Southern Lehigh School District

UbD Curriculum Template

Course: **Biology** Unit: **Basic Biological Principles** Grades: **9**

Teacher Team: **Rick Dreves, Adrienne Searfoss, Jesse Mead** Date: **June 2015**

Stage 1 – Desired Results	
Established Goals	**Enduring Understandings/Transfer**
1. What 21st Century Essentials included in the mission statement will this unit address? *Effective Communication Skills* *Transfer of Learning* *Problem-solving* 2. What content standards will this unit address? • ELA PA Core State Standards Reading CC.3.5.9-10.A. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanation or description. CC.3.5.9-10.B. Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. CC.3.5.9-10.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.	**Written as a declarative statement, an enduring understanding is a "big idea" that focuses on larger concepts, principles, and processes that go beyond discrete facts or skills. Enduring Understandings are applicable to new situations across content areas and TRANSFERABLE (the ability to learn in one context and apply to a new situation, particularly outside of the classroom) to the real world.** 3. List the Enduring Understanding(s): *Organisms share common characteristics of life.* *Cells are the basic unit of life.* *Cells have organized structures and systems necessary to support chemical reactions needed to maintain the living condition.* *Through a variety of mechanisms, organisms seek to maintain a biological balance between their internal and external environments.* *Eukaryotic cells can differentiate and organize making it possible for multicellularity.* *Organisms obtain and use energy to carry out life processes* 4. What do you want students to do with this knowledge or skill beyond this course? What is Transfer? ** Students will select and use appropriate tools and techniques when conducting experiments related to the biological sciences and then communicate an analysis of the findings.* ** Students will provide examples for when it is correct to use the terms scientific principle, scientific theory, scientific law, fact, and belief.* ** Students will compare and contrast the structural and functional similarities and differences among living things.* ** Students will describe the flow of energy through living systems.* *Students will cite examples of how structure is related to function at all biological levels of organization.*

CC.3.5.9-10.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
CC.3.5.9-10.E. Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
CC.3.5.9-10.F. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.
CC.3.5.9-10.G. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
CC.3.5.9-10.I. Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.
CC.3.5.9-10.J. By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.
Writing
CC.3.6.9-10.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
CC.3.6.9-10.H. Draw evidence from informational texts to support analysis,

Essential Questions

What thought-provoking questions will foster inquiry, meaning-making, and transfer?

5. List the Essential Question(s) that students should ponder, wonder about or explain by the end of this unit:
   How do we know something is alive?
   How does life result from chemical structure and function?
   How does life result from cellular structure and function?
   How do organisms maintain a biological balance between their internal and external environment?
   What are the advantages of multicellularity?
   How do different organisms obtain and use energy to survive in their environment?

Acquisition

Students will know...	**Students will be skilled at... (be able to do)**
6. What facts should students know and be able to use to gain further knowledge? *Organisms are made up of simpler units called cells.* *Organisms obtain and use energy through photosynthesis or cellular respiration to carry out their life processes.* *Organisms release waste chemicals produced by cells.* *Organisms seek to maintain homeostasis at all biological levels of organization.* *Organisms grow, develop and eventually die.* *Organisms adapt to changes in their environments.* *Different types of cells and tissues combine to form distinct structures known as organs, which perform specific functions.* *Organs work together as a system to perform common functions.* *Organ systems function to meet an organism's needs.* *Cells that have differentiated to perform specialized functions rely on the collective function of other specialized cells within a multicellular organism to maintain their living condition.* *Cells occur in two basic forms: Prokaryotes (Bacteria) and Eukaryotes (all other cells).* *A cell's interior is separated or compartmentalized*	9. What discrete skill and processes should students be able to demonstrate? *BIO.A.1.1.1 Describe the characteristics of life shared by all prokaryotic and eukaryotic organisms.* *BIO.A.1.2.1 Compare cellular structures and their functions in prokaryotic and eukaryotic cells.* *BIO.A.1.2.2 Describe and interpret relationships between structure and function at various levels of biological organization (i.e., organelles, cells, tissues, organs, organ systems, and multicellular organisms).*

reflection, and research. • Math PA Core State Standards • PA Content Standards *BIO.A.1.1 Explain the characteristics common to all organisms.* *BIO.A.1.2 Describe relationships between structure and function at biological levels of organization.*	*from the environment by a phospholipid bilayer plasma membrane.* *The cytoplasm contains organelles that serve specific functions.* *Structure is related to function at the cellular and organelle levels of biological organization.* 7. What vocabulary should students know and be able to recall? *biology, cell, chloroplast, endoplasmic reticulum, endosymbiosis, eukaryote, extracellular, golgi, hypothesis, intracellular, mitochondria, multicellular, nucleus, organ, organelle, organism, organ system, prokaryote, science, scientific law, scientific principle, scientific theory, fact, belief, tissue, unicellular, lysosomes, vacuoles, central vacuole, vesicles, nucleous, ribosome, cell membrane, cytoplasm, cytoskeleton, centriole, cell wall, photosynthesis, respiration, homeostasis* 8. What basic concepts should students know and be able to recall and apply? *Identify how structure relates to function in organelles of eukaryotes.* *Name and describe various organelles in eukaryotic cells.* *Distinguish similarities and differences between prokaryotic and eukaryotic cells.* *Describe the characteristics of life.* *Be able to distinguish if something is alive or not based on its characteristics.*	

Stage 2 – Evidence	
NETS for Students	**PERFORMANCE TASK(S)—can include transfer tasks and Project-Based Learning**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live	*Examples include but are not limited to:* *Labs, open-ended essays, voice recordings, videos, presentations, discussion boards, graphic organizers, songs, skits, dioramas, visual projects (posters, dioramas)* List the task(s), then explain how the student will demonstrate the transfer of knowledge or skill involved in the task(s)

productively in an increasingly global and digital world. *Critical Thinking* *Communication and Collaboration*	(reference Stage 1, Item #4): *Using the Microscope Lab ("r/e" Lab) - apply the use of the microscope to practice focusing* *Plant and Animal Cell Lab - apply the knowledge of differences between plant and animals to distinguish between these two types of cells.* *Intro to Microscopy Activity – learning parts of a microscope to be able to apply those skills to the use of a microscope.* *Cell Analogy Project – students do project comparing the organization of the cellular organelles to a larger complex entity such as a factory*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Quiz* *Unit Test* *Lab Report*

Stage 3 – Learning Plan		
NETS for Students	**Learning Activities**	**Progress Monitoring/Formative Assessment**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world. *Critical Thinking* *Communication and Collaboration*	Questions to consider while planning: • Are transfer and acquisition addressed in the learning plan? • Does the learning plan reflect principles of learning and best practices? • Is there tight alignment with Stages 1 and 2? • Is the plan likely to be engaging and effective for all students?	• **How will you monitor students' progress toward acquisition, meaning, and transfer during learning activities?** Homework Checks/Bell ringers Section quizzes Lab analysis Discussions and questioning • **What are potential rough spots and student misunderstandings?** Vocabulary Visualizing parts because they are microscopic Identifying organelle structure Applying the structure to the function from a diagram perspective • **How will students get the feedback they need?** Labs

			Homework Notes Worksheets
	List planned activities *(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games)*: Using a microscope to examine and identify cells. Cell Analogy Project – students do project comparing the organization of the cellular organelles to a larger complex entity such as a factory	**List resources required** *(examples include but are not limited to: laptops, iPads, websites, digital cameras, magazines, Blackboard, textbooks, novels, primary source documents, other non-fiction text, lab equipment, maps, translator, calculators)* Internet School Website Textbook Lab materials	**FORMATIVE ASSESSMENTS—any non-graded, diagnostic assessment administered prior to or during a unit that reflects prior knowledge, skill levels, and potential misconceptions.** *Examples include but are not limited to: Pre-tests, clickers (CPS), mini whiteboards, entrance and exit tickets, CDTs, DIBELS, Aimsweb* Homecheck and Bell Ringer Review games

Southern Lehigh School District

UbD Curriculum Template

Course: **Biology** Unit: **The Chemical Basis for Life** Grades: **9**

Teacher Team: **Rick Dreves, Adrienne Searfoss, Jesse Mead** Date: **June 2015**

Stage 1 – Desired Results

Established Goals

1. What 21st Century Essentials included in the mission statement will this unit address?
   Effective Communication Skills
   Transfer of Learning
   Adaptation and flexibility
   Problem-solving

2. What content standards will this unit address?

   - ELA PA Core State Standards
     Reading
     CC.3.5.9-10.A. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanation or description.
     CC.3.5.9-10.B. Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
     CC.3.5.9-10.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

Enduring Understandings/Transfer

Written as a declarative statement, an enduring understanding is a "big idea" that focuses on larger concepts, principles, and processes that go beyond discrete facts or skills. Enduring Understandings are applicable to new situations across content areas and TRANSFERABLE (the ability to learn in one context and apply to a new situation, particularly outside of the classroom) to the real world.

3. List the Enduring Understanding(s):
   How unique properties of water support life on earth.
   Relationship between structure and function at various levels of biochemical organization.
   How carbon is suited to support biological macromolecules.
   How the structure of macromolecules enable them to do their job.
   How enzymes regulate biochemical reactions in the cell.
   The role of enzymes as catalysts.

4. What do you want students to do with this knowledge or skill beyond this course? What is Transfer?
   ** Students will understand how chemistry is related to the building blocks of macromolecules.*
   ** Students will know how cells to the body are like chemistry to the world.*
   ** Students will be able to identify the reactants and products in a chemical reaction.*

Essential Questions

What thought-provoking questions will foster inquiry, meaning-making, and transfer?

5. List the Essential Question(s) that students should ponder, wonder about or explain by the end of this unit:
   What are the unique properties of water and how do they support life on Earth?
   How does the structure of atoms, molecules and marcomolecules allow them to perform various tasks?
   Why is carbon suited to form biological marcomolecules?
   What is the structure of the 4 macromolecules and how does that structure dictate function?
   How do enzymes function as catalysts?

CC.3.5.9-10.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. CC.3.5.9-10.E. Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). CC.3.5.9-10.F. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. CC.3.5.9-10.G. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. CC.3.5.9-10.J. By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently. Writing CC.3.6.9-10.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. CC.3.6.9-10.H. Draw evidence from informational texts to support analysis, reflection, and research.	**Acquisition**	
	Students will know...	**Students will be skilled at... (be able to do)**
	6. What facts should students know and be able to use to gain further knowledge? *Water is polar.* *Unique properties of water include adhesion, cohesion, and high specific heat.* *Water molecules are held together by hydrogen bonds.* *Where acids and bases fall on the pH scale.* *Know the elements used to construct the macromolecules.* *The monomers used to construct the macromolecules.* *Carbon has the ability to form 4 bonds with itself and other elements.* *Carbon allows the formation of many different shapes ie chains and rings and lines and things.* *The functions of each of the macromolecules.* *The function of a catalyst.* *How enzymes functions as catalysts and why they are important to living things.* *pH and temperature can affect the enzyme because it changes the shape of the enzyme.* *The structure of atoms and the bonds used to join compounds and molecules.*	9. What discrete skill and processes should students be able to demonstrate? *BIO.A.2.1.1 Describe the unique properties of water and how these properties support life on Earth (e.g., freezing point, high specific heat, cohesion).* *BIO.A.2.2.1 Explain how carbon is uniquely suited to form biological macromolecules.* *BIO.A.2.2.2 Describe how biological macromolecules form from monomers.* *BIO.A.2.2.3 Compare the structure and function of carbohydrates, lipids, proteins, and nucleic acids in organisms.* *BIO.A.2.3.1 Describe the role of an enzyme as a catalyst in regulating a specific biochemical reaction.* *BIO.A.2.3.2 Explain how factors such as pH, temperature, and concentration levels can affect enzyme function.*

• Math PA Core State Standards • PA Content Standards *BIO.A.2.1 Describe how the unique properties of water support life on Earth.* *BIO.A.2.2 Describe and interpret relationships between structure and function at various levels of biochemical organization (i.e., atoms, molecules, and macromolecules).* *BIO.A.2.3 Explain how enzymes regulate biochemical reactions within a cell.*	7. What vocabulary should students know and be able to recall? *atom, element, covalent bond, ionic bond, hydrogen bond, adhesion, cohesion, polar, carbohydrate, carbon, catalyst, enzyme, lipid, glycerol, fatty acid, macromolecule, molecule, monomer, nucleic acid, pH, protein, polymer, amino acid, specific heat, temperature, monosaccharide, buffer, substrate, active site, activation energy, electron, proton, neutron, ions, isotope, nucleotides, nucleic acid, phosphate group, 5 carbon sugar, nitrogen base, amino group, R group, carboxyl group, hydroxide ion, hydrogen ion, dehydration synthesis, hydrolysis* 8. What basic concepts should students know and be able to recall and apply? *The relationship between structure and function of the macromolecules.* *Electrons are involved in bonding.* *Importance of maintaining pH as an example of homeostasis to living things.* *Carbon is necessary to build the macromolecules.* *How enzymes make life possible.* *How atoms make molecules which make monomers which make polymers which make life.*	

Stage 2 – Evidence	
NETS for Students	**PERFORMANCE TASK(S)—can include transfer tasks and Project-Based Learning**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world.	*Examples include but are not limited to:* *Labs, open-ended essays, voice recordings, videos, presentations, discussion boards, graphic organizers, songs, skits, dioramas, visual projects (posters, dioramas)* List the task(s), then explain how the student will demonstrate the transfer of knowledge or skill involved in the task(s) (reference Stage 1, Item #4): *Last Meal Lab - compare and contrast the 4 macromolecules by running various tests (ie. benedicts, biuret, iodine and oil seep test) to determine what macromolecule is present and therefore what the person's last meal was.*

Communication and Collaboration *Creative and Innovation*	**OTHER SUMMATIVE ASSESSMENTS—can include factual recall** *Examples include but are not limited to final projects, research papers, quizzes and tests.* List the assessments: *Quiz* *Unit Test* *Lab Report*

Stage 3 – Learning Plan		
NETS for Students	**Learning Activities**	**Progress Monitoring/Formative Assessment**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world.	Questions to consider while planning: • Are transfer and acquisition addressed in the learning plan? • Does the learning plan reflect principles of learning and best practices? • Is there tight alignment with Stages 1 and 2? • Is the plan likely to be engaging and effective for all students?	• **How will you monitor students' progress toward acquisition, meaning, and transfer during learning activities?** Homework Checks/Bell ringers Section quizzes Lab analysis Discussions and questioning • **What are potential rough spots and student misunderstandings?** Vocabulary Visualizing parts because they are microscopic Identifying chemical structure and building from a monomer to a polymer Applying the structure to the function from a diagram perspective at the chemical structure level • **How will students get the feedback they need?** Labs Homework Notes Worksheets

	List planned activities *(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games)*: Using a microscope to examine and identify cells. Cell Analogy Project – students do project comparing the organization of the cellular organelles to a larger complex entity such as a factory	**List resources required** *(examples include but are not limited to: laptops, iPads, websites, digital cameras, magazines, Blackboard, textbooks, novels, primary source documents, other non-fiction text, lab equipment, maps, translator, calculators)* Internet School Website Textbook Lab materials	**FORMATIVE ASSESSMENTS—any non-graded, diagnostic assessment administered prior to or during a unit that reflects prior knowledge, skill levels, and potential misconceptions.** *Examples include but are not limited to: Pre-tests, clickers (CPS), mini whiteboards, entrance and exit tickets, CDTs, DIBELS, Aimsweb* Homework check and Bell Ringer Review games

Southern Lehigh School District

UbD Curriculum Template

Course: **Biology** Unit: **Bioenergetics** Grades: **9**

Teacher Team: **Rick Dreves, Adrienne Searfoss, Jesse Mead** Date: **June 2015**

Stage 1 – Desired Results

Established Goals

1. What 21st Century Essentials included in the mission statement will this unit address?
   Transfer of Learning
   Adaptation and flexibility
   Problem-solving

2. What content standards will this unit address?

   - ELA PA Core State Standards
     Reading:
     CC.3.5.9-10.A. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanation or description.
     CC.3.5.9-10.B. Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
     CC.3.5.9-10.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
     CC.3.5.9-10.D. Determine the meaning

Enduring Understandings/Transfer

Written as a declarative statement, an enduring understanding is a "big idea" that focuses on larger concepts, principles, and processes that go beyond discrete facts or skills. Enduring Understandings are applicable to new situations across content areas and TRANSFERABLE (the ability to learn in one context and apply to a new situation, particularly outside of the classroom) to the real world.

3. List the Enduring Understanding(s):
   Organisms share common characteristics of life.
   Organisms obtain and use energy to carry out their life processes.
   Organisms on Earth interact and depend in a variety of ways on other living and nonliving things in their environments.

4. What do you want students to do with this knowledge or skill beyond this course? What is Transfer?
   ** Students will understand the importance of autotrophs to all life on Earth.*
   ** Students will show how energy moves from autotrophs to heterotrophs.*
   ** Students will make the connection between chemistry and biology.*

Essential Questions

What thought-provoking questions will foster inquiry, meaning-making, and transfer?

5. List the Essential Question(s) that students should ponder, wonder about or explain by the end of this unit:
   How do different organisms obtain and use energy to survive in their environment?
   How do organisms interact and depend on each other and their environment for survival?

Acquisition

Students will know...	Students will be skilled at... (be able to do)
6. What facts should students know and be able to use to gain further knowledge? *State the basic reactants and products of photosynthesis.*	9. What discrete skill and processes should students be able to demonstrate? *BIO.A.3.1.1 Describe the fundamental roles of plastids (e.g., chloroplasts) and mitochondria in*

of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. CC.3.5.9-10.E. Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). CC.3.5.9-10.F. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. CC.3.5.9-10.G. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. CC.3.5.9-10.J. By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently. Writing: CC.3.6.9-10.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. CC.3.6.9-10.D. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. CC.3.6.9-10.E. Use technology, including the Internet, to produce, publish, and update individual or shared writing	*State the importance of light dependence and independence in the reactions that takes place in the chloroplast.* *State the basic reactants and products of aerobic cellular respiration.* *Explain how photosynthesis and aerobic respiration are opposite processes and how they are interconnected.* *Identify types of organisms that do photosynthesis and the organisims that do cellular respiration.* *Explain how ATP is related to ADP and energy.* *Identify energy transfer in both photosynthesis and cellular respiration.* *Identify the organelles involved in photosynthesis and cellular respiration.* 7. What vocabulary should students know and be able to recall? *ADP, aerobic, anaerobic, ATP, cellular respiration, chlorophyll, chloroplast, fermentation, mitochondria, photosynthesis, metabolism, glycolysis, Krebs Cycle, Electron Transport Chain, light independent reaction and light dependent reactions, autotrophs, heterotrophs, pigment, thylakoid, stroma, NADP+, NADPH* 8. What basic concepts should students know and be able to recall and apply? *Organisms obtain and use energy through photosynthesis or cellular respiration to carry out their life processes* *Chemical reactions and processes necessary for life are carried out in cytoplasm or organelles within a eukaryotic cell's cytoplasm.* *Structure is related to function at the cellular and organelle levels of biological organization* *Most biochemical reactions require an input of energy.* *Photosynthesis is the process that transforms light energy into potential chemical energy.*	*energy transformations.* *BIO.A.3.2.1 Compare the basic transformation of energy during photosynthesis and cellular respiration.* *BIO.A.3.2.2 Describe the role of ATP in biochemical reactions.*

products, taking advantage of technology's capacity to link CC.3.6.910.H.Draw evidence from informational texts to support analysis, reflection, and research. • Math PA Core State Standards CC.2.1.HS.F.3 Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays. CC.2.4.HS.B.1 Summarize, represent, and interpret data on a single count or measurement variable. CC.2.4.HS.B.2 Summarize, represent, and interpret data on two categorical and quantitative variables. • PA Content Standards *BIO.A.3.1 Identify and describe the cell structures involved in processing energy.* *BIO.A.3.2 Identify and describe how organisms obtain and transform energy for their life processes.*	*Cellular respiration is the process by which potential chemical energy in the bonds of glucose is transformed into potential chemical energy in the bonds of ATP and heat.* *ATP molecules store usable chemical energy to drive life processes* *Sunlight is the initial energy source for most life on Earth.*	

Stage 2 – Evidence	
NETS for Students	**PERFORMANCE TASK(S)—can include transfer tasks and Project-Based Learning**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world. *Critical Thinking*	*Examples include but are not limited to:* *Labs, open-ended essays, voice recordings, videos, presentations, discussion boards, graphic organizers, songs, skits, dioramas, visual projects (posters, dioramas)* List the task(s), then explain how the student will demonstrate the transfer of knowledge or skill involved in the task(s) (reference Stage 1, Item #4): *Do BTB (bromothymol blue) Labs for Photosynthesis and/or Respiration OR yeast fermentation - lab used to measure how much carbonic acid is produced through exercise*

	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Photosynthesis Test* *Cellular Respiration Test*

Stage 3 – Learning Plan		
NETS for Students	**Learning Activities**	**Progress Monitoring/Formative Assessment**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world. *Critical Thinking*	Questions to consider while planning: • Are transfer and acquisition addressed in the learning plan? • Does the learning plan reflect principles of learning and best practices? • Is there tight alignment with Stages 1 and 2? • Is the plan likely to be engaging and effective for all students?	• **How will you monitor students' progress toward acquisition, meaning, and transfer during learning activities?** Homework Checks/Bell ringers Section quizzes Lab analysis Discussions and questioning • **What are potential rough spots and student misunderstandings?** Flow of energy and electron transport Energy transformations (types of energy) Balanced equations • **How will students get the feedback they need?** Labs Homework Notes Worksheets Directed study & after school help Website resources In class questioning/discussion

	List planned activities *(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games)*: Labs Homework Notes Worksheets	**List resources required** *(examples include but are not limited to: laptops, iPads, websites, digital cameras, magazines, Blackboard, textbooks, novels, primary source documents, other non-fiction text, lab equipment, maps, translator, calculators)* Internet School Website Textbook Lab materials	**FORMATIVE ASSESSMENTS—any non-graded, diagnostic assessment administered prior to or during a unit that reflects prior knowledge, skill levels, and potential misconceptions.** *Examples include but are not limited to: Pre-tests, clickers (CPS), mini whiteboards, entrance and exit tickets, CDTs, DIBELS, Aimsweb* Homework Checks/Bell ringers Review games

Southern Lehigh School District

UbD Curriculum Template

Course: **Biology** Unit: **Homeostasis and Transport** Grades: **9**

Teacher Team: **Rick Dreves, Adrienne Searfoss, Jesse Mead** Date: **June 2015**

Stage 1 – Desired Results

Established Goals

1. What 21st Century Essentials included in the mission statement will this unit address?
   Effective Communication Skills
   Transfer of Learning

   Problem-solving

2. What content standards will this unit address?

   - ELA PA Core State Standards
     Reading:
     CC.3.5.9-10.A. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanation or description
     CC.3.5.9-10.B. Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
     CC.3.5.9-10.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

Enduring Understandings/Transfer

Written as a declarative statement, an enduring understanding is a "big idea" that focuses on larger concepts, principles, and processes that go beyond discrete facts or skills. Enduring Understandings are applicable to new situations across content areas and TRANSFERABLE (the ability to learn in one context and apply to a new situation, particularly outside of the classroom) to the real world.

3. List the Enduring Understanding(s):
   Organisms share common characteristics of life.
   Cells have organized structures to maintain homeostasis.
   Through a variety of mechanisms, organisms seek to maintain a biological balance between their internal and external environments.
   Organisms obtain and use energy to carry out life processes.
   Cells have various ways of transporting materials into and out of the cell.
   Organisms maintain homeostasis in several ways.

4. What do you want students to do with this knowledge or skill beyond this course? What is Transfer?
   ** Students will cite examples of how structure is related to function at all biological levels of organization.*
   ** Students will understand that the ability to maintain homeostasis is necessary for all living things.*
   ** Students will understand how the structure and function of macromolecules allow the cell membrane to do its job.*
   ** Students will recognize several ways that organisms maintain homeostasis.*

Essential Questions

What thought-provoking questions will foster inquiry, meaning-making, and transfer?

5. List the Essential Question(s) that students should ponder, wonder about or explain by the end of this unit:
   How do we know something is alive?
   How do organisms maintain a biological balance between their internal and external environment?
   How does each method of transport work?

CC.3.5.9-10.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. CC.3.5.9-10.E. Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). CC.3.5.9-10.F. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. CC.3.5.9-10.G. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. CC.3.5.9-10.J. By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently. Writing CC.3.6.9-10.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. CC.3.6.9-10.H. Draw evidence from informational texts to support analysis, reflection, and research. • Math PA Core State Standards	**Acquisition**	
	Students will know...	**Students will be skilled at... (be able to do)**
	6. What facts should students know and be able to use to gain further knowledge? *Organisms need to move materials in and/or out in a timely manner in order to maintain homeostasis.* *Organisms seek to maintain homeostasis at all biological levels of organization.* *A cell's interior is separated or compartmentalized from the environment by a phospholipid bilayer / plasma membrane.* *Passive transport is driven by concentration gradients.* *Molecules are in constant motion.* *Active transport requires energy in order to move molecules.* *Organisms need to maintain stable body temperature, water regulation, and oxygen regulation.* 7. What vocabulary should students know and be able to recall? *carbohydrate, transport protein, lipid, enzymes, adenosine triphosphate (ATP), homeostasis, cytoplasm, phospholipid bilayer, passive transport, active transport, osmosis, diffusion, concentration gradient, endocytosis, exocytosis, solute, solvent, equilibrium, permeability, selectively permeable, impermeable, facilitated diffusion, plasma membrane, concentration, vesicle, bulk transport, molecular transport, thermoregulation, oxygen regulation, water regulation* 8. What basic concepts should students know and be able to recall and apply? *Ability for students to work osmosis problems* *Ability to draw the various types of movement and label parts* *Draw cell membrane with labels*	9. What discrete skill and processes should students be able to demonstrate? *BIO.A.4.1.1 Describe how the structure of the plasma membrane allows it to function as a regulatory structure and/or protective barrier for a cell.* *BIO.A.4.1.2 Compare the mechanisms that transport materials across the plasma membrane (i.e., passive transport—diffusion, osmosis, facilitated diffusion; and active transport—pumps, endocytosis, exocytosis).* *BIO.A.4.1.3 Describe how membrane-bound cellular organelles (e.g., endoplasmic reticulum, Golgi apparatus) facilitate the transport of materials within a cell.* *BIO.A.4.2.1 Explain how organisms maintain homeostasis (e.g., thermoregulation, water regulation, oxygen regulation).* *Ability to solve osmosis problems.* *Ability to draw the various types of movement and label parts.* *Draw cell membrane with labels.* *Predict the direction of movement based on concentrations.* *Identify examples of how organisms maintain temperature, oxygen, and water.*

• PA Content Standards *BIO.A.4.1 Identify and describe the cell structures involved in transport of materials into, out of, and throughout a cell.* *BIO.A.4.2 Explain mechanisms that permit organisms to maintain biological balance between their internal and external environments.*	*Predict the direction of movement based on concentrations* *Identify examples of how organisms maintain temperature, oxygen, and water*	

Stage 2 – Evidence	
NETS for Students	**PERFORMANCE TASK(S)—can include transfer tasks and Project-Based Learning**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world. *Critical Thinking* *Communication and Collaboration*	*Examples include but are not limited to:* *Labs, open-ended essays, voice recordings, videos, presentations, discussion boards, graphic organizers, songs, skits, dioramas, visual projects (posters, dioramas)* List the task(s), then explain how the student will demonstrate the transfer of knowledge or skill involved in the task(s) (reference Stage 1, Item #4): *Transport Labs / Simulations - students apply appropriate vocabulary through analyzing data and making predictions about various scenarios dealing with homeostasis* *Homeostasis Lab - shows the students how the ability to maintain homeostasis is necessary for all living things.*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Transport Labs / Simulations - students apply appropriate vocabulary through analyzing data and making predictions about various scenarios dealing with homeostasis* *Homeostasis Lab - shows the students how the ability to maintain homeostasis is necessary for all living things.*

Stage 3 – Learning Plan		
NETS for Students	**Learning Activities**	**Progress Monitoring/Formative Assessment**
NETS—National Educational	Questions to consider while planning:	• **How will you monitor students' progress toward**

<table>
<tr>
<td rowspan="2">Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world.

Critical Thinking
Communication and Collaboration</td>
<td colspan="2">• Are transfer and acquisition addressed in the learning plan?
• Does the learning plan reflect principles of learning and best practices?
• Is there tight alignment with Stages 1 and 2?
• Is the plan likely to be engaging and effective for all students?</td>
<td>acquisition, meaning, and transfer during learning activities?

Homework Checks/Bell ringers
Section quizzes
Lab analysis
Discussions and questioning

• What are potential rough spots and student misunderstandings?
Vocabulary
Osmosis Problems with matching units and math skills
Applying vocabulary in order to identify various diagrams of transport

• How will students get the feedback they need?
Labs
Homework
Notes
Worksheets
Directed study & after school help
Website resources
In class questioning/discussion</td>
</tr>
<tr>
<td>List planned activities
(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games):

Labs
Homework
Notes
Worksheets</td>
<td>List resources required
(examples include but are not limited to: laptops, iPads, websites, digital cameras, magazines, Blackboard, textbooks, novels, primary source documents, other non-fiction text, lab equipment, maps, translator, calculators)
Internet
School Website
Textbook
Lab materials</td>
<td>FORMATIVE ASSESSMENTS—any non-graded, diagnostic assessment administered prior to or during a unit that reflects prior knowledge, skill levels, and potential misconceptions.

Examples include but are not limited to: Pre-tests, clickers (CPS), mini whiteboards, entrance and exit tickets, CDTs, DIBELS, Aimsweb

Homework Checks/Bell ringers
Review games</td>
</tr>
</table>

Southern Lehigh School District

UbD Curriculum Template

Course: **Biology** Unit: **Cell Growth and Reproduction** Grades: **9**

Teacher Team: **Rick Dreves, Adrienne Searfoss, Jesse Mead** Date: **June 2015**

Stage 1 – Desired Results

Established Goals

1. What 21st Century Essentials included in the mission statement will this unit address?
   Effective Communication Skills
   Transfer of Learning
   Problem-solving

2. What content standards will this unit address?

   - ELA PA Core State Standards
     Reading:
     CC.3.5.9-10.A. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanation or description
     CC.3.5.9-10.B. Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
     CC.3.5.9-10.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
     CC.3.5.9-10.D. Determine the meaning

Enduring Understandings/Transfer

Written as a declarative statement, an enduring understanding is a "big idea" that focuses on larger concepts, principles, and processes that go beyond discrete facts or skills. Enduring Understandings are applicable to new situations across content areas and TRANSFERABLE (the ability to learn in one context and apply to a new situation, particularly outside of the classroom) to the real world.

3. List the Enduring Understanding(s):

   Organisms share common characteristics of life.
   There are 3 main stages of the cell cycle.
   There are 2 main types of cell division.
   DNA is replicated for use during cell division.
   DNA, genes, alleles and chromosomes all play a role in inheritance.

4. What do you want students to do with this knowledge or skill beyond this course? What is Transfer?

   ** Students will know how meiosis relates to reproduction and how you end up with traits from both your parents.*
   ** Students will understand how the cell cycle allows the individual organisms to grow, repair and replace cells.*

Essential Questions

What thought-provoking questions will foster inquiry, meaning-making, and transfer?

5. List the Essential Question(s) that students should ponder, wonder about or explain by the end of this unit:
   How do we know if something is alive?
   Compare and contrast mitosis and meiosis?
   How does DNA replicate?
   How does the structure of DNA allow for replication to occur?
   What is the relationship between DNA, alleles, genes and chromosomes?

of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. CC.3.5.9-10.E. Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). CC.3.5.9-10.F. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. CC.3.5.9-10.G. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. CC.3.5.9-10.J. By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently. Writing: CC.3.6.9-10.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. CC.3.6.9-10.H. Draw evidence from informational texts to support analysis, reflection, and research. • Math PA Core State Standards	**Acquisition** **Students will know...** 6. What facts should students know and be able to use to gain further knowledge? • *Stages and purpose of mitosis and meiosis* • *What happens during interphase and cytokinesis?* • *Cell grows and prepares to divide during interphase.* • *Organisms can reproduce their own kind using DNA.* • *Sexually reproducing organisms produce gametes, which transport hereditary information from one generation of organisms into another generation.* • *One or more pairs of genes on one or more chromosomes code for the expression of inherited traits.* • *Two or more versions of a gene (alleles) contribute to the expression of inherited traits.* • *During the process of meiosis genetic recombinations may occur contributing to genetic variability within a population.* • *Know the events and steps in order for cell division* • *DNA contains the complete set of instructions, the genetic code, for building and running an organism.* • *Mitotic cell division creates two identical diploid body cells for use in growth, repair and replacement* • *Meiotic cell division creates 4 genetically different haploid cells for use in sexual reproduction.* • *Know the steps of DNA replication* • *Know the structure of DNA*	**Students will be skilled at... (be able to do)** 9. What discrete skill and processes should students be able to demonstrate? *BIO.B.1.1.1 Describe the events that occur during the cell cycle: interphase, nuclear division (i.e., mitosis or meiosis), cytokinesis.* *BIO.B.1.1.2 Compare the processes and outcomes of mitotic and meiotic nuclear divisions.* *BIO.B.1.2.1 Describe how the process of DNA replication results in the transmission and/or conservation of genetic information.* *BIO.B.1.2.2 Explain the functional relationships between DNA, genes, alleles, and chromosomes and their roles in inheritance.*

• PA Content Standards *BIO.B.1.1 Describe the three stages of the cell cycle: interphase, nuclear division, cytokinesis.* *BIO.B.1.2 Explain how genetic information is inherited.*	7. What vocabulary should students know and be able to recall? *allele, cell cycle, gamete, chromosome, crossing over, cytokinesis, DNA, DNA replication, gene, interphase, meiosis, mitosis, somatic, nondisjunction, chromatin, sister chromatids, prophase, metaphase, anaphase, telophase, haploid, diploid, homologous chromosome, spindle, centrioles, centromere, DNA polymerase, DNA helicase, telomeres, DNA telomerase, gametes, fertilization, tetrads, zygote* 8. What basic concepts should students know and be able to recall and apply? • *Explain how the structure of DNA relates to replication of DNA* • *Analyze why meiosis occurs in the formation of sex cells.* • *Explain why and when DNA replication occurs* • *Identify and describe various ways models are used to explain, interpret, and predict, biological phenomena/systems.* • *Draw or interpret diagrams relating to the cell cycle and meiosis.*	

Stage 2 – Evidence	
NETS for Students	**PERFORMANCE TASK(S)—can include transfer tasks and Project-Based Learning**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world. *Critical Thinking*	*Examples include but are not limited to:* *Labs, open-ended essays, voice recordings, videos, presentations, discussion boards, graphic organizers, songs, skits, dioramas, visual projects (posters, dioramas)* List the task(s), then explain how the student will demonstrate the transfer of knowledge or skill involved in the task(s) (reference Stage 1, Item #4): *Cell Cycle Lab - students will look at slides of plants or animal cells and see the various stages of the cell cycle and identify them* *Cell Cycle Drawings - students will make drawings and label parts of the phases of the cell cycle* *Meiosis Lab - students will make drawings and label parts of the phases of meiosis* *DNA replication lab - students will use manipulatives to show a DNA molecule unwinding, replicating and forming two*

	identical molecules *The students relate this information to genetics and how this process makes genetic inheritance possible.* *Apply the knowledge of structure of various parts of the cell cycle to the function.*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Quiz and Unit Test*

Stage 3 – Learning Plan		
NETS for Students	**Learning Activities**	**Progress Monitoring/Formative Assessment**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world. *Critical Thinking*	Questions to consider while planning: • Are transfer and acquisition addressed in the learning plan? • Does the learning plan reflect principles of learning and best practices? • Is there tight alignment with Stages 1 and 2? • Is the plan likely to be engaging and effective for all students?	• **How will you monitor students' progress toward acquisition, meaning, and transfer during learning activities?** Homework Checks/Bell ringers Section quizzes Lab analysis Discussions and questioning • **What are potential rough spots and student misunderstandings?** Vocabulary Visualizing parts because they are microscopic Identifying organelle structure Applying the structure to the function from a diagram perspective • **How will students get the feedback they need?** Labs Homework Notes Worksheets

	List planned activities *(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games)*:	**List resources required** *(examples include but are not limited to: laptops, iPads, websites, digital cameras, magazines, Blackboard, textbooks, novels, primary source documents, other non-fiction text, lab equipment, maps, translator, calculators)*	**FORMATIVE ASSESSMENTS—any non-graded, diagnostic assessment administered prior to or during a unit that reflects prior knowledge, skill levels, and potential misconceptions.** *Examples include but are not limited to: Pre-tests, clickers (CPS), mini whiteboards, entrance and exit tickets, CDTs, DIBELS, Aimsweb*
	Describe the events of the cell cycle Cell Cycle Lab Cell Cycle Drawings Describe the events of meiosis Meiosis Drawings Meiosis Lab DNA replication lab Cell Cycle project	Internet School Website Textbook Lab materials	Homework check and Bell Ringer Review games

Southern Lehigh School District

UbD Curriculum Template

Course: **Biology** Unit: **Genetics** Grades: **9**

Teacher Team: **Rick Dreves, Adrienne Searfoss, Jesse Mead** Date: **June 2015**

Stage 1 – Desired Results	
Established Goals	**Enduring Understandings/Transfer**
1. What 21st Century Essentials included in the mission statement will this unit address? *Effective Communication Skills* *Transfer of Learning* *Problem-solving* 2. What content standards will this unit address? • ELA PA Core State Standards Reading: CC.3.5.9-10.A. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanation or description CC.3.5.9-10.B. Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. CC.3.5.9-10.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.	**Written as a declarative statement, an enduring understanding is a "big idea" that focuses on larger concepts, principles, and processes that go beyond discrete facts or skills. Enduring Understandings are applicable to new situations across content areas and TRANSFERABLE (the ability to learn in one context and apply to a new situation, particularly outside of the classroom) to the real world.** 3. List the Enduring Understanding(s): *Organisms share common characteristics of life.* *Hereditary information is inherited and expressed.* *DNA segments direct the production of proteins necessary for the growth and function of cells.* *Describe and predict various observed patterns of inheritance.* *Describe processes that can alter composition or number of chromosomes.* *Explain the process of protein synthesis.* *Describe how the processes of transcription and translation are similar in all organisms.* *Describe the role of ribosomes, ER, golgi and the nucleus in production of specific types of proteins.* *Explain how genetic information is expressed.* *Describe how genetic mutations alter the DNA sequence and may or may not affect phenotype.* *Apply scientific thinking, processes, tools, and technologies in the study of genetics.* *Explain how genetic engineering has impacted the fields of medicine, forensics, and agriculture.* 4. What do you want students to do with this knowledge or skill beyond this course? What is Transfer? ** Students will understand how traits are passed through families.* ** Students will understand how genetics impacts the individual and the next generation.* ** Students will understand why disease run in families.* ** Students will understand the benefits and drawbacks of genetic engineering.* ** Students will understand patterns of inheritance and how to interpret a diagram and make predictions.*

CC.3.5.9-10.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
CC.3.5.9-10.E. Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
CC.3.5.9-10.F. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.
CC.3.5.9-10.G. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
CC.3.5.9-10.J. By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.
Writing:
CC.3.6.9-10.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
CC.3.6.9-10.H. Draw evidence from informational texts to support analysis, reflection, and research.

Essential Questions

What thought-provoking questions will foster inquiry, meaning-making, and transfer?

5. List the Essential Question(s) that students should ponder, wonder about or explain by the end of this unit:
   How do we know if something is alive?
   Why is DNA called the "blueprint of life"?
   What organelles play a role in protein production?
   How do different types of inheritance work?
   What would change the number of chromosomes in a cell?
   How are proteins made?
   How are transcription and translation similar in all organisms?
   How is genetic information expressed?
   What affect can mutations have on phenotypes?
   How has genetic engineering impacted medicine, forensics and agriculture?

Acquisition

Students will know...	**Students will be skilled at... (be able to do)**
6. What facts should students know and be able to use to gain further knowledge? • *Organisms can reproduce their own kind using DNA.* • *One or more pairs of genes on one or more chromosomes code for the expression of inherited traits.* • *Two or more versions of a gene (alleles) contribute to the expression of inherited traits.* • *Patterns of inheritance reflecting how genes interact and express themselves (including dominant, recessive, codominance, incomplete dominance, sex-linked, sex-influenced, multiple alleles) can be predicted, observed and described.* • *The Punnett square is a tool that can be used to predict the probability of an offspring's genotype and phenotype.* • *Selective breeding and biotechnology contribute to the deliberate changing of the genetic makeup of a population.* • *The basic molecular and the associated genetic code structure of DNA are universal, revolutionizing*	9. What discrete skill and processes should students be able to demonstrate? *BIO.B.2.1.1 Describe and/or predict observed patterns of inheritance (i.e., dominant, recessive, co-dominance, incomplete dominance, sex-linked, polygenic, and multiple alleles).* *BIO.B.2.1.2 Describe processes that can alter composition or number of chromosomes (i.e., crossing-over, nondisjunction, duplication, translocation, deletion, insertion, and inversion).* *BIO.B.2.2.1 Describe how the processes of transcription and translation are similar in all organisms.* *BIO.B.2.2.2 Describe the role of ribosomes, endoplasmic reticulum, Golgi apparatus, and the nucleus in the production of specific types of proteins.* *BIO.B.2.3.1 Describe how genetic mutations alter the DNA sequence and may or may not affect phenotype (e.g., silent, nonsense, frame-shift).* *BIO.B.2.4.1 Explain how genetic engineering has*

• Math PA Core State Standards • PA Content Standards *BIO.B.2.1 Compare Mendelian and non-Mendelian patterns of inheritance.* *BIO.B.2.2 Explain the process of protein synthesis (i.e., transcription,and protein modification).* *BIO.B.2.3 Explain how genetic information is expressed.* *BIO.B.2.4 Apply scientific thinking, processes, tools, and technologies in the study of genetics.*	*our understanding of disease, heredity and evolution.* • *DNA contains the complete set of instructions, the genetic code, for building and running an organism.* • *RNA is necessary for protein synthesis from DNA.* • *Many synthesized polypeptides require additional processing to acquire their active, three-dimensional structures.* • *Which genes are expressed at a given time is determined by the integration of internal and environmental signals received by a cell.* • *Mutations alter composition and number of chromosomes in a cell.* • *Various organelles contribute to protein synthesis* 7. What vocabulary should students know and be able to recall? *genetics, trait, segregation, gamete, principle of dominance, mutation, biotechnology, base pairing, nucleotide, hybrid, inbreeding, Punnett Square, Mendel, monohybrid, dihybrid, allele, gene, heterozygous, homozygous, multiple alleles, independent assortment, blood-type, incomplete dominance, codominance, sex-linked, pedigree, polygenic, chromosome, cloning, DNA, forensics, frameshift, gene expression, gene recombination, gene splicing, gene therapy, GMO, genetic engineering, genotype, crossing over, phenotype, inheritance, nondisjunction, point mutation, protein synthesis, ribosome, recessive, dominant, selective breeding, transcription, translation, translocation, duplication, deletion, insertion, inversion, ER, golgi, nucleus, protein, silent mutation, nonsense mutation*	*impacted the fields of medicine, forensics, and agriculture (e.g., selective breeding, gene splicing, cloning, genetically modified organisms, gene therapy).*

	8. What basic concepts should students know and be able to recall and apply? • *Explain the work of Gregory Mendel* • *Differentiate dominant and recessive alleles* • *Predict the offspring of a genetic cross for various types of inheritance* • *Explain the law of segregation and relate it to genetic crosses and meiosis* • *Analyze why meiosis occurs in the formation of sex cells.* • *Construct and perform a punnett square to express genetic outcomes* • *Describe the structural and functional differences between DNA and RNA* • *Explain the functions of mRNA and tRNA in protein synthesis* • *Transcribe a DNA segment into mRNA* • *Use the genetic code to translate mRNA into an amino acid sequence* • *Explain additional modifications necessary to produce a finished protein* • *Identify different types of gene mutations in a DNA sequence* • *Explain how genetic engineering was practiced through selective breeding* • *Explain how technology has enabled our ability to make alterations to the genetic code to modify human health and the human environment* • *Identify and describe various ways models are used to explain, interpret, and predict, biological phenomena/systems.* • *Select and use appropriate tools and techniques when designing and conducting experiments related to the biological sciences and then communicate an analysis of the findings using various types of media.* • *Pose questions and provide evidence-based explanations about understanding and observations of biological phenomena and processes.* • *Describe the role of DNA in protein synthesis,*	

	reproduction and evolution. • *Identify and describe various ways models are used to explain, interpret, and predict, biological phenomena/systems.*	

Stage 2 – Evidence	
NETS for Students	**PERFORMANCE TASK(S)—can include transfer tasks and Project-Based Learning**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world. *Critical Thinking*	*Examples include but are not limited to:* *Labs, open-ended essays, voice recordings, videos, presentations, discussion boards, graphic organizers, songs, skits, dioramas, visual projects (posters, dioramas)* List the task(s), then explain how the student will demonstrate the transfer of knowledge or skill involved in the task(s) (reference Stage 1, Item #4): *Segregation and Fertilization Lab - students will understand how to do genetics problems based on alleles segregating during meiosis and then joining during fertilization* *Genetic Engineering Activity - students look at real world examples and apply knowledge of vocabulary and concepts*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Quiz* *Unit Test* *Lab Report*

Stage 3 – Learning Plan		
NETS for Students	**Learning Activities**	**Progress Monitoring/Formative Assessment**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world.	Questions to consider while planning: • Are transfer and acquisition addressed in the learning plan? • Does the learning plan reflect principles of learning and best practices? • Is there tight alignment with Stages 1 and 2? • Is the plan likely to be engaging and effective for all students?	• **How will you monitor students' progress toward acquisition, meaning, and transfer during learning activities?** Homework Checks/Bell ringers Section quizzes Lab analysis Discussions and questioning

Critical Thinking			• **What are potential rough spots and student misunderstandings?** Vocabulary Visualizing parts because they are microscopic Identifying organelle structure Applying the structure to the function from a diagram perspective • **How will students get the feedback they need?** Labs Homework Notes Worksheets
	List planned activities *(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games)*: Segregation and Fertilization Lab Genetic Engineering Activity Punnett Square problems Protein Synthesis Lab Activity Transcription and Translation Process Sort	**List resources required** *(examples include but are not limited to: laptops, iPads, websites, digital cameras, magazines, Blackboard, textbooks, novels, primary source documents, other non-fiction text, lab equipment, maps, translator, calculators)* Internet School Website Textbook Lab materials	**FORMATIVE ASSESSMENTS—any non-graded, diagnostic assessment administered prior to or during a unit that reflects prior knowledge, skill levels, and potential misconceptions.** *Examples include but are not limited to: Pre-tests, clickers (CPS), mini whiteboards, entrance and exit tickets, CDTs, DIBELS, Aimsweb* Homework check and Bell Ringer Review games

Southern Lehigh School District

UbD Curriculum Template

Course: **Biology** Unit: **Theory of Evolution** Grades: **9**

Teacher Team: **Rick Dreves, Adrienne Searfoss, Jesse Mead** Date: **June 2015**

Stage 1 – Desired Results

Established Goals

1. What 21st Century Essentials included in the mission statement will this unit address?
   Effective Communication Skills
   Transfer of Learning
   Problem-solving

2. What content standards will this unit address?

   - ELA PA Core State Standards
     Reading:
     CC.3.5.9-10.A. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanation or description
     CC.3.5.9-10.B. Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
     CC.3.5.9-10.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
     CC.3.5.9-10.D. Determine the meaning

Enduring Understandings/Transfer

Written as a declarative statement, an enduring understanding is a "big idea" that focuses on larger concepts, principles, and processes that go beyond discrete facts or skills. Enduring Understandings are applicable to new situations across content areas and TRANSFERABLE (the ability to learn in one context and apply to a new situation, particularly outside of the classroom) to the real world.

3. List the Enduring Understanding(s):
   Organisms share common characteristics of life.
   Evolution is the result of many random processes selecting for the survival and reproduction of a population.

4. What do you want students to do with this knowledge or skill beyond this course? What is Transfer?
   ** Students will understand how new species arise.*
   ** Students will understand the role of variation in survival and selection.*
   ** Students will understand how scientific ideas can change in response to new evidence.*

Essential Questions

What thought-provoking questions will foster inquiry, meaning-making, and transfer?

5. List the Essential Question(s) that students should ponder, wonder about or explain by the end of this unit:
   How do we know if something is alive?
   How do we scientifically explain the evidence and mechanisms for biological evolution?

Acquisition

Students will know...

6. What facts should students know and be able to use to gain further knowledge?
   Organisms adapt to changes in their environments.
   Mutations alter a gene's genetic information, resulting in a change in the protein that is made, or how or when a cell makes that protein.

Students will be skilled at... (be able to do)

9. What discrete skill and processes should students be able to demonstrate?
   BIO.B.3.1.1 Explain how natural selection can impact allele frequencies of a population.
   BIO.B.3.1.2 Describe the factors that can contribute to the development of new species (e.g., isolating

of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics. CC.3.5.9-10.E. Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). CC.3.5.9-10.F. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment ina text, defining the question the author seeks to address. CC.3.5.9-10.G. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. CC.3.5.9-10.H. Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. CC.3.5.9-10.J. By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently. Writing: CC.3.6.9-10.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. CC.3.6.9-10.H. Draw evidence from informational texts to support analysis, reflection, and research.	*Most mutations are evolutionarily neutral.* *Evolution occurs when the gene frequency of alleles in a population shifts to confer survival and reproductive success.* *The differential reproductive success of populations of organisms with advantageous traits is known as natural selection.* *Speciation occurs when one population is isolated from another population. The isolation can be geological/ecological, temporal, or behavioral.* *Common anatomical and/or genetic structures and behaviors demonstrate that species have evolved from common ancestors.* *The fossil record documents patterns between extinct and present day species.* *Selective breeding and biotechnology contribute to the deliberate changing of the genetic makeup of a population.* *Limiting factors can cause population fluctuations or extinction in a given ecosystem.* 7. What vocabulary should students know and be able to recall? *Darwin, natural selection, artificial selection, adaptation, fitness, vestigial structures, homologous structures, analogous structures, natural variation, Hutton, Lyell, fossil, Lamarck, Malthus, evolution, genetic drift, bottleneck effect, founder effect, allele frequency, speciation, embryology, behavioral, ecological, temporal, gradualism, punctuated equilibrium, speciation, mutations, evolved* 8. What basic concepts should students know and be able to recall and apply? *Natural variations occurs within individuals of a population* *Variations may play an advantageous role in an organism's fitness* *How to predict the survival rates of groups of*	*mechanisms, genetic drift, founder effect, migration).* *BIO.B.3.1.3 Explain how genetic mutations may result in genotypic and phenotypic variations within a population.* *BIO.B.3.2.1 Interpret evidence supporting the theory of evolution (i.e., fossil, anatomical, physiological, embryological, biochemical, and universal genetic code).* *BIO.B.3.3.1 Distinguish between the scientific terms: hypothesis, inference, law, theory, principle, fact, and observation.*

• Math PA Core State Standards • PA Content Standards *BIO.B.3.1 Explain the mechanisms of evolution.* *BIO.B.3.2 Analyze the sources of evidence for biological evolution.* *BIO.B.3.3 Apply scientific thinking, processes, tools, and technologies in the study of the theory of evolution.*	*organisms based on possessed traits* *Model a scenario to explain the idea behind "Survival of the Fittest" from Darwin's theory of natural selection.•* *The role mutations and gene recombination play in changing a population of organisms.* *Ability to compare modern day descendants of extinct species to propose possible scientific explanations for their present appearance.* *Natural selection can act only on inherited traits.* *Natural selection illustrates and accounts for a species' survival, extinction or change over time.*	

Stage 2 – Evidence	
NETS for Students	**PERFORMANCE TASK(S)—can include transfer tasks and Project-Based Learning**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world. *Critical Thinking* *Research and Information Fluency* *Creative and Innovation*	*Examples include but are not limited to:* *Labs, open-ended essays, voice recordings, videos, presentations, discussion boards, graphic organizers, songs, skits, dioramas, visual projects (posters, dioramas)* List the task(s), then explain how the student will demonstrate the transfer of knowledge or skill involved in the task(s) (reference Stage 1, Item #4): *Evolution Labs / Simulations - students apply appropriate vocabulary to model a scenario and identify variations relating to natural selection and be able to predict how the species will change* *Model a scenario… Various beans and various utensils are used to demonstrate competition amongst various species*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Evolution test* *Labs*

Stage 3 – Learning Plan		
NETS for Students	**Learning Activities**	**Progress Monitoring/Formative Assessment**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills	Questions to consider while planning: • Are transfer and acquisition addressed in the learning plan?	• **How will you monitor students' progress toward acquisition, meaning, and transfer during learning activities?**

<table>
<tr>
<td rowspan="2">and knowledge students need to learn effectively and live productively in an increasingly global and digital world.</td>
<td colspan="2">

Does the learning plan reflect principles of learning and best practices?
Is there tight alignment with Stages 1 and 2?
Is the plan likely to be engaging and effective for all students?

</td>
<td>
Homework Checks/Bell ringers
Section quizzes
Lab analysis
Discussions and questioning
Exit Tickets

What are potential rough spots and student misunderstandings?
Address personal misconceptions about what evolution is
Vocabulary
Allele frequency problems

How will students get the feedback they need?
Labs
Homework
Notes
Worksheets
Directed study & after school help
Website resources
In class questioning/discussion

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<tr>
<td>List planned activities
(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games):

Homework
Notes
Worksheets
Labs
Scenario</td>
<td>List resources required
(examples include but are not limited to: laptops, iPads, websites, digital cameras, magazines, Blackboard, textbooks, novels, primary source documents, other non-fiction text, lab equipment, maps, translator, calculators)
Internet
School Website
Textbook
Lab materials</td>
<td>FORMATIVE ASSESSMENTS—any non-graded, diagnostic assessment administered prior to or during a unit that reflects prior knowledge, skill levels, and potential misconceptions.

Examples include but are not limited to: Pre-tests, clickers (CPS), mini whiteboards, entrance and exit tickets, CDTs, DIBELS, Aimsweb

Homework Checks/Bell ringers</td>
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Southern Lehigh School District

UbD Curriculum Template

Course: **Biology** Unit: **Ecology** Grades: **9**

Teacher Team: **Rick Dreves, Adrienne Searfoss, Jesse Mead** Date: **June 2015**

Stage 1 – Desired Results

Established Goals

1. What 21st Century Essentials included in the mission statement will this unit address?
   Effective Communication Skills
   Transfer of Learning
   Problem-solving
   Global Awareness

2. What content standards will this unit address?

   - ELA PA Core State Standards
     Reading:
     CC.3.5.9-10.A. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanation or description
     CC.3.5.9-10.B. Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
     CC.3.5.9-10.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

Enduring Understandings/Transfer

Written as a declarative statement, an enduring understanding is a "big idea" that focuses on larger concepts, principles, and processes that go beyond discrete facts or skills. Enduring Understandings are applicable to new situations across content areas and TRANSFERABLE (the ability to learn in one context and apply to a new situation, particularly outside of the classroom) to the real world.

3. List the Enduring Understanding(s):

   There are many levels of ecological organization.
   Different ecosystems have characteristic abiotic and biotic components.
   There are various interactions and relationships in every ecosystem.
   Energy flows through an ecosystem.
   Matter cycles through ecosystems.
   Ecosystems change in response the natural and human disturbances.
   Limiting factors affect population dynamics and extinction.

4. What do you want students to do with this knowledge or skill beyond this course? What is Transfer?
   ** Students will make decisions with the good of the planet in mind - consider the ecological implications of our lifestyle choices.*
   ** Students will understand that all life and environments are connected.*

Essential Questions

What thought-provoking questions will foster inquiry, meaning-making, and transfer?

5. List the Essential Question(s) that students should ponder, wonder about or explain by the end of this unit:
   What are the ecological levels of organization in the biosphere?
   What are the characteristic biotic and abiotic components in each of the ecosystems?
   How does energy flow through an ecosystem?
   What are the common biotic interactions in an ecosystem?
   How and why do various forms of matter cycle through an ecosystem?
   How do ecosystems change in response to natural and human disturbances?

CC.3.5.9-10.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.
CC.3.5.9-10.E. Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).
CC.3.5.9-10.G. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
CC.3.5.9-10.J. By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.
Writing:
CC.3.6.9-10.C. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
CC.3.6.9-10.H. Draw evidence from informational texts to support analysis, reflection, and research.

- Math PA Core State Standards
  A1.1.2.1.1:Write, solve and/or apply linear equation (including problem situations).
- PA Content Standards
  BIO.B.4.1 Describe ecological levels of organization in the biosphere
  BIO.B.4.2 Describe interactions and relationships in an ecosystem.

What are the effects of limiting factors that affect population dynamics and extinction?

Acquisition

Students will know...	**Students will be skilled at... (be able to do)**
6. What facts should students know and be able to use to gain further knowledge? *Every level of ecological organization incorporates different components.* *Ecosystem is made up of biotic and abiotic factors.* *Abiotic factors determine the biotic factors of an ecosystem.* *Organisms have different adaptations to survive in different ecosystems.* *The arrows indicate the direction of energy moving through the ecosystem.* *Food webs illustrate the movement of energy through and ecosystem.* *Energy pyramids are limited due to energy loss at every trophic level - follow the 10% rule.* *Ecosystems rely on nitrogen, oxygen, carbon and water to sustain life.* *We can't create or destroy matter which is why these are cycled through an ecosystem.* *Humans affect ecosystems - ecosystems respond in various ways.*	9. What discrete skill and processes should students be able to demonstrate? *BIO.B.4.1.1 Describe the levels of ecological organization (i.e., organism, population, community, ecosystem, biome, and biosphere).* *BIO.B.4.1.2 Describe characteristic biotic and abiotic components of aquatic and terrestrial ecosystems.* *BIO.B.4.2.1 Describe how energy flows through an ecosystem (e.g., food chains, food webs, energy pyramids).* *BIO.B.4.2.2 Describe biotic interactions in an ecosystem (e.g., competition, predation, symbiosis).* *BIO.B.4.2.3 Describe how matter recycles through an ecosystem (i.e., water cycle, carbon cycle, oxygen cycle, and nitrogen cycle).* *BIO.B.4.2.4 Describe how ecosystems change in response to natural and human disturbances (e.g., climate changes, introduction of nonnative species, pollution, fires).* *BIO.B.4.2.5 Describe the effects of limiting factors on population dynamics and potential species extinction.*
7. What vocabulary should students know and be able to recall? *biosphere, species, population, community, ecology, ecosystem, biome, biotic factor, abiotic factor, autotroph, primary producer, photosynthesis, heterotroph, consumer, carnivore, herbivore, scavenger, omnivore, decomposer, food chain, phytoplankton, food web, zooplankton, trophic level, ecological pyramid, biomass, biogeochemical cycle, nutrient, nitrogen fixation, denitrification, limiting nutrient, weather, climate, microclimate, greenhouse effect, habitat, niche, resource, predation, keystone species, symbiosis, mutualism,*	

	parasitism, commensalism, ecological succession, primary succession, pioneer species, secondary succession, population density, age structure, immigration, emigration, exponential growth, logistic growth, carrying capacity, limiting factor, density-dependent limiting factor, density-independent limiting factor, demography, demographic transition, biochemical conversion, energy pyramid, organism, nonnative species, invasive species, endemic species, population dynamics, growth rate, death rate, migration, ecology, environment, competition, marine ecosystem, freshwater ecosystem, greenhouse gases, climate change, carbon dioxide, respiration, decomposition, assimilation, runoff, nitrogen fixation, ammonia, nitrite, nitrate, precipitation, evaporation, condensation, transpiration, uptake, infiltration, runoff, surface water, ground water, decomposition, fossil fuel, combustion, deforestation, algal blooms 8. What basic concepts should students know and be able to recall and apply? *Populations make communities which together with abiotic factors make ecosystems which make up the biosphere.* *Energy and other essential materials cycle through the components of ecosystems because it cannot be created or lost* *Differences in temperature and precipitation allow for different characteristic plants which allow for different characteristic animals to live in the various biomes/ecosystems* *Usable energy is "lost" as it moves through the various trophic levels due to the individual organism using it as well as loss as heat.* *Humans are the caretakers of the planet - our choices impact all ecological levels (interdependence)*	

Stage 2 – Evidence	
NETS for Students	**PERFORMANCE TASK(S)—can include transfer tasks and Project-Based Learning**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world. *Critical Thinking*	*Examples include but are not limited to:* *Labs, open-ended essays, voice recordings, videos, presentations, discussion boards, graphic organizers, songs, skits, dioramas, visual projects (posters, dioramas)* List the task(s), then explain how the student will demonstrate the transfer of knowledge or skill involved in the task(s) (reference Stage 1, Item #4): *Illustrate food chains and food webs* *Identify trophic levels in food chains and food webs* *Calculate energy loss at various trophic levels* *Identify symbiotic relationships* *Identify characteristics of various terrestrial and aquatic biomes* *Draw and label parts of nitrogen, oxygen, carbon and water cycles* *Read a climatogram* *Identify different growth patterns based upon graphs - logistic vs exponential*
	OTHER SUMMATIVE ASSESSMENTS—can include factual recall
	Examples include but are not limited to final projects, research papers, quizzes and tests. List the assessments: *Quiz and Unit Test*

Stage 3 – Learning Plan		
NETS for Students	**Learning Activities**	**Progress Monitoring/Formative Assessment**
NETS—National Educational Technology Standards; i.e., the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world.	Questions to consider while planning: • Are transfer and acquisition addressed in the learning plan? • Does the learning plan reflect principles of learning and best practices? • Is there tight alignment with Stages 1 and 2? • Is the plan likely to be engaging and effective for all students?	• **How will you monitor students' progress toward acquisition, meaning, and transfer during learning activities?** Homework Checks/Bell ringers Section quizzes Lab analysis Discussions and questioning • **What are potential rough spots and student misunderstandings?** Calculations for energy loss Drawing arrows in the correct direction for food web

			and food chain • **How will students get the feedback they need?** Labs Homework Notes Worksheets
	List planned activities *(examples include but are not limited to: experiments, guided reading, worksheets, discussions, note-taking, research, games)*: Biome project - the following should be included in the biome [Draw appropriate food chain and food web and identify trophic levels for given biome. Identify symbiotic relationships Identify characteristics of various terrestrial and aquatic biomes Include a climatogram and interpret the information]	**List resources required** *(examples include but are not limited to: laptops, iPads, websites, digital cameras, magazines, Blackboard, textbooks, novels, primary source documents, other non-fiction text, lab equipment, maps, translator, calculators)* Internet School Website Textbook Lab materials	**FORMATIVE ASSESSMENTS—any non-graded, diagnostic assessment administered prior to or during a unit that reflects prior knowledge, skill levels, and potential misconceptions.** *Examples include but are not limited to: Pre-tests, clickers (CPS), mini whiteboards, entrance and exit tickets, CDTs, DIBELS, Aimsweb* Homework check and Bell Ringer Review games