Ashley Pack

1/23/12

EDN 300

**Curriculum Plan**

1. Pick one grade: 10th grade
2. Pick a course you want to teach: Biology
3. State Standards: http://www.ncpublicschools.org/docs/acre/standards/new-standards/science/biology.pdf
4. Calendars
	1. How many grading periods do you have? Two
	2. How many instructional days per grading period? About 38 (76 total)
	3. How many days will be reserved for teacher workdays and testing? About 8
5. Curriculum Mapping
	1. What have the students been expected to learn during their past school years? Students have been expected to learn basic scientific concepts, such as the scientific method and scientific units of measure. They should also come in with a basic knowledge of several biological concepts, such as matter cycling (water, nitrogen, oxygen, and carbon dioxide), fossils, and characteristics of bacteria and viruses.
	2. What the students are to learn during the present school year? Students are to learn structure and function of living organisms, basic ecology, evolution and genetics, and basic molecular biology.
	3. What they are going to be required to learn in future grades? They will be required to learn earth and environmental concepts, physical science concepts, and chemistry.
6. Year long/Semester long planning

|  |  |
| --- | --- |
| **Week One**Scope of Biology (Chapter 1)* Introducing the Ten Themes

The Molecules of Life (Chapter 5)* Carbohydrates
* Carbon
* Lipids
* Proteins
* Enzymes
 | **Essential Standards Covered**Bio 1.1.2 (Prokaryotic vs. Eukaryotic Cells)Bio 1.1.3 (Instructions in DNA)Bio 1.2.1 (Homeostasis maintained in a cell)Bio 2.1.2 (Survival and reproductive success of organisms due to adaptations)Bio 4.1.1 (Major biological molecules)Bio 4.1.3 (Enzymes) |
| **Week Two**A Tour of the Cell (Chapter 6)* Cell Theory
* Animal vs. Plant Cells
* Prokaryotic vs. Eukaryotic Cells
* Cell membrane
* Diffusion
* Passive transport vs. Active transport
* Osmosis
* Cell organelles
 | **Essential Standards Covered**Bio 1.1.1 (Organelles in Eukaryotic Cells)Bio 1.1.2 (Prokaryotic vs. Eukaryotic Cells)Bio 1.1.3 (Instructions in DNA) |
| **Week Three**The Working Cell: Energy from food (Chapter 7)* Autotroph vs. Heterotroph
* Cellular respiration
* Kinetic, potential, thermal, and chemical energy
* ATP
* Electron Transport Chain
* Metabolism
* Fermentation
* Anaerobic vs. Aerobic
 | **Essential Standards Covered**Bio 4.2.1 (Photosynthesis and Cellular Respiration) |
| **Week Four**The Working Cell: Energy from Sunlight (Chapter 8)* Chloroplasts
* Photosynthesis
* Calvin Cycle
* Greenhouse effect

The Cellular Basis of Inheritance ( ½ of Chapter 9)* Asexual vs. Sexual reproduction
* The Cell Cycle
* Mitosis
 | **Essential Standards Covered**Bio 4.2.1 (Photosynthesis and Cellular Respiration)Bio 1.1.1 (Organelles in Eukaryotic Cells)Bio 1.2.2 (Mitosis) |
| **Week Five**The Cellular Basis of Inheritance (½ of Chapter 9)* Cancer cells
* Meiosis
* Karyotypes
* Crossing over & genetic variation
* Genetic Recombination
 | **Essential Standards Covered**Bio 3.2.1 (Meiosis) |
| **Week Six**Patterns of Inheritance (½ Chapter 10)* Genetics
* Monohybrid crosses and Dihybrid crosses
* Genotype vs. Phenotype
* Dominant vs. Recessive
* Punnet Squares
 | **Essential Standards Covered**Bio 3.2.2 (Inheritance Patterns) |
| **Week Seven**Patterns of Inheritance (½ Chapter 10)* Intermediate Inheritance, Codominance, & Polygenic inheritance
* Gene linkage & crossing over
* Sex-linked genes
* Genes & the environment
 | **Essential Standards Covered**Bio 3.2.2 (Inheritance Patterns)Bio 3.2.3 (Environment influencing genetic traits) |
| **Week Eight**DNA and the Language of Life (½ Chapter 11)* Griffith’s and Avery’s experiments and conclusions
* Viruses and bacteriophages
* DNA vs. RNA
* Building blocks of DNA
* DNA structure
* Base pairing in DNA
* Template mechanism
 | **Essential Standards Covered**Bio 3.1.1 (DNA Structure & Function)Bio 3.1.2 (DNA and RNA) |
| **Week Nine**DNA and the Language of Life ( ½ Chapter 11)* DNA replication
* “One gene-one polypeptide” hypothesis
* DNA transcription
* DNA translation

Mutations (causes and effects on genes) | **Essential Standards Covered**Bio 3.1.2 (DNA and RNA)Bio 3.1.3 (Mutations) |
| **Week Ten**Human Genetics (Chapter 12)* DNA packing
* Human Genome Project
* Genetic disorders
* Duplications, deletions, inversions, and translocations
* Pedigrees
* Genetic counselors
 | **Essential Standards Covered**Bio 3.3.1 (DNA used for comparison/identification)Bio 3.3.3 |
| **Week Eleven**Frontiers of Genetics (Chapter 13)* Biotechnology
* Recombinant DNA technology
* Plasmids
* Restriction enzymes
* Cloning
* Genetically modified organism (GMO)
* Polymerase chain reaction (PCR)
* Gel electrophoresis
* DNA fingerprinting
* Stem Cells
 | **Essential Standards Covered**Bio 3.3.1 (DNA used for comparison/identification)Bio 3.3.2 (Transgenic organisms)Bio 3.3.3 (Ethical issues of DNA)Bio 1.1.3 (Instructions in DNA) |
| **Week Twelve**Evolution: A History and a Process (½ Chapter 14)* Evolution
* Darwin’s observations
* Descent with modification and natural selection
* Fossils
* Similarities in structure and development among different species providing evidence for evolution
* Molecular evidence for evolution
 | **Essential Standards Covered**Bio 3.4.1 (Fossil, biochemical, anatomical evidence for evolution)Bio 3.4.2 (Natural selection) |
| **Week Thirteen**Evolution: A History and a Process (½ Chapter 14)* Darwin’s theory of Natural Selection
* Pesticide resistance in insects showing natural selection
* Genetic drift, gene flow, mutation, and natural selection contribute to gene pools
* Fitness
* Sickle cell anemia
* Evolution of antibiotic resistance in bacteria
 | **Essential Standards Covered**Bio 3.4.2 (Natural selection)Bio 3.4.3 (Disease agents influencing natural selection) |
| **Week Fourteen**Origins of Biological Diversity (Chapter 15)* Biological Species Concept
* Microevolution vs. Macroevolution
* Reproductive barriers between species
* Geographic isolation & adaptive radiation
* Developmental biology
* Radiometric dating & half-life
* Mass extinctions
* Taxonomy
* Phylogentic trees
* Cladograms
* Domains and kingdoms
 | **Essential Standards Covered**Bio 3.5.1 (Classification systems)Bio 3.5.2 (Dichotomous keys & phylogenetic trees) |
| **Week Fifteen**The Biosphere (Chapter 34)* Five levels of ecological study
* Patchiness of biosphere
* Key abiotic factors
* Uneven heating of Earth’s surface
* Global patterns of wind, precipitation, and ocean currents
* Local climates vs. Microclimates
* Biomes
* Ponds, streams, and estuaries
* Intertidal, neritic, and oceanic zones
 | **Essential Standards Covered**Bio 2.1.2 (Survival & reproduction of organsisms due to adaptations)Bio 2.1.3 (Ways organisms interact) |
| **Week Sixteen**Population and Community Ecology (Chapter 35)* Defining populations
* Population density
* Sampling techniques
* Exponential growth
* Limiting factors & carrying capacity
* Density-dependent vs. Density-independent factors
* Human population growth
* Age structures
* Interspecific competition
* Predators and prey
* Symbiotic relationships
* Primary vs. Secondary succession
* How human activities can affect species diversity
 | **Essential Standards Covered**Bio 2.1.3 (Ways organisms interact)Bio 2.1.4 (Stability of ecosystems) |
| **Week Seventeen**Ecosystems and Conservation in Biology (½ Chapter 36)* Energy flow & cycling
* Food chains and food webs
* Ecosystem productivity & biomass
* Ecological pyramids
* Carbon and Oxygen cycle
* Nitrogen cycle
* Water cycle
 | **Essential Standards Covered**Bio 2.1.1 (Flow of energy and cycling of matter) |
| **Week Eighteen**Ecosystems and Conservation in Biology (½ Chapter 36)* Human activities impacting chemical cycles
* Pollution affecting food chains
* Biodiversity & biodiversity threats
* Conservation biology
 | **Essential Standards Covered**Bio 2.2.1 (Human activities impacting the environment)Bio 2.2.2 (Protection and conservation of natural resources) |

1. What standards are not covered by your textbook choice? What other materials and resources do you plan on using?

**Standards that are not sufficiently covered by textbook**:

Bio 4.2.2: Explain ways that organisms use released energy for maintaining homeostasis (active transport).

Bio 1.2.3: Explain how specific cell adaptations help cells survive in particular environments (focus on unicellular organisms).

**Supplemental Websites**:

1. [http://www.phscho ol.com/atschool/phbio/active\_art/active\_transport/index.html](http://www.phschool.com/atschool/phbio/active_art/active_transport/index.html): This is a great website that explains the different types of active transport and animates them.
2. <http://www.youtube.com/watch?v=QGAm6hMysTA>: YouTube video that explains flagella and cilia by using microscopic videos of protists moving.
3. <http://science.howstuffworks.com/zoology/insects-arachnids/question675.htm>: Website that explains why moths are attracted to light through phototaxis.
4. <https://www.youtube.com/watch?v=w6lM-TNKd7w>: YouTube video that explains cellular transport through proteins.
5. <https://www.youtube.com/watch?v=dPKvHrD1eS4>: Funny YouTube video that uses everyday examples to explain cell transport.