADP	Glucose	Product
ATP	Glycolysis	Pyruvic Acid
Calvin cycle	Kilocalorie	Reactants
Catalyst	Krebs Cycle	RuBP
Cellular Respiration	Lactic acid	Stomata
Chlorophyll	Lactic Acid Fermentation	Stroma
Chloroplast	Light reactions	Substrate
Chromatography	Mesophyll	Thylakoid
Cristae	Metabolism	
Dark reactions	Mitochondria	

COURSE: Biology
UNIT 5: Mitosis & Meiosis
CONTACT: athompson@bridgeportedu.net
TIME FRAME: 3 weeks, 2nd Marking Period

CODE:
MAP LEVEL: 4
GRADE: 10

PERFORMANCE STANDARDS

SCIENCE - SCIENTIFIC INQUIRY (I)

- 27.1.1.9.1 Students will identify questions that can be answered through scientific investigation.
- 27.1.1.9.2 Students will read, interpret and examine the credibility and validity of scientific claims in different sources of information.
- 27.1.1.9.3 Students will formulate a testable hypothesis and demonstrate logical connections between the scientific concepts guiding the hypothesis and the design of the experiment.
- 27.1.1.9.4 Students will design and conduct appropriate types of scientific investigations to answer different questions.
- 27.1.1.9.5 Students will identify independent and dependent variables, including those that are kept constant and those used as controls.
- 27.1.1.9.6 Students will use appropriate tools and techniques to make observations and gather data.

SCIENCE - SCIENTIFIC INQUIRY (I)

- 27.1.1.9.7 Students will assess the reliability of the data that was generated in the investigation.
- 27.1.1.9.8 Students will use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.
- 27.1.1.9.9 Students will articulate conclusions and explanations based on the results of the research, and assess their validity based on the design of the investigation.
- 27.1.1.9.10 Students will communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.

SCIENCE - LIFE SCIENCE (V, VI, VII)

- 27.3.6.10.28 Students will describe the general role of DNA in protein synthesis and cell reproduction.
- 27.3.7.8.25 Students will explain the similarities and differences in cell division in somatic and germ cells.
- 27.3.7.8.26 Students will describe the structure and function of the male and female human reproduction system, including the process of egg and sperm production.
- 27.3.7.8.27 Students will describe the structure of the genes on chromosomes, and explain sex determination in humans.
- 27.3.7.10.36 Students will explain the usefulness of meiosis in maintaining organisms genetic variability.

ESSENTIAL/FOCUS QUESTIONS

Essential Questions:

How do cells reproduce?
How do organisms reproduce?

Focus Questions:

What occurs during each phase of the cell cycle?
How do cells produce new, identical cells?
How do organisms produce gametes for sexual reproduction?
How are Mitosis and Meiosis similar and different?
What are the end products of Mitosis and Meiosis?

CONTENT

Phases of the cell cycle
Mitosis and Meiosis
Genetic Diversity
Cancer

SKILLS

Illustrate and label the phases of the cell cycle. (4)

Demonstrate an understanding of the activities that occur during each phase as important toward the final goal of replication of genetic material for the new cell. (3)

Compare and contrast mitosis between plant and animal cells. (6)

Explain how crossing over increases genetic diversity. (2)

Distinguish between haploid and diploid cells and calculate the number of one given the other. (4)

Describe the process of meiosis by comparing and contrasting with mitosis. (1)

ASSURED EXPERIENCES

Onion Root Tip Lab
Diagram of mitosis and meiosis

ASSESSMENTS

Pre-assessment
Bridgeport Public Schools 06/08 - Draft

Post-assessment
Tests
Quizzes
Lab reports
Cooperative group activities
Homework
Open-ended questions
Oral questioning presentations
Inquiry-based activities & questions
Concept maps
Portfolios
Bio journal
Rubrics in preparation for CAPT testing
Self-assessment

OPTIONAL ACTIVITIES

1. Model stages of mitosis/meiosis using pipe cleaners, construction paper, clay, etc.
 2. Students can write a play or story to illustrate the phases of mitosis and present to class.
 3. Research cancer and cell mutations
 4. Genetic variations and gene mutations in crossing-over, possible link to natural selection
-

RESOURCES

Textbook:
Exploring Life
Modern Biology (Magnet Only)

Lab Manual:
Exploring Life
Modern Biology (Magnet Only)

Cybered Software

Internet Resources
http://www.biology.arizona.edu/Cell_bio/tutorials/cell_cycle/cells3.html (online tutorial - cell cycle, mitosis & meiosis)

www.johnkyrk.com/mitosis.html (interactive mitosis tutorial)

<http://micro.magnet.fsu.edu/micro/gallery/mitosis/mitosis.html> (images and info on mitosis and onion root tip)

<http://www.johnkyrk.com/meiosis.html> (interactive meiosis tutorial)

<http://www.cellsalive.com/meiosis.htm> (meiosis interactive animation)

<http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/M/Meiosis.html> (notes on meiosis)

www.stolaf.edu/people/giannini/flashanimat/celldivision/meiosis.swf (meiosis animation)

http://www.cellsalive.com/cell_cycle.htm (cell cycle interactive animation)

http://www.biology.arizona.edu/Cell_bio/tutorials/cell_cycle/cells3.html online tutorial - cell cycle, mitosis & meiosis

www.johnkyrk.com/mitosis.html interactive mitosis tutorial

<http://micro.magnet.fsu.edu/micro/gallery/mitosis/mitosis.html> images and info on mitosis and onion root tip

<http://www.johnkyrk.com/meiosis.html> interactive meiosis tutorial

<http://www.cellsalive.com/meiosis.htm> meiosis interactive animation

<http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/M/Meiosis.html> notes on meiosis

www.stolaf.edu/people/giannini/flashanimat/celldivision/meiosis.swf meiosis animation

http://www.cellsalive.com/cell_cycle.htm cell cycle interactive animation

United Streaming

Mitosis and Meiosis

Biologix: Meiosis and Gamete Formation

Biologix: Chromosomal Alterations

ADDITIONAL NOTES

Instructional Strategies

Create a climate for learning

Assess prior knowledge

Practice effective questioning techniques

Vary the structure of lessons

Vary the way students work

Use warm-up activities

Create and embed science, technology and society (STS) activities

Strengthen comprehension for content area text

Common assessments within and across all disciplines

Allow opportunities for peer review

Direct instruction

Classroom discussion

Graphic organizers

Cooperative learning strategies

Higher order level thinking skills

Bridgeport Public Schools 06/08 - Draft

Outlines/drawings
Internet research
Integrate technology lessons/activities
Library research
Hands-on laboratory research skills
Laboratory activities
Audio-visual enhancements

VOCABULARY

Anaphase	Homologous Chromosomes
Cancer	Interphase
Cell plate	Karyotype
Cell Cycle	Metaphase
Centromere	Metastasis
Chromatin	Meiosis
Chromosome	Mitosis
Crossing Over	Prophase
Cytokinesis	Sex Chromosomes
Diploid	Sister Chromatid
Fertilization	Telophase
Gamete	Tetrad
Genetic Recombination	Tumor
Haploid	Zygote

COURSE: Biology
UNIT 6: DNA & Protein Synthesis
CONTACT: athompson@bridgeportedu.net
TIME FRAME: 3-4 weeks, 3rd Marking Period

CODE:
MAP LEVEL: 4
GRADE: 10

PERFORMANCE STANDARDS

SCIENCE - SCIENTIFIC INQUIRY (I)

- 27.1.1.9.1 Students will identify questions that can be answered through scientific investigation.
- 27.1.1.9.2 Students will read, interpret and examine the credibility and validity of scientific claims in different sources of information.
- 27.1.1.9.3 Students will formulate a testable hypothesis and demonstrate logical connections between the scientific concepts guiding the hypothesis and the design of the experiment.
- 27.1.1.9.4 Students will design and conduct appropriate types of scientific investigations to answer different questions.
- 27.1.1.9.5 Students will identify independent and dependent variables, including those that are kept constant and those used as controls.
- 27.1.1.9.6 Students will use appropriate tools and techniques to make observations and gather data.

SCIENCE - SCIENTIFIC INQUIRY (I)

- 27.1.1.9.7 Students will assess the reliability of the data that was generated in the investigation.
- 27.1.1.9.8 Students will use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.
- 27.1.1.9.9 Students will articulate conclusions and explanations based on the results of the research, and assess their validity based on the design of the investigation.
- 27.1.1.9.10 Students will communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.

SCIENCE - LIFE SCIENCE (V, VI, VII)

- 27.3.6.10.28 Students will describe the general role of DNA in protein synthesis and cell reproduction.
- 27.3.7.10.40 Students will explain how the processes of genetic mutation and natural selection are related to the evolution of species.

SCIENCE - SCIENCE & TECHNOLOGY IN SOCIETY (XI)

- 27.5.11.10.34 Students will describe, in general terms, how the genetic information of organisms can be altered to make them produce new materials.
- 27.5.11.10.35 Students will explain the risks and benefits of altering the genetic composition and cell products of existing organisms.

ESSENTIAL/FOCUS QUESTIONS

Essential Questions:

1. How are genes related to traits?
2. How do cells produce proteins?
3. How is DNA replicated?

Focus Questions:

1. What is the structure of DNA?
 2. How do the nitrogenous bases pair?
 3. What is a gene and what does it do?
 4. What occurs during transcription and translation?
-

CONTENT

Structure and function of DNA
Processes of replication
Protein synthesis
DNA technology

SKILLS

Illustrate and label a chromosome (2)
Describe the structure of DNA (1)
Name the four nitrogen bases that make up DNA (1)
Recognize the bases as purines and pyrimidines and how the bases bond to each other (4)
Describe the double helix of DNA (2)
Discuss the reason DNA must replicate and the process of replication (2)
Discuss how accuracy is maintained during replication of DNA (2)
Determine the complimentary strand of DNA (3)
Compare the structure of DNA and RNA (5)
Differentiate between the three types of RNA and their function (4)
Describe the process of transcription and translation (1)
Write the transcribed code of RNA using a DNA sequence (1)
Compare protein as to their amino acid sequence (5)
Describe the relationship between the DNA code, amino acid sequence and the structure and function of the protein (1)
Explain what is meant by the "universal code" (2)
Predict the anticodons of tRNA for a given segment of mRNA (2)

ASSURED EXPERIENCES

Embedded Task: Bioengineered Foods
Decoding Activity
DNA workshop activity
Bridgeport Public Schools 06/08 - Draft

ASSESSMENTS

Pre-assessment
Post-assessment
Tests
Quizzes
Lab reports
Cooperative group activities
Homework
Open-ended questions
Oral questioning presentations
Inquiry-based activities & questions
Concept maps
Portfolios
Bio journal
Rubrics in preparation for CAPT testing
Self-assessment

OPTIONAL ACTIVITIES

Online tutorial of DNA replication (animated)
<http://207.207.4.198/pub/flash/24/menu.swf>

Translation online tutorial (animated)
www.stolaf.edu/people/giannini/flashanimat/molgenetics/translation.swf

Hands-on activity to illustrate DNA structure and function
<http://www.iit.edu/~smile/bi8801.html>

Groovy DNA beads – students will use string and beads to model DNA and illustrate the relationship between DNA and RNA
<http://www.iit.edu/~smile/bi96m2.html>

Create a three-dimensional model of DNA

RESOURCES

Textbook:

Exploring Life
Modern Biology (Magnet Only)

Lab Manual:

Exploring Life
Modern Biology (Magnet Only)

Cybered Software

Internet Resources:

http://www.phschool.com/science/biology_place/biocoach/dnarep/intro.html DNA Replication Animated Tutorial

http://www.phschool.com/science/biology_place/biocoach/transcription/intro.html Transcription Animated Tutorial

http://www.phschool.com/science/biology_place/biocoach/translation/intro.html Translation Animated Tutorial

<http://www.ipse.psu.edu/activities/dna/code.doc> Alternative Translating Code Activity

http://www.ornl.gov/sci/techresources/Human_Genome/home.shtml Human Genome Project

<http://www.genome.gov/10001772> Human Genome Project

<http://www.pbs.org/wgbh/nova/photo51/elkin.html> Rosalind Franklin's Story

<http://learn.genetics.utah.edu/units/stemcells/whatissc/> Stem Cell Animated Tutorial

United Streaming:

DNA – The Master-Molecule of Life
Manipulating DNA
Forensic Detectives
Human Genome

ADDITIONAL NOTES

Instructional Strategies

Create a climate for learning
Assess prior knowledge
Practice effective questioning techniques
Vary the structure of lessons
Vary the way students work
Use warm-up activities
Create and embed science, technology and society (STS) activities
Strengthen comprehension for content area text
Common assessments within and across all disciplines
Allow opportunities for peer review
Direct instruction
Classroom discussion
Graphic organizers
Cooperative learning strategies

Bridgeport Public Schools 06/08 - Draft

Higher order level thinking skills
Outlines/drawings
Internet research
Integrate technology lessons/activities
Library research
Hands-on laboratory research skills
Laboratory activities
Audio-visual enhancements

VOCABULARY

Adenine	Nucleotide
Anticodon	Purine
Codon	Pyrimidine
Cytosine	Replication
Deoxyribonucleic Acid	Repressor Protein
Double Helix	Ribonucleic Acid
Exon	RNA polymerase
Gene	rRNA
Gene Expression	Thymine
Genetic Code	Transcription
Guanine	Transformation
Inducer	Translation
Intron	Transposon
mRNA	tRNA
Mutagen	Uracil

COURSE: Biology
UNIT 7: Genetics
CONTACT: athompson@bridgeportedu.net
TIME FRAME: 4 Weeks, 3rd Marking Period

CODE:
MAP LEVEL: 4
GRADE: 10

PERFORMANCE STANDARDS

SCIENCE - SCIENTIFIC INQUIRY (I)

- 27.1.1.9.1 Students will identify questions that can be answered through scientific investigation.
- 27.1.1.9.2 Students will read, interpret and examine the credibility and validity of scientific claims in different sources of information.
- 27.1.1.9.3 Students will formulate a testable hypothesis and demonstrate logical connections between the scientific concepts guiding the hypothesis and the design of the experiment.
- 27.1.1.9.4 Students will design and conduct appropriate types of scientific investigations to answer different questions.
- 27.1.1.9.5 Students will identify independent and dependent variables, including those that are kept constant and those used as controls.
- 27.1.1.9.6 Students will use appropriate tools and techniques to make observations and gather data.

SCIENCE - SCIENTIFIC INQUIRY (I)

- 27.1.1.9.7 Students will assess the reliability of the data that was generated in the investigation.
- 27.1.1.9.8 Students will use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.
- 27.1.1.9.9 Students will articulate conclusions and explanations based on the results of the research, and assess their validity based on the design of the investigation.
- 27.1.1.9.10 Students will communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.

SCIENCE - LIFE SCIENCE (V, VI, VII)

- 27.3.7.10.37 Students will use the Punnet Square technique to predict the distribution of traits in mono- and di-hybrid crossings.
 - 27.3.7.10.38 Students will deduce the probable mode of inheritance of traits (e.g., recessive/dominant, sex-linked) from pedigree diagrams showing phenotypes.
 - 27.3.7.10.39 Students will describe the difference between genetic disorders and infectious diseases.
-

ESSENTIAL/FOCUS QUESTIONS

Essential Questions:

How are traits inherited?
What determines which genes are expressed?
What are genetic disorders and how are they caused?

Focus Questions:

What happens in a monohybrid/dihybrid cross?
How are genotype and phenotype related?
What are some types of genetic disorders and how are they passed on?
What is a mutation and how is it caused?

CONTENT

Inheritance
Mendelian genetics
Pedigree
Mutations

SKILLS

Explain the importance of genetic variety (2)
Explain Mendel's experiments and hypotheses (2)
List and describe the three basic principles of genetics and the role of probability (1)
Predict the outcomes of various genetic crosses using punnett squares (2)
Describe the phenotypes of various traits given their genotypes (1)
Describe how geneticists use probability to predict possible genotypes and phenotypes (1)
Explain mutation and provide some examples of gene mutations (2)
Explain what is meant by a sex-linked trait (2)
Determine inheritance patterns of blood types (3)
Describe at least three genetic disorders (1)
Explain the condition of Polyploidy (2)

ASSURED EXPERIENCES

Genetic Probability Activity
Blood Type Simulation Lab
Genetic Disorders Project

ASSESSMENTS

Pre-assessment
Post-assessment
Tests
Quizzes
Lab reports
Cooperative group activities
Homework

Open-ended questions
Oral questioning presentations
Inquiry-based activities & questions
Concept maps
Portfolios
Bio journal
Rubrics in preparation for CAPT testing
Self-assessment

OPTIONAL ACTIVITIES

Genetic variations in hand span size <http://www.iit.edu/~smile/bi8603.html>

Easter Egg Genetics – activity with genetic crosses and punnett squares
<http://www.accessexcellence.com/AE/ATG/data/released/0256-AnneBuchanan/index.html>

RESOURCES

Textbook:
Exploring Life
Modern Biology (Magnet Only)

Lab Manual:
Exploring Life
Modern Biology (Magnet Only)

Cybered Software

Internet Resources

Genetic disorders: <http://learn.genetics.utah.edu/units/disorders/whataregd/>

Genetics activities: <http://www.nclark.net/Genetics>

Hands-on genetics activities:
<http://school.discoveryeducation.com/curriculumcenter/genetics/activities.html>

Biology animations, including heredity: <http://science.nhmccd.edu/biol/bio1int.htm#genetic>

Human traits activity and lesson: <http://www.mysciencebox.org/book/export/html/320>

United Streaming:

Understanding Genetics (37:13)

This two-part program provides students with a comprehensive introduction to the science of genetics. In Part One of this program, the principles of classical Mendelian genetics are presented. Part Two examines the principles of genetics in terms of modern molecular gene theory.

Biologix: Alternate Patterns of Inheritance (29:07)

Reveals how knowledge of Mendelian genetics, blood groups and pedigrees can be used to solve a paternity case. Examines other patterns of human inheritance involving skin color, eye color and height. Discusses the occurrence of multiple alleles in Himalayan rabbits.

ADDITIONAL NOTES

Instructional Strategies

Create a climate for learning
Assess prior knowledge
Practice effective questioning techniques
Vary the structure of lessons
Vary the way students work
Use warm-up activities
Create and embed science, technology and society (STS) activities
Strengthen comprehension for content area text
Common assessments within and across all disciplines
Allow opportunities for peer review
Direct instruction
Classroom discussion
Graphic organizers
Cooperative learning strategies
Higher order level thinking skills
Outlines/drawings
Internet research
Integrate technology lessons/activities
Library research
Hands-on laboratory research skills
Laboratory activities
Audio-visual enhancements

VOCABULARY

Allele	Gamete	Huntingtons disease	Polygenic inheritance
Autosomal	Gene therapy	Incomplete dominance	Polyploidy
Blood type	Genetic disorder	Karyotype	Probability
Codominance	Genetics	Kinfelter's syndrome	Punnett square
Color blindness	Genety counseling	Law of Independent assortment	Recessive
Cystic fibrosis	Genotype	Law of Segregation	Sex-linked inheritance
Dihybrid cross	Gregor Mendel	Monohybrid cross	Sickle-cell anemia
Dominant	Hemophilia	Mutation	Tay-Sachs disease
Down syndrome (trisomy 21)	Heterozygous	Pedigree	Trisomy
Fragil X syndrome	Homozygous	Phenotype	True - breeding

COURSE: Biology
UNIT 8: Evolution & Natural Selection
CONTACT: athompson@bridgeportedu.net
TIME FRAME: 3-4 Weeks, 4th Marking Period

CODE:
MAP LEVEL: 4
GRADE: 10

PERFORMANCE STANDARDS

SCIENCE - SCIENTIFIC INQUIRY (I)

- 27.1.1.9.1 Students will identify questions that can be answered through scientific investigation.
- 27.1.1.9.2 Students will read, interpret and examine the credibility and validity of scientific claims in different sources of information.
- 27.1.1.9.3 Students will formulate a testable hypothesis and demonstrate logical connections between the scientific concepts guiding the hypothesis and the design of the experiment.
- 27.1.1.9.4 Students will design and conduct appropriate types of scientific investigations to answer different questions.
- 27.1.1.9.5 Students will identify independent and dependent variables, including those that are kept constant and those used as controls.
- 27.1.1.9.6 Students will use appropriate tools and techniques to make observations and gather data.

SCIENCE - SCIENTIFIC INQUIRY (I)

- 27.1.1.9.7 Students will assess the reliability of the data that was generated in the investigation.
- 27.1.1.9.8 Students will use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.
- 27.1.1.9.9 Students will articulate conclusions and explanations based on the results of the research, and assess their validity based on the design of the investigation.
- 27.1.1.9.10 Students will communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.

SCIENCE - LIFE SCIENCE (V, VI, VII)

- 27.3.7.10.40 Students will explain how the processes of genetic mutation and natural selection are related to the evolution of species.
 - 27.3.7.10.41 Students will explain how the current theory of evolution provides a scientific explanation for fossil records of ancient life forms.
 - 27.3.7.10.42 Students will describe how structural and behavioral adaptations increase organisms chances for survival in their environment.
-

ESSENTIAL/FOCUS QUESTIONS

Essential Questions:

How is Natural Selection related to evolution?
What is the difference between early and modern theories of evolution?

Focus Questions:

What is Natural Selection and how does it work?
How have the theories of evolution changed over time?
What proof exists to support the Theory of evolution?
How can we tell the difference between convergent and divergent evolution?
How does genetic drift, founder effect and population bottle-neck affect the evolution of a species?

CONTENT

Darwinian and Modern Theories of Evolution
Gene Frequencies

SKILLS

Explain how the theory of evolution has changed over time (2)
Discuss Lamarck's theory of evolution by inheritance of acquired characteristics (2)
Compare Lamarck's theory with Darwin's theory of evolution (4)
Discuss how natural evidence exists to support Darwin's theory (2)
Discuss the four factors that cause changes in a gene pool (2)
Describe how geographic isolation can result in speciation (1)
Explain the theory of Evolution by punctuated equilibrium (2)
Describe how natural selection occurs and the fossil record (1)
Summarize the effects of natural selection on the peppered moth and on the sickle cell allele (2)
Relate natural selection to evolution (4)
Describe the difference between convergent and divergent evolution 1)
Describe some similarities and differences between the human being, primates and other organisms (1)

ASSURED EXPERIENCES

Natural Selection Lab

ASSESSMENTS

Pre-assessment
Post-assessment
Tests
Quizzes
Lab reports
Cooperative group activities
Homework

Open-ended questions
Oral questioning presentations
Inquiry-based activities & questions
Concept maps
Portfolios
Bio journal
Rubrics in preparation for CAPT testing
Self-assessment

OPTIONAL ACTIVITIES

Interactive simulation on adaptation, genetics, and environmental pollution
<http://www.sciencenetlinks.com/interactives/evolution.html>

Darwin and Lamarck Court Case – role play in which Darwin and Lamarch must defend their theories in court
<http://www.accessexcellence.com/AE/ATG/data/released/0078-DonMils/index.html>

Lesson plan – comparing Lamarck and Darwin’s theories of evolution
<http://www.sciencenetlinks.com/lessons.cfm?BenchmarkID=1&DocID=387>

Lesson plan – fossils and geologic time
<http://www.sciencenetlinks.com/lessons.cfm?BenchmarkID=10&DocID=44>

Lesson plan – history of evolutionary theory
<http://www.sciencenetlinks.com/lessons.cfm?BenchmarkID=10&DocID=391>

Lesson plan – Natural selection
<http://www.sciencenetlinks.com/lessons.cfm?BenchmarkID=5&DocID=99>

Lesson plan – extinction of the woolly mammoth
<http://www.sciencenetlinks.com/lessons.cfm?BenchmarkID=5&DocID=328>

RESOURCES

Textbook:
Exploring Life
Modern Biology (Magnet Ony)

Lab Manual:
Exploring Life
Modern Biology (Magnet Only)

Cybered Software

Internet Resources

Exploring Life Online Activities - Chp. 14 &15
<http://www.pearsonsuccessnet.com/snpapp/iText/products/0-13-115075-8/index.html>

Bridgeport Public Schools 06/08 - Draft

PBS: Evolution for students <http://www.pbs.org/wgbh/evolution/students/index.html>

United Streaming:

Great Books: Origins of Species: 51 minutes

Darwin's theory of natural selection has provoked acclaim and debate since it was detailed in his Origin of Species in 1859. Explore the book that revolutionized science and culture. The program examines evolutionary theory from its beginnings with Jean Baptiste Lamarck, the famous Scopes Monkey trial, and how political leaders such as Adolf Hitler have twisted Darwinian theory and used it for their own purposes.

Icons of Science: Evolution: 20 minutes

Take a fresh look at the often misunderstood concepts of natural selection and the "selfish gene." Drawing on the latest findings from genetics, ecology, and animal behavior, learn why this topic is as relevant now as when it was first introduced centuries ago.

Neanderthals: 50 minutes

Follow the experience of a small clan of Neanderthals living in Dordogne, France, at one of the most important junctures in human evolution. Using the latest scientific research, this program tells the story of the rise and fall of a human species.

ADDITIONAL NOTES

Instructional Strategies

Create a climate for learning

Assess prior knowledge

Practice effective questioning techniques

Vary the structure of lessons

Vary the way students work

Use warm-up activities

Create and embed science, technology and society (STS) activities

Strengthen comprehension for content area text

Common assessments within and across all disciplines

Allow opportunities for peer review

Direct instruction

Classroom discussion

Graphic organizers

Cooperative learning strategies

Higher order level thinking skills

Outlines/drawings

Internet research

Integrate technology lessons/activities

Library research

Hands-on laboratory research skills

Laboratory activities

Audio-visual enhancements

Bridgeport Public Schools 06/08 - Draft

VOCABULARY

Acquired characteristics	Fossil	On the Origin of Species by Means of Natural Selection
Adaption	Founder effect	Peppered moths
Alfred Russell Wallace	Galapagos Islands	Population
Balancing selection	Genetic drift	Population bottleneck
Beneficial mutation	Gradualism	Punctuated equilibrium
Charles Darwin	Half-life	Radioactive dating
Common descent	H.M.S. Beagle	Sickle-cell anemia
Convergent evolution	Homologous structure	Speciation
Directional selections	Jean-Baptiste Lamarck	Survival of the fittest
Divergent evolution	Kettlewell	Variation
Evolution	Natural selection	Vestigial structure

COURSE: Biology
UNIT 9: Immunology & Pathology
CONTACT: athompson@bridgeportedu.net
TIME FRAME: 3 weeks, 4th Marking Period

CODE:
MAP LEVEL: 4
GRADE: 10

PERFORMANCE STANDARDS

SCIENCE - SCIENTIFIC INQUIRY (I)

- 27.1.1.9.1 Students will identify questions that can be answered through scientific investigation.
- 27.1.1.9.2 Students will read, interpret and examine the credibility and validity of scientific claims in different sources of information.
- 27.1.1.9.3 Students will formulate a testable hypothesis and demonstrate logical connections between the scientific concepts guiding the hypothesis and the design of the experiment.
- 27.1.1.9.4 Students will design and conduct appropriate types of scientific investigations to answer different questions.
- 27.1.1.9.5 Students will identify independent and dependent variables, including those that are kept constant and those used as controls.
- 27.1.1.9.6 Students will use appropriate tools and techniques to make observations and gather data.

SCIENCE - SCIENTIFIC INQUIRY (I)

- 27.1.1.9.7 Students will assess the reliability of the data that was generated in the investigation.
- 27.1.1.9.8 Students will use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.
- 27.1.1.9.9 Students will articulate conclusions and explanations based on the results of the research, and assess their validity based on the design of the investigation.
- 27.1.1.9.10 Students will communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.

SCIENCE - LIFE SCIENCE (V, VI, VII)

- 27.3.6.10.31 Students will describe the differences in the structure of yeasts, bacteria and viruses.
 - 27.3.6.10.32 Students will describe how bacterial and viral infectious diseases are transmitted and explain the role of sanitation, vaccination and antibiotic medications in the prevention and treatment of infectious diseases.
 - 27.3.6.10.33 Students will explain how bacteria and yeasts are used to produce foods for human consumption.
 - 27.3.7.10.39 Students will describe the difference between genetic disorders and infectious diseases.
-

ESSENTIAL/FOCUS QUESTIONS

Essential Questions:

What causes disease?
How do our bodies defend us from pathogens?
How can diseases be treated and prevented?

Focus Questions:

What are some different types of pathogens?
What is the difference between specific and non-specific defenses?
How do vaccines work?
What are antibiotics and how do they work?
What is AIDS and how is it transmitted?

CONTENT

Immunology
Pathogens
Antibiotics
Vaccines
AIDS & HIV

SKILLS

Explain how the immune system works (2)
Describe the cell-mediated immune response (1)
Describe the humoral immune response (1)
Describe how pathogens can cause sickness and disease (1)
List examples of different types of pathogens (1)
Describe different treatments for disease such as the use of antibiotics and vaccinations (1)
Explain how HIV virus affects the immune system (2)
Discuss how the AIDS epidemic has spread and how scientists are experimenting with different treatments (2)
Discuss the ability of organisms (pathogens) to mutate (evolve) causing resistance to certain treatments (2)
Explain how pasteurization is used to preserve food (2)
Explain acquired and natural immunity (2)

ASSURED EXPERIENCES

Disease Transmission Lab

ASSESSMENTS

Pre-assessment
Bridgeport Public Schools 06/08 - Draft

Post-assessment
Tests
Quizzes
Lab reports
Cooperative group activities
Homework
Open-ended questions
Oral questioning presentations
Inquiry-based activities & questions
Concept maps
Portfolios
Bio journal
Rubrics in preparation for CAPT testing
Self-assessment

OPTIONAL ACTIVITIES

Disease presentation
<http://www.accessexcellence.com/AE/ATG/data/released/0358-GenNelson/index.html>

Bacteria Wanted poster
<http://www.accessexcellence.com/AE/ATG/data/released/0210-JoyceCalo/index.html>

Virus Newspaper Project
<http://www.accessexcellence.com/AE/ATG/data/released/0302-KathyParis/index.html>

ELISA kit – HIV test (order from NEOSCI)

RESOURCES

Textbook:
Exploring Life
Modern Biology (Magnet Only)

Lab Manual:
Exploring Life
Modern Biology (Magnet Only)

Cybered Software

Internet:

Immune System Notes http://kidshealth.org/parent/general/body_basics/immune.html

Immune System Lesson Plans <http://www.teacherplanet.com/resource/immune.php>

Microbial Ecology - "Microbe Zoo" <http://commtechlab.msu.edu/sites/dlc-me/>

<http://www.microbeworld.org/>

<http://people.ku.edu/~jbrown/bugs.html>

www.cellsalive.com

United Streaming:

- "Understanding: Bacteria"
 - "Bacteria: Friends or Enemies?"
 - "Understanding: Viruses"
 - "Assignment Discovery: An Inside Look at the Flu"
 - "The Body's Defenses Against Disease"
 - "AIDS: Ending the Epidemic"
-

ADDITIONAL NOTES

Instructional Strategies

- Create a climate for learning
 - Assess prior knowledge
 - Practice effective questioning techniques
 - Vary the structure of lessons
 - Vary the way students work
 - Use warm-up activities
 - Create and embed science, technology and society (STS) activities
 - Strengthen comprehension for content area text
 - Common assessments within and across all disciplines
 - Allow opportunities for peer review
 - Direct instruction
 - Classroom discussion
 - Graphic organizers
 - Cooperative learning strategies
 - Higher order level thinking skills
 - Outlines/drawings
 - Internet research
 - Integrate technology lessons/activities
 - Library research
 - Hands-on laboratory research skills
 - Laboratory activities
 - Audio-visual enhancements
-

VOCABULARY

AIDS	Host	Pasteurization
Airborne	Human Immunodeficiency virus	Pathogen
Allergy	Immune response	Penicillin
Antibiotic	Immune system	Phagocytes
Antibiotic resistance	Immunity	Primary immune response
Antibody	Inflammatory response	Salmonella
Antigen	Interleukin 1	Secondary immune response
Antihistamine	Interleukin 2	Streptococcus Pneumonii
Autoimmune disease	Leukocytes	

Bacteria B-cells E. coli Histamine	Lymphatic system Macrophage Memory cells Mucus membrane	T-cells Transmission Vaccine Virulent Virus
---	--	---

COURSE: Biology
UNIT 10: Ecology
CONTACT: athompson@bridgeportedu.net
TIME FRAME: 4-5 weeks End of Year

CODE:
MAP LEVEL: 4
GRADE: 10

PERFORMANCE STANDARDS

SCIENCE - SCIENTIFIC INQUIRY (I)

- 27.1.1.9.1 Students will identify questions that can be answered through scientific investigation.
- 27.1.1.9.2 Students will read, interpret and examine the credibility and validity of scientific claims in different sources of information.
- 27.1.1.9.3 Students will formulate a testable hypothesis and demonstrate logical connections between the scientific concepts guiding the hypothesis and the design of the experiment.
- 27.1.1.9.4 Students will design and conduct appropriate types of scientific investigations to answer different questions.
- 27.1.1.9.5 Students will identify independent and dependent variables, including those that are kept constant and those used as controls.
- 27.1.1.9.6 Students will use appropriate tools and techniques to make observations and gather data.

SCIENCE - SCIENTIFIC INQUIRY (I)

- 27.1.1.9.7 Students will assess the reliability of the data that was generated in the investigation.
- 27.1.1.9.8 Students will use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.
- 27.1.1.9.9 Students will articulate conclusions and explanations based on the results of the research, and assess their validity based on the design of the investigation.
- 27.1.1.9.10 Students will communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.

SCIENCE - LIFE SCIENCE (V, VI, VII)

- 27.3.5.6.5 Students will explain how populations are affected by predator-prey relationships.
- 27.3.5.6.6 Students will describe common food webs in different Connecticut ecosystems
- 27.3.7.4.10 Students will describe how animals, directly or indirectly, depend on plants to provide the food and energy they need in order to grow and survive.
- 27.3.7.4.11 Students will describe how natural phenomena and some human activities may cause changes to habitats and their inhabitants.

SCIENCE - SCIENCE & TECHNOLOGY IN SOCIETY (XI)

- 27.5.11.10.43 Students will describe the factors that affect the carrying capacity of the environment.

ESSENTIAL/FOCUS QUESTIONS

Essential Questions:

How are the organisms and the environment related?
How do environments change over time?
How do humans affect environments?

Focus Questions:

How does energy “flow” between organisms and environment?
How and why do populations of organisms within an environment change over time?
How do temperature and precipitation determine the types of organisms present in an ecosystem?
What is carrying capacity and how does it affect population growth?

CONTENT

Energy Transfer
Biomes
Succession & Population Dynamics
Nutrient Cycles

SKILLS

Identify the components of an ecosystem (1)
Discuss the flow of energy through ecosystems and food webs (2)
Explain why every ecosystem must include producers (2)
Draw a food chain with at least four levels (3)
Discuss how the different trophic levels affect the transfer of energy (2)
Explain at which trophic level humans would be placed (2)
Differentiate among carnivores, herbivores and omnivores (4)
Explain the Carbon, Nitrogen, and water cycles (2)
Identify and describe the major terrestrial and aquatic biomes (1)
Describe the different interactions between organisms, such as, parasitism, mutualism, commensalism (1)
Describe an example of co-evolution (1)
Relate the stability of an ecosystem to its diversity (4)
Describe how human activities affect environment (pollution) (1)
List examples of successful solutions to environmental problems (recycle, conservation, etc.) (1)

ASSURED EXPERIENCES

Owl Pellet Dissection

ASSESSMENTS

Pre-assessment
Post-assessment
Tests
Quizzes
Lab reports
Cooperative group activities
Homework
Open-ended questions
Oral questioning presentations
Inquiry-based activities & questions
Concept maps
Portfolios
Bio journal
Rubrics in preparation for CAPT testing
Self-assessment

OPTIONAL ACTIVITIES

Design an ecosystem
<http://www.accessexcellence.com/AE/ATG/data/released/0079-KarinWesterling/index.html>

Ecology Issue Paper
<http://www.accessexcellence.com/AE/ATG/data/released/0181-GaryBrekke/index.html>

Lesson plan on how species become endangered
<http://www.sciencenetlinks.com/lessons.cfm?DocID=310>

Lesson plan on contaminants in the water cycle
<http://www.nationalgeographic.com/xpeditions/lessons/14/g912/tgsouhegan.html>

RESOURCES

Textbook:
Exploring Life
Modern Biology (Magnet Only)

Lab Manual:
Exploring Life
Modern Biology (Magnet Only)

CyberEd Software

Internet:

Bridgeport Public Schools 06/08 - Draft

Biomes Galore <http://www.thewildclassroom.com/biomes/>

Tutorial on Greenhouse Effect & Global Warming

<http://earthguide.ucsd.edu/earthguide/diagrams/greenhouse/>

Build Food Webs from Different Ecosystems

http://www.sustainablebusiness.com.au/foodwebs/kids_web.htm

Descriptions of Organisms & Trophic Levels

<http://www.qrg.northwestern.edu/projects/MarsSim/SimHTML/info/whats-a-decomposer.html>

Conservation - Calculate Carbon Footprint <http://www.carbonfootprint.com/>

Animal Diversity <http://animaldiversity.ummz.umich.edu/site/index.html>

Virtual Owl Pellet Dissection <http://www.kidwings.com/betapellet.swf>

Biome in a Bag <http://pbskids.org/zoom/activities/sci/biomeinabaggie.html>

Bottle Biome

<http://www.eduref.org/cgi-bin/printlessons.cgi/Virtual/Lessons/Science/Ecology/ECL0014.html>

An Inconvenient Truth Movie Website <http://www.climatecrisis.net/>

Symbiotic Relationships

<http://magma.nationalgeographic.com/ngexplorer/0601/articles/mainarticle.html>

Pollution Information & Lesson Plans

<http://school.discoveryeducation.com/lessonplans/programs/finiteoceans/>

United Streaming:

Investigating Ecosystems & Biomes

Endangered Species

Global Warming Signs & Science

ADDITIONAL NOTES

Instructional Strategies

Create a climate for learning

Assess prior knowledge

Practice effective questioning techniques

Vary the structure of lessons

Vary the way students work

Use warm-up activities

Create and embed science, technology and society (STS) activities

Strengthen comprehension for content area text

Common assessments within and across all disciplines

Allow opportunities for peer review

Bridgeport Public Schools 06/08 - Draft

Direct instruction
 Classroom discussion
 Graphic organizers
 Cooperative learning strategies
 Higher order level thinking skills
 Outlines/drawings
 Internet research
 Integrate technology lessons/activities
 Library research
 Hands-on laboratory research skills
 Laboratory activities
 Audio-visual enhancements

VOCABULARY

Autotroph	Ecology	Nutrient cycle
Biome	Ecosystem	Omnivore
Carbon cycle	Energy	Parasitism
Carnivore	Food web	Plankton
Climate	Freshwater ecosystem	Producer
Co-evolution	Greenhouse effect	Savannah
Community	Habitat	Temperate grassland
Coniferous forest	Herbivore	Terrestrial ecosystem
Consumer	Heterotroph	Trophic level
Deciduous forest	Marine ecosystem	Tropical rainforest
Decomposer	Mutualism	Tundra
Desert	Nitrogen cycle	Water cycle
Diversity	Nitrogen fixation	