Resource Guide to the Arkansas Curriculum Framework for Students with Disabilities for Tenth Grade Science

Summer 2007

Purpose and Process

The Individuals with Disabilities Education Act and No Child Left Behind mandates that schools provide access to the general education curriculum for all students receiving special education services. In recognizing the challenge of providing opportunities for students with disabilities to access general education curriculum, it is the desire of the Arkansas Department of Education to assist educators with this process. The goal is to assist school personnel who serve children with disabilities in conceptualizing, planning, and implementing activities that are aligned to the Arkansas Curriculum Framework.

The following document contains ideas for linking activities to the same science framework used for the general education curriculum. When selecting appropriate activities, decisions must be based on individual student needs and abilities. Collaboration with science personnel will provide assistance in linking science curriculum with the state framework. The Arkansas Alternate Portfolio Assessment must have alignment to the Arkansas Curriculum Framework. The Tenth Grade Science Portfolio Assessment for Students with Disabilities must align with the same content standards used by other tenth grade students, which is Biology. The tenth grade science portfolio assessment must contain one entry from each of the nine content standards that are embedded in the four standards for biology listed below.

Science Curriculum Framework

Standards:

- Molecules and Cells (3 content standards)
- Heredity and Evolution (3 content standards)
- Classification and the Diversity of Life (1 content standard)
- Ecology and Behavioral Relationships (2 content standards)

In May 2007, the Arkansas Department of Education convened a task force of general education science teachers, teachers of students with disabilities and administrators to collaborate and develop the following resource guide to be used to help with the process of developing the 10th grade science portfolio assessment for students with disabilities not accessing Biology or any equivalent course.

This publication includes selected student learning expectations from the Biology Arkansas Science Curriculum Framework. It also uses a matrix visual organizer to provide several sample activities that demonstrate alignment from least complex activities to more complex activities. Teachers on the committee discussed the specific student learning expectation to determine the basic learning needed to find the essence of the learning. Using the essence of the student learning expectation, different levels of complexity of the learning were written for students to have access to the same content standards. The abilities of the student must first be considered when selecting ideas from this guide. Augmentative communication equipment and/or other adaptations should be used to make accommodations for students who require them to meet the student learning expectation (SLE). Teachers will have to use creativity in adapting the suggested activities to meet the student's individual needs.

Although this publication is not intended for generating specific test item activities for the Arkansas Alternate Portfolio System for Students with Disabilities, its purpose is to provide educators in Arkansas with a process for determining alignment between models of education that have been to some extent separate. Using the activities as idea starters, the educators can then individualize and develop specific activities that align with the education program, demonstrate performance of skills, and document educational opportunities. The members of the committee do not intend this publication to be used as a checklist, a menu of alternate assessment "test activities or items", or as IEP goals and objectives. The resources listed in the document are meant to give teachers some ideas of ways to access materials for teaching science to students with disabilities. This is not an exhaustive list and websites may change over time.

COMMITTEE MEMBERS

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Biology

Strand	Content Standard
Molecules and Cells	
	1. Students shall demonstrate an understanding of the role of chemistry in life processes.
	2. Students shall demonstrate an understanding of the structure and function of cells.
	3. Students shall demonstrate an understanding of how cells obtain and use energy *(energetics*).
Heredity and Evolution	
	4. Students shall demonstrate an understanding of *heredity*.
	5. Students shall investigate the molecular basis of genetics.
	6. Students shall examine the development of the *theory* of *biological evolution.*
Classification and the Diversity of Life	
	7. Students shall demonstrate an understanding that organisms are diverse.
Ecology and Behavioral Relationships	
	8. Students shall demonstrate an understanding of ecological and behavioral relationships among organisms.
	9. Students shall demonstrate an understanding of the ecological impact of global issues.

Molecules and Cells	**Content Standard 1:** Students shall demonstrate an understanding of the role of chemistry in life processes.				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** →			***More Complex***
MC.1.B.1-Describe the structure and function of the major organic molecules found in living systems: • *carbohydrates* • *proteins* • *enzymes* • *lipids* • *nucleic acids* **Resources: Unitedstreaming**	Describe organic molecules in living things	Group foods as starches (carbohydrates), fats (lipids), and proteins Example: Use magazine pictures, food, internet pictures to sort and classify groups, food groups/pyramid	Construct a model of an organic molecule Example: Use three (3) objects (i.e., gumdrops, marshmallows, jelly beans, gummy bears) that represent elements (oxygen, hydrogen, and carbon) to form an organic molecule	Identify the categories of organic molecules Example: Use flashcards, pictures, models to classify and sort	Distinguish among the four (4) categories of organic molecules (carbohydrates, lipids, proteins, and nucleic acids) Example: Use video streaming to identify organic molecules for example watch

Molecules and Cells	**Content Standard 1:** Students shall demonstrate an understanding of the role of chemistry in life processes.				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** → ***More Complex***			
MC.1.B.3-Investigate the properties and importance of water and its significance for life: • surface tension • *adhesion* • *cohesion* • *polarity* • *pH*	Identify why water is important to life	Determine the effects of water on living things Example: Take two (2) plants, water one plant, do not water the other. Determine what happens to both plants	Represent how all living things use water Example: Discuss how long humans can go without food versus water. Make estimations and compare them. **Resources: NASA website**	Compare water samples Example: Collect samples of bottled water, pond water, pool water, etc. Use pH or litmus paper to test water samples. Decide which water sample would be best to drink **Resources: Properties of Water**	Determine the effects of sports drinks on the body Example: Bring in a sports drink, soda, and water. Read the story about how and why sports drinks were created. Determine which drink will hydrate the body better and why. **Resources: Effects of Sports Drinks**

Molecules and Cells	**Content Standard 1:** Students shall demonstrate an understanding of the role of chemistry in life processes.				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** → ***More Complex***			
MC.1.B.5-Explain the role of energy in chemical reactions of living systems: • *activation energy* • *exergonic reactions* • *endergonic reactions*	Describe how energy can be taken in or given off in living systems	Identify cold-blooded versus warm-blooded animals (reptiles/mammals) Example: Use pictures or picture symbols to sort and classify **Resources: AGFC**	Demonstrate the transfer of energy Example: Use instant cold packs and hot packs to demonstrate the transfer of energy Demonstrate knowledge of observations **Resources: Hot and Cold Packs**	Demonstrate the results of incubation Example: Observe incubation, (i.e., hatcheries, video streaming, field trip) Demonstrate knowledge of observations	Demonstrate how food has energy to produce heat Example: Burn potato chips or peanuts in a soda can oven. **Resources: Scientific American website, Diagram**

Molecules and Cells	**Content Standard 2:** Students shall demonstrate an understanding of the structure and function of cells.				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** →			***More Complex***
MC.2.B.1-Construct a hierarchy of life from cells to *ecosystems* **Resources: Unitedstreaming**	Depict the progression of life from cells to ecosystems	Sequence the progression of life Example: Arrange pictures to depict progression of life (i.e., seed to plant). Increase number of pictures to match student's ability level. Example: Plant a seed and document how it grows into a plant.	Demonstrate the progression of life Example: Create a picture book/flip book. Example: Use clear transparencies to layer the progression of life: 1st sheet-cell 2nd sheet-tissue 3rd sheet-organ 4th sheet-organ system 5th sheet-body.	Illustrate progression from cell to ecosystem Example: Make a graphic map (picture line) that shows progression.	Model an ecosystem Example: Construct a diorama of an ecosystem. Label the various levels. **Resources: Ecology**

Molecules and Cells	**Content Standard 2:** Students shall demonstrate an understanding of the structure and function of cells.				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** →			***More Complex***
MC.2.B.2-Compare and contrast *prokaryotes* and *eukaryotes*	Compare cells with and without a nucleus	Recognize cells with and without a nucleus Example: Put hair gel in two (2) sandwich bags. Place a marble in one bag. Recognize one bag represents a cell without a nucleus and one bag represents a cell with a nucleus. Have students identify each.	Identify cells with and without a nucleus Example: Take two (2) half cored oranges. Fill each with gelatin. Add a grape to one. Students will identify which half represents a cell with and without a nucleus.	Develop and identify models of a cell with and without a nucleus Example: Use different color modeling clay to create a cell with or without a nucleus. Label parts.	Compare cells with and without a nucleus Example: Observe cells using a microscope or internet website. Record results on a lab sheet. **Resources: Cells Alive website**

Molecules and Cells	**Content Standard 2:** Students shall demonstrate an understanding of the structure and function of cells.				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** → ***More Complex***			
MC.2.B.4-Relate the function of the *plasma* (*cell) membrane* to its structure **Resources: Cells, Unitedstreaming**	Illustrate the role of the cell membrane	Recognize that the cell membrane allows certain materials to pass in and out of the cell Example: Use a mesh laundry bag to demonstrate a cell membrane. The mesh bag allows water and detergent in, but keeps other clothes in the washing machine out. Example: Boil-in-bag of rice.	Demonstrate the function of the cell membrane by using common materials Examples: • Fish net • Colander • Slotted spoon • Sifter • Window screen	Illustrate the role of the cell membrane Examples: Make tea or coffee to demonstrate how the granules stay in the bag but the water penetrates it.	Investigate the movement of material across the cell membrane Examples: Use dialysis tubing filled with glucose/starch. Tie the tubing, then put it in water for one hour or more. Test the water for simple sugar by dropping Benedict solution/iodine in the water. Heat the water; it changes color if the water tests positive for sugar/starch. **Resources: Biology Lab Descriptions**

Molecules and Cells	**Content Standard 2:** Students shall demonstrate an understanding of the structure and function of cells.				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** →			***More Complex***
MC.2.B.5-Compare and contrast the structures of an animal cell to a plant cell **Resources: Cells**	Depict differences between animal and plant cells	Identify the difference between plant and animal cell Example: Use pictures or visual aids.	Demonstrate plant and animal cell by using hands on activities Example: Example of an "edible cell" Animal cell Cell membrane-plastic wrap Nucleus-plum Ribosome – candy Endoplasmic Reticulum-gummy worms Mitochondria – raisins Centriole – rope licorice Golgi Complex-Fruit strips Lysosome – empty vitamin capsule	Compare and contrast the plant and animal cell Example: Create a Venn diagram by using gallon bags, divided into three (3) sections. Place like items in the center section. Place different items in the outer sections. **Resources: See Diagram.**	Analyze the differences between plant and animal cells Example: Observe cells through a microscope and record findings on a lab sheet. Example: Plant Cell (elodea) Animal Cell (cheek)

Molecules and Cells	**Content Standard 2:** Students shall demonstrate an understanding of the structure and function of cells.				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** →			***More Complex***
MC.2.B.6-Compare and contrast the functions of *autotrophs* and *heterotrophs* **Resources: Ecology**	Compare and contrast what producers and consumers do in an ecosystem	Identify producer and consumer Example: Compare a person and an apple tree. The tree produces apples and the person consumes the apple. Example: Create an activity in which the student identifies which produces an apple, which consumes an apple.	Determine consumers and producers in a system Example: Make a classroom terrarium. Students identify consumers and producers in the terrarium.	Classify consumers and producers in an ecosystem Example: By using a camera, go outside and take pictures of things in the environment, such as flowers-producers / bees-consumers. Create a photo page of both.	Create and label examples of interactions between producers and consumers Example: A biome in a box or a diorama that shows consumers and producers in action. Students label the consumers and producers (deer eating grass).

Molecules and Cells	**Content Standard 2:** Students shall demonstrate an understanding of the structure and function of cells.				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** →			***More Complex***
MC.2.B.11-Discuss *homeostasis* using *thermoregulation* as an example	Identify how organisms maintain body temperature	Identify cold-blooded and warm-blooded organisms Example: Sort pictures of animals. **Resources: AGFC**	Discuss the importance of organisms maintaining their temperature Example: Look at pictures of athletes sweating, people shivering in the cold, and reptiles basking in the sun. Example: Take temperature of every student in the room over a period of time and chart it to demonstrate regulation of body temperature.	Demonstrate how physical activity affects the body Example: Complete a checklist before and after the activity that includes temperature, sweating, pulse, rate of breathing, skin color, thirst, etc. Write a comparison of two check lists. **Resources: Unitedstreaming**	Compare cold-blooded and warm-blooded animals in relation to maintaining body temperature Example: Contact a state park representative. Ask them to bring reptiles and describe how reptiles change as they become warmer or colder. Students write a summary of the visit or answer questions to demonstrate understanding of concepts presented.

Molecules and Cells	**Content Standard 3:** Students shall demonstrate an understanding of how cells obtain and use energy *(energetics*).				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** →			***More Complex***
MC.3.B.1-Compare and contrast the structure and function of *mitochondria* and *chloroplasts* **Resources: Unitedstreaming, Cells**	Identify how animal cells and plant cells get their energy	Observe an illustration of how cells can use energy Example: Use a flashlight/radio and battery. Label the parts. The battery represents the mitochondria when the battery is placed in the flashlight/radio, turn on and you have energy, which is the powerhouse (mitochondrian) **Resources: See Diagram** Note: Use a touch light for students with limited motor skills.	Demonstrate that cells need energy to grow Example: Cover up half of plant leaves with aluminum foil. After two (2) days the leaf will not grow. Example: Cut initials out of foil, place initials on leaf before it changes. As it changes the color of the initials will show. Note: The fall season will provide various colors.	Determine how energy is transferred to organisms Example: Observe video clip of mitochondria or photosynthesis from video streaming and make a chart or answer questions.	Analyze the outcome of light energy deprivation Example: Take two (2) plants put one in light and one in the dark. Chart the growth over a two (2) week time period. Explain research findings.

Molecules and Cells	**Content Standard 3:** Students shall demonstrate an understanding of how cells obtain and use energy *(energetics*).				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** → ***More Complex***			
MC.3.B.3-Compare and contrast *aerobic* and *anaerobic respiration:* ▪ *lactic acid fermentation* ▪ alcoholic fermentation	Describe cellular respiration with and without the use of oxygen	Observe anaerobic (without oxygen) and aerobic (with oxygen) celluar respiration Example: Use milk and lemon juice in a jar. Shake it up. This is lactic acid fermentation. Complete a T-chart. Example: Amish bread, Fruitcake **Resources: See Recipe**	Demonstrate the results of cellular respiration Example: Use 125 ml of warm water, 60 ml of sugar, a soda bottle, and a package of yeast. Combine sugar and water in the bottle. Shake to mix the solution. Add yeast. Quickly place a balloon over the neck of the bottle and agitate bottle for a few seconds. Record results. **Resources: Lab Descriptions**	Record practical applications of cellular respiration Example: Watch a video on how to make cheese • Contact American Dairy Council • Make a listening sheet **Resources: Unitedstreaming**	Evaluate the process of fermentation **Resources: Lab Descriptions**

Molecules and Cells	**Content Standard 3:** Students shall demonstrate an understanding of how cells obtain and use energy *(energetics*).				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** → ***More Complex***			
MC.3.B.5-Compare and contrast *cellular respiration* and *photosynthesis* as energy conversion pathways	Describe how organisms produce and transfer energy	Indicate the flow of energy Example: Have students label a chart of energy flow and oxygen going in – water, energy and carbon dioxide coming out. **Resources: See Diagram**	Determine the outcome of energy conversion in respiration and photosynthesis Example: Place plastic bag over plant. Place plant in sunlight. Watch the water collect in bag. Observe for 2-3 days. Chart results. **Resources: Biology Lab Descriptions**	Interpret the results of cellular respiration Example: Obtain seeds and soak overnight. Use a container with a clear top. Plant seeds in potting soil in the container. Record the results. Note you should have a collection of water on top. **Resources: Biology Lab Descriptions**	Compare cellular respiration and photosynthesis Example: Construct a Venn Diagram. **Resources: Unitedstreaming**

Heredity and Evolution	**Content Standard 4:** Students shall demonstrate an understanding of *heredity*.				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** → ***More Complex***			
HE.4.B.1-Summarize the outcomes of Gregor Mendel's experimental procedures **Resources: Genetics, Unitedstreaming**	Recognize the difference in dominant and recessive traits	Identify traits of plants and animals given real examples or photographs Example: height, hair color, eye color, flower color **Resources: Animals and Plants**	Sort plants or animals based on dominant and recessive traits given real examples or photographs Example: tall/short, dark hair/light hair, dark eyes/light eyes	Distinguish traits as dominant or recessive Example: Give specific examples on pictures, charts, and case studies of various characteristics.	Explain how offspring acquire dominant and recessive traits Example: Oral recording, draw Punnett square, pedigree (family tree)
HE.4.B.3-Use the *laws* of probability and *Punnett squares* to predict *genotypic* and *phenotypic ratios* **Resources: Genetics, Unitedstreaming**	Predict appearance of organisms based on inherited genes	Identify inherited traits Example: Match offspring to parents using picture cards or living things (e.g., chick to chicken, puppy to dog).	Predict the appearance of offspring based on observation of parents Example: Use picture cards depicting various traits such as height, hair color, eye color, flower color.	Predict appearance of offspring using manipulatives with a pre-constructed Punnett square Example: Use colored candy, checkers. X O X O	Complete a Punnett square to predict the appearance of offspring Example: B b B b

Heredity and Evolution	**Content Standard 4:** Students shall demonstrate an understanding of *heredity*.				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** →			***More Complex***
HE.4.B.5-Analyze the historically significant work of prominent geneticists **Resources: Genetics, Unitedstreaming**	Identify major genetic discoveries	Recognize the name or picture of major geneticists Example: Gregor Mendel	Match geneticists to major discoveries	Research a major discovery in genetics and present findings	Create a multi-media presentation outlining the discoveries of one major geneticist

Heredity and Evolution	**Content Standard 5:** Students shall investigate the molecular basis of genetics.				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** →			***More Complex***
HE.5.B.3-Compare and contrast the structure and function of *DNA* and *RNA* **Resources: Genetics, Unitedstreaming**	Identify the differences between DNA and RNA **Resources: See Diagram**	Recognize DNA (double strand) and RNA (single strand) models Example: licorice candy, pull and peel candy, yarn, string cheese	Distinguish between the appearances of DNA and RNA Example: Sort materials by appearance such as a zipper, string, string cheese, velcro, pull and peel candy	Depict or illustrate the appearances of DNA and RNA Example: Label or assemble a model	Make 3-D models of DNA and RNA and identify their functions Example: puzzle, marshmallows and toothpicks
HE.5.B.4-Describe and model the processes of replication, *transcription*, and *translation* **Resources: Genetics, Unitedstreaming**	Model DNA replication	Model DNA replication through physical movement Example: photocopy, name stamp, daily routine, imitation of motor movements (cross-lateral movement), calisthenics, zipper, velcro	Model replication of DNA by matching like items Example: matching socks, sorting clothes by color, puzzle pieces	Model replication of DNA by repeating a pattern Example: manipulatives, repetition of activities	Assemble a model of DNA replication using a prepared model or puzzle Example: Use index cards to make puzzle pieces.

Heredity and Evolution	**Content Standard 5:** Students shall investigate the molecular basis of genetics.				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** → ***More Complex***			
HE.5.B.6-Identify effects of changes brought about by *mutations:* ▪ beneficial • harmful • neutral **Resources: Genetics, Unitedstreaming**	Identify the effects of changes in DNA	Recognize that mutations are changes Example: Identify the different object in a group of similar objects.	Identify harmful or beneficial changes Example: Picture cards of animals in a camouflaged environment (e.g., white/brown rabbits in snow).	Distinguish among mutations in living things as beneficial, harmful, or neutral. Example: Use white and black paper. Spread hole-punch pieces on both sheets of paper. Observe the camouflage effect of the hole-punch pieces on both sheets of paper.	Research mutations in living organisms

Heredity and Evolution	**Content Standard 6:** Students shall examine the development of the *theory* of *biological evolution.*				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** → ***More Complex***			
HE.6.B.1-Compare and contrast Lamarck's explanation of *evolution* with Darwin's *theory* of *evolution* by *natural selection* **Resources: Evolution**	Recognize how organisms change over time	Identify changes that take place over time Example: Use pictures or objects that have changed over time (e.g., transportation, communication, fashion, hairstyles).	Describe changes in organisms that take place over time Example: elephants, horses, birds	Organize pictures of an organism's evolutionary history Example: elephants, horses, birds	Create a pictogram of an organism's evolutionary history Example: elephants, horses, birds
HE.6.B.3-Analyze the effects of *mutations* and the resulting *variations* within a *population* in terms of *natural selection* **Resources: Evolution**	Recognize how natural selection results in variations within populations	Recognize that populations vary Example: Match pictures of various species into the appropriate population.	Identify changes that occur in organisms for survival Example: Pictures of organisms that show camouflage, mimicry, other adaptations	Compare traits that allow natural selection Example: Compare two animals and identify traits that enable them to survive in their environment.	Analyze adaptations needed for natural selection Example: Select animal shaped cookies or pictures and describe or draw changes that would adapt selected animals for water life.

Heredity and Evolution	**Content Standard 6:** Students shall examine the development of the *theory* of *biological evolution.*				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** → ***More Complex***			
HE.6.B.4-Illustrate *mass extinction* events using a time line **Resources: Evolution**	Identify events of mass extinction over time	Recognize that mass extinction is the loss of a species Example: Simulate mass extinction by grouping animal crackers and eating one group.	Identify species on Earth that have become extinct Example: dinosaurs, saber-tooth cats, wooly mammoth, dodo bird	Depict mass extinction events Example: Create a timeline that shows mass extinction events.	Research an extinct or endangered animal

Heredity and Evolution	**Content Standard 6:** Students shall examine the development of the *theory* of *biological evolution.*				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** → ***More Complex***			
HE.6.B.5-Evaluate *evolution* in terms of evidence as found in the following: • fossil record • *DNA* analysis • *artificial selection* • morphology • embryology • viral *evolution* • geographic distribution of related *species* • *antibiotic* and *pesticide resistance* in various organisms **Resources: Evolution, Unitedstreaming**	Recognize that the theory of evolution is supported by evidence.	Recognize that organisms leave proof of their existence Example: Place a finger in mud or plaster, fingerprint. Example: cooking activities that use moldings	Identify specific evidences of evolution Example: Match organisms to its fossils.	Construct a model of a fossil Examples: draw, clay, plaster	Research evidences of fossil records

Classification and the Diversity of Life	**Content Standard 7.** Students shall demonstrate an understanding that organisms are diverse.				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** →			***More Complex***
CDL.7.B.2-Differentiate the characteristics of the six kingdoms: • Eubacteria • Archaea • Protista • *Fungi* • Plantae • Animalia **Resources: Classification**	Categorize organisms based on the characteristics of their kingdom	Identify different kingdoms Example: Match pictures of organisms according to characteristics. Specifically animals, plants, vertebrates, and invertebrates. **Resources: AGFC**	Match the organism with the correct kingdom by characteristics Example: question & answer quiz, match game	Select an appropriate organism to be placed in certain kingdoms by characteristics Example: Design photo page from pictures taken on campus.	Invent a new organism to fit into a kingdom Example: Use various materials (e.g., foam, art materials, pipe cleaners).

Classification and the Diversity of Life	**Content Standard 7.** Students shall demonstrate an understanding that organisms are diverse.				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** →			***More Complex***
CDL.7.B.4-Classify and name organisms based on their similarities and differences applying *taxonomic nomenclature* using *dichotomous keys* **Resources: Classification**	Recognize similarities and differences of organisms by using a classification key	Determine organisms can be classified by similarities and differences by use of a one step key Example: Use pictures with yes or no answer key.	Classify an organism by using 3-4 step keys Example: rain forest, ocean, live stock, zoo	Classify a collection of organisms by using a classification key Example: leaf collection, insect collection, seed collection	Design a classification for four (4) organisms using four (4) characteristics Example: alligator, dog, bear
CDL.7.B.5-Investigate Arkansas' *biodiversity* using appropriate tools and *technology* **Resources: Ecology**	Examine *biodiversity* in Arkansas	Identify trees and animals in Arkansas Example: Campus field study or picture study (cardinal, gray squirrel, pine tree, oak tree)	Identify organisms native to Arkansas Example: plants, animals, insects	Categorize the biodiversity of Arkansas by state or regions Example: scavenger hunt by state or region, for example, fish animals, birds, plant **Resource: Arkansas State Parks**	Generate an example of Arkansas biodiversity Example: mural, individual posters

Classification and the Diversity of Life	**Content Standard 7.** Students shall demonstrate an understanding that organisms are diverse.				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** →			***More Complex***
CDL.7.B.7-Evaluate the medical and economic importance of *viruses* **Resources: Viruses, Unitedstreaming**	Describe how viruses affect life	Identify common viruses experienced by the class Example: stomach viruses, colds, West Nile, chicken pox, influenza	Explain how easily viruses are spread Example: hand-washing technique using glitter-ball spread hand-to-hand Note: Use make-up glitter. Example: Blow up a balloon. Place hole-punch pieces inside the balloon. Pop the balloon and observe the spread of paper pieces. **Resources: County Extension Office (Body Walk Program) Arkansas Department of Health**	Collect current events about viruses from news print Example: Make a scrapbook of current events relating to viruses.	Research childhood diseases and vaccines Example: Use the internet, school nurse, guest speaker. Record data.

Classification and the Diversity of Life	**Content Standard 7.** Students shall demonstrate an understanding that organisms are diverse.				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** → ***More Complex***			
CDL.7.B.8-Compare and contrast life cycles of familiar organisms ▪ sexual reproduction ▪ asexual reproduction • metamorphosis • *alternation of generations* **Resources: Unitedstreaming, Reproduction**	Describe how organisms reproduce and develop	Sequence different metamorphic organisms Example: ladybugs, frogs, butterflies	Illustrate types of asexual reproduction Example: Budding, regeneration, binary fission, vegetative propagation (grafting or cutting)	Distinguish different steps of fertilization Example: Label the steps in the fertilization of an egg.	Compare and contrast sexual and asexual reproduction Example: Venn Diagram

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Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** →			***More Complex***
CDL.7.B.17-Describe the structure and function of the major parts of a plant: ▪ roots ▪ stems ▪ leaves ▪ flowers **Resources: Plants**	Identify the specific jobs of the various parts of a plant	Examine a live plant and identify its parts Example: lily, zinnia, rose	Label the parts of a plant Example: Diagram drawing. **Resources: See diagram.**	Identify the function of each part of the plant. (root, stem, leaf, flower) Example: Paste the function by matching to the plant part. "Pin the Function on the Plant"	Construct a model of a plant Example: Use art supplies.
CDL.7.B.19-Evaluate the medical and economic importance of plants **Resource: Plants, Unitedstreaming**	Explore the impact that plants have on our lives	Identify important plants that are used by humans Example: corn, potato, carrots, peas	Indicate what plants are used to make food or other resources Example: corn-corn meal to food for animals	Discover plants that are economically important Example: pumpkin/pumpkin patch, coffee/coffee beans, vegetables/market	Research plants that are medically beneficial Example: aloe vera, chamomile, aspirin (willow tree)
CDL.7.B.22-Compare and contrast the major vertebrate classes according to their nervous, respiratory, excretory, circulatory, digestive, reproductive and integumentary systems **Resources: Unitedstreaming, Body Systems**	Explore the major body systems of vertebrates	Recognize the major body parts of vertebrates Example: Trace the human body and parts on butcher paper	Identify body systems	Explain the function of body systems Example: graphic organizer or foldables	Research and report information about the various body systems

Ecology and Behavioral Relationships	**Content Standard 8.** Students shall demonstrate an understanding of ecological and behavioral relationships among organisms.				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** → ***More Complex***			
EBR.8.B.1-Cite examples of abiotic and *biotic factors* of *ecosystems* **Resources: Ecology, Unitedstreaming**	Identify living and nonliving things	Recognize living and nonliving things Example: Match or sort living/nonliving things using picture cards.	Locate pictures or representations of living and nonliving things Example: scavenger hunt, find pictures in magazines	Collect examples of living and nonliving things Example: leaf collection, bug collection, rock collection, sticker collection	Model an ecosystem with living and nonliving things Example: terrarium, aquarium
EBR.8.B.2-Compare and contrast the characteristics of *biomes* **Resources: Ecology, Unitedstreaming**	Describe characteristics of biomes	Identify areas of land and water Examples: On a map or globe identify land and water, samples of soil and water.	Determine the types of biomes Example: Match pictures to names of biomes.	Classify organisms to their biomes Example: Match plants and animals to the appropriate biome.	Illustrate the characteristics of a biome Example: Create a representation of a biome.

Ecology and Behavioral Relationships	**Content Standard 8.** Students shall demonstrate an understanding of ecological and behavioral relationships among organisms.				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** → ***More Complex***			
EBR.8.B.3-Diagram the carbon, nitrogen, phosphate, and water cycles in an *ecosystem* **Resources: Ecology**	Illustrate ecosystem cycles	Recognize that materials move in a system Example: Boiled water turns to steam, measure the amount of water left in a glass over time, moisture on glass	Describe an example of movement of materials Example: Chart precipitation patterns.	Sequence the steps of an ecosystem cycle Example: magnets, pictures, skits	Illustrate the steps in an ecosystem cycle Example: Diagram the water cycle, skits (see resource guide)
EBR.8.B.4-Analyze an *ecosystem's* energy flow through food chains, food webs, and *energy pyramids* **Resources: Ecology, Unitedstreaming**	Recognize how energy flows through an ecosystem	Recognize that organisms need energy Example: Ask students questions such as why do you eat and why do plants need water and sunlight?	Demonstrate the linear flow of energy in living things Example: Construct a food chain	Distinguish between producers and consumers Example: Plants and animals, T-chart, pictures to sort	Describe complex energy flow among living things in an ecosystem Example: Construct a food web

Ecology and Behavioral Relationships	**Content Standard 8.** Students shall demonstrate an understanding of ecological and behavioral relationships among organisms.				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** → ***More Complex***			
EBR.8.B.5-Identify and predict the factors that control *population*, including *predation*, *competition*, crowding, water, nutrients, and shelter **Resources: Ecology**	Identify factors that control population size	Recognize basic needs of organisms Example: food, water, shelter, air, space	Recognize factors that limit population size Example: competition, natural causes, resources	Predict the effect of factors on population growth Example: predator/prey relationships, mutualism, water supply, food supply, natural disasters	Analyze population growth Example: Construct a graph that shows change in population size over time.
EBR.8.B.8-Identify the properties of each of the five levels of *ecology:* ▪ organism ▪ *population* ▪ *community* ▪ *ecosystem* ▪ *biosphere* **Resources: Ecology, Unitedstreaming**	Distinguish among the levels of ecology	Identify the whole is made of parts Examples: ingredients make up a recipe, certain items go in certain rooms, slices of pie	Sequence the levels of ecology from specific to whole Example: Arrange pictures in order of ecology levels.	Model the levels of ecology Example: Construct a diagram showing relationships that exist among parts of an ecosystem.	Examine levels of ecology Example: Mark off a three (3) meter square area outside. Record examples within the area.

Ecology and Behavioral Relationships	**Content Standard 9.** Students shall demonstrate an understanding of the ecological impact of global issues.				
Student Learning Expectation	***Essence of Student Learning Expectation***	***Less Complex*** → ***More Complex***			
EBR.9.B.1-Analyze the effects of human *population* growth and *technology* on the environment/*biosphere* **Resources: Ecology**	Describe effects that humans have on the environment	Recognize that humans affect the environment Example: pollution, global warming, picking up trash, recycling	Identify positive and negative human effects on the environment Example: Construct a list of ways to conserve energy; create flyers and/or brochures.	Predict the effects of human population growth on the environment Example: food shortage, loss of habitat, extinct species	Research positive/negative human impacts on the environment Example: Prepare a presentation; defend the protection of an endangered species (posters, report, multi-media).
EBR.9.B.3-Assess current world issues applying scientific themes (e.g., global changes in climate, *epidemics*, *pandemics*, ozone depletion, UV radiation, natural resources, use of *technology*, and public policy)	Examine current science issues that affect the world	Recognize that science is in the news Example: Create a scrapbook, bulletin board, or journal using newspaper articles.	Identify a current world issue with a scientific theme Example: Classify articles or multimedia presentations.	Describe a current world issue with a scientific theme	Research and report causes and effects of current world issues with scientific themes

Biology Glossary for Grade 10 Science

Abiotic factor	Any nonliving component of an *ecosystem* (e.g., sunlight, air, water, soil)
Activation energy	The kinetic energy required to initiate a chemical reaction
Active transport	The movement of a substance across a plasma (cell) membrane against a concentration gradient
Adhesion	The property of sticking to some other substance
Aerobic respiration	Growing or metabolizing only in the presence of molecular oxygen
Alcoholic fermentation	The process by which pyruvic acid is converted to ethyl alcohol
Alleles	Alternate forms of a *gene* or *DNA* sequence, which occur on either of two homologous *chromosomes* in a diploid organism
Alternation of generation	Alternating sexual and asexual generation reproduction
Amino acid	Any of 20 basic building blocks of *proteins*--composed of a free amino (NH2) end, a free carboxyl (COOH) end, and a side group (R)
Anaerobic respiration	Growing or metabolizing only in the absence of molecular oxygen
Anaphase	Third phase of *mitosis*, beginning when sister *chromatids* separate from each other and ending when a complete set of daughter *chromosomes* have arrived at each of the two poles of the cell
Antibiotic resistance	The ability of a microorganism to produce a *protein* that disables an antibiotic or prevents transport of the antibiotic into the cell
Applied science	The practical use of scientific information to improve human life
Artificial selection	Breeding organisms by humans for specific phenotypic characteristics
Asexual reproduction	Nonsexual means of reproduction which can include grafting and budding
Autotroph	An organism that uses energy to synthesize organic molecules from inorganic substances
Bacteria	A single-celled, microscopic prokaryotic organism
Base pair (bp)	A pair of *complementary nitrogenous bases* in a *DNA* molecule
Biodiversity	The wide diversity and interrelatedness of earth organisms based on genetic and environmental factors
Biological *evolution*	Change in allele frequency of a *species* or *population* over time
Biome	A geographic area characterized by specific kinds of plants and animals
Biosphere	The area on and around Earth where life exists
Biotic factor	A living component of an *ecosystem*
Carbohydrates	Compound containing carbon, hydrogen, and oxygen in the approximate ratio of C:2H:O (e.g., sugars, starches, and cellulose)

Cell cycle	The events of cell division; includes *interphase*, *mitosis*, and *cytokinesis*
Cellular respiration	The process by which cells generate ATP through a series of redox (chemical) reactions
Cell theory	The *theory* that all living things are made of cells, that cells are the basic units of organisms, and that cells come only from existing cells
Centromere	The central portion of the *chromosome* to which the spindle fibers attach during mitotic and meiotic division
Chloroplasts	A plastid containing chlorophyll; the site of *photosynthesis*
Chromatid	Each of the two daughter strands of a duplicated *chromosome* joined at the *centromere* during *mitosis* and *meiosis*.
Chromosome	A single *DNA* molecule, a tightly coiled strand of *DNA*
Chromosome theory of heredity	The *theory* that states that *genes* are located on *chromosomes* and that each *gene* occupies a specific place on a *chromosome*
Citric acid cycle (Kreb's)	Series of chemical reactions in *aerobic respiration* in which a acetyl coenzyme A is completely degraded to carbon dioxide and water with the release of metabolic energy that is used to produce ATP; also known as Kreb's cycle
Cladogram	A branching diagram that illustrates taxonomic relationships based on the principles of claudistics
Codominance	An inheritance relationship in which neither of two *alleles* of the same *gene* totally mask the other
Cohesion	The property of sticking together; like substances sticking together
Commensalism	The close association of two or more dissimilar organisms where the association is advantageous to one and doesn't affect the other(s)
Community	All the *populations* in one area
Cytokinesis	The division of cytoplasm of one cell into two new cells
Cytoskeleton	Framework of the cell composed of a variety of filaments and fibers that support cell structure and drive cell movement
Deletion	*Chromosome* abnormality in which part of the *chromosome* is missing; loss of one or more *base pairs* from *DNA* which can result in a frameshift
Dichotomous key (classification key)	Classification tool used in identifying organisms or materials
Diffusion	The process by which molecules move from an area of greater concentration to an area of lesser concentration
DNA (Deoxyribonucleic acid)	An organic acid and polymer composed of four *nitrogenous bases*--adenine, thymine, cytosine, and guanine; the genetic material of most organisms; exists as a double-stranded molecule held together by *hydrogen bonds*
Domain	Taxonomic category that includes one or more kingdom (e.g., Bacteria, Archaea, Eukarya)
Dominance	A characteristic in which an allele that expresses its *phenotype* even in the presence of a recessive allele
Double helix	The *DNA* molecule, resembling a spiral staircase in which the paired bases form the steps and the sugar-phosphate backbones form the rails
Ecology	The study of the interactions of organisms with their environment and with each other
Ecosystem	The organisms in a plant *population* and the biotic and *abiotic factor*s which impact on them
Electron transport chain	Series of chemical reactions in the thylakoid membrane or inner *mitochondrial* membrane during which hydrogens or their electrons are passed along with the release of energy

Endergonic reaction	A reaction requiring a net input of free energy
Endocytosis	The process by which a cell surrounds and engulfs substances
Energetics	Use of energy
Energy pyramid	Summarizes interactions of matter and energy at each trophic level
Enzymes	*Proteins* that control the various steps in all chemical reactions
Epidemic	An outbreak of a contagious disease that spreads widely and rapidly
Eukaryote	An organism whose cells possess a *nucleus* and other membrane-bound vesicles, including all members of the protist, fungi, plant and animal kingdoms; and excluding *viruses*, bacteria, and blue-green algae
Evolution	The long-term process through which a *population* of organisms accumulates genetic changes that enable its members to successfully adapt to environmental conditions and to better exploit food resources
Exergonic reaction	A reaction that gives off free energy
Exocytosis	The process in which a vesicle inside a cell fuses with a cell membrane and releases its contents to the external environment
Frameshift mutation	A *mutation* that results in the misreading of the code during *translation* because of the change in the reading frame
Fungi	Microorganisms that lacks chlorophyll
Gamete	A haploid sex cell, egg or sperm, that contains a single copy of each *chromosome*
Gene	The functional unit of heredity; a locus on a *chromosome* that encodes a specific *protein* or several related *proteins*
Genome	The complete genetic material contained in an individual; the genetic complement contained in the *chromosomes* of a given organism, usually the haploid *chromosome* state
Genotype	The structure of *DNA* that determines the expression of a trait
Genus	A category including closely related *species*; interbreeding between organisms within the same category can occur
Germ Theory of Disease (Koch's Postulates)	A set of criteria used to establish that a particular infectious agent causes a disease
Glycolysis	A pathway in which glucose is oxidized to pyruvic acid
Heterotroph	An organism that obtains organic food molecules by eating organisms or their by-products
Homeostasis	The stable internal conditions of a living thing
Host	Animal or plant on which or in which another organism lives
Human Genome Project	A project coordinated by the National Institutes of Health (NIH) and the Department of Energy (DOE) to determine the entire *nucleotide* sequence of the human *chromosomes*
Hydrogen bond	A relatively weak bond formed between any hydrogen atom (which is covalently bound to a nitrogen or oxygen atom) and a nitrogen or oxygen with an unshared electron pair
Hypotheses	Statement or predictions that can be tested
Incomplete dominance	A condition where a heterozygous off- spring has a *phenotype* that is distinctly different from, and intermediate to, the parental *phenotypes*

Independent assortment	The *law* stating that pairs of *genes* separate independently of one another in *meiosis*
Interphase	Period of time where a cell carries on metabolism and replicates *chromosomes* prior to cell division
Inversion	A *mutation* that occurs when a *chromosome* piece breaks off and reattaches in reverse orientation
k-strategist	*Species* characterized by slow maturation, few young, slow *population* growth and reproduction late in life
Karyotype	All of the *chromosomes* in a cell or an individual organism, visible through a microscope during cell division
Law	An observation that happens every time under a certain set of conditions
Lactic acid fermentation	The process by which pyruvic acid is converted to lactic acid
Light dependent	Reaction of *photosynthesis* that requires light; light energy is absorbed converted to chemical energy in the form of ATP and NADPH
Light independent	The fixing of carbon dioxide in a 3 carbon compound for use in sugar production or other end products
Lipid	Any of a group of organic compounds that are insoluble in water but soluble in nonpolar solvents; serve as energy storage and are important components of cell membranes
Lysogenic cycle	A type or phase of the *virus* life cycle during which the *virus* integrates into the *host chromosome* of the infected cell, often remaining essentially dormant for some period of time
Lytic cycle	A phase of the *virus* life cycle during which the *virus* replicates within the *host* cell, releasing a new generation of *viruses* when the infected cell lyses
Mass extinction	One of the brief periods of time during which large numbers of *species* disappeared
Meiosis	The reduction division process by which haploid *gametes* and *spores* are formed consisting of a single duplication of the genetic material followed by two mitotic divisions
Metaphase	Second phase of *mitosis* in which the *chromosomes* line up across the equator of the cell
Microbe	A microorganism
Mitochondria	*Organelles* that are the sites of *aerobic respiration* in eukaryotic cells
Mitosis	The replication of a cell to form two daughter cells with identical sets of *chromosomes*
Molecular biology	The study of the biochemical and molecular interactions within living cells
Molecular genetics	The branch of genetics that deals with the expression of *genes* by studying the *DNA* sequences of *chromosomes*
Multiple alleles	Three or more *alleles* of the same *gene* that code for a single trait
Mutation	An alteration in *DNA* structure or sequence of a *gene*
Mutualism	A form of *symbiosis* in which both organisms benefit from living together
Natural selection	The differential survival and reproduction of organisms with genetic characteristics that enable them to better utilize environmental resources
Nitrogenous bases	The purines (adenine and guanine) and pyrimidines (thymine, cytosine, and uracil) that comprise *DNA* and *RNA* molecules
Nonvascular plant	A plant that lacks vascular tissue and true roots, stems, and leaves
Nucleic acids	The two *nucleic acids*, deoxyribonucleic acid (*DNA*) and ribonucleic acid (*RNA*), are made up of long chains of molecules called *nucleotides*
Nucleotide	A building block of *DNA* and *RNA*, consisting of a nitrogenous base, a five-carbon sugar, and a phosphate group

Nucleus	The membrane-bound region of a eukaryotic cell that contains the *chromosomes*
Organelle	A cell structure that carries out a specialized function in the life of a cell
Osmosis	The *diffusion* of water across a selectively permeable membrane
Parasitism	The close association of two or more dissimilar organisms where the association is harmful to at least one
Passive transport	The movement of substances across a plasma (cell) membrane without the use of cell energy
Pandemic	An epidemic over a wide geographic area and affecting an exceptionally high proportion of the population
Pathogen	Organism which can cause disease in another organism
Pesticide	A substance that kills harmful organisms (e.g., an insecticide or fungicide)
pH	Indicates the relative concentration of hydrogen ions and hydroxide ions in a substance
Pinocytosis	A type of *endocytosis* in which a cell engulfs solutes of fluids
Phagocytosis	A type of *endocytosis* in which a cell engulfs large particles or whole cells
Phenotype	The observable characteristics of an organism, the expression of *gene alleles* (*genotype*) as an observable physical or biochemical trait
Phospholipids	A class of *lipid* molecules in which a phosphate group is linked to glycerol and two fatty acetyl groups; a chief component of biological membranes
Photosynthesis	The process by which light energy is converted to chemical energy stored in organic molecules
Plasma (cell) membrane	A selectively permeable surface that encloses the cell contents and through which all materials entering or leaving a cell must pass
Point mutation	A change in a single *base pair* of a *DNA* sequence in a *gene*
Polarity	Molecules having uneven distribution of charges
Population	A local group of organisms belonging to the same *species* and capable of interbreeding
Primary succession	Succession that occurs in a newly formed habitat that has never before sustained life
Prokaryote	A bacterial cell lacking a true *nucleus*; its *DNA* is usually in one long strand
Prophase	First phase of *mitosis* in which duplicated *chromosomes* condense and mitotic spindle fibers begin to form
Protein	An organic compound composed of one or chains of polypeptides which in turn are formed from *amino acids*
Protein synthesis	A formation of *proteins* using information coded on *DNA* and carried by *RNA*
Pure science	The gathering of new information or the discovery of a new relationship or fact for sake of knowledge
Punnett square	A type of grid used to show the gametes of each parent and their possible offspring; a type of grid that can indicate all the possible outcomes of a genetic cross
Radioactive dating	A method of determining the age of an object by measuring the amount of a specific radioactive isotope it contains
Recessive gene	Characterized as having a *phenotype* expressed only when both copies of the *gene* are mutated or missing
Relative dating	A method of determining the age of fossils by comparing them to other fossils in different layers of rock
Ribosome	A sub-cellular structure that is the site of *protein synthesis* during *translation*.
RNA (ribonucleic acid)	An organic acid composed of a single strand of *nucleotide* that acts as a messenger between *DNA* and the *ribosomes* and carries out the process of *protein synthesis*: composed units of adenine, guanine, cytosine, and uracil
Secondary succession	The sequential replacement of *population* in a disrupted habitat

Segregation	The *law* stating that pairs of *genes* separate in *meiosis* and each *gamete* receives one *gene* of a pair
Sex influenced	Description of a trait that is caused by a *gene* whose expression differs in male and females; (e.g., male patterned baldness)
Sex linkage	The presence of a *gene* on a sex *chromosome*; (e.g., hemophilia, color-blindness)
Sexual reproduction	The process where two cells (*gametes)* fuse to form one hybrid, fertilized cell
Species	A classification of related organisms that can freely interbreed
Spore	A form taken by certain *microbes* that enables them to exist in a dormant stage. It is an asexual reproductive cell
Symbiosis	The close association of two or more dissimilar organisms where both receive an advantage from the association
Taxonomic nomenclature	The procedure of assigning names to the kinds and groups of organisms according to their taxa
Technology	Practical use of scientific information to improve the quality of human life: see also *applied science*
Telophase	Final phase of *mitosis* during which *chromosomes* uncoil, a nuclear envelope returns around the chromatin, and a nucleolus becomes visible in each daughter cell
Theory	A well tested explanation of natural events
Thermoregulation	The maintenance of internal temperature within a range that allows cells to function efficiently
Translation	The process of converting the genetic code in *RNA* into the *amino acid* sequence that makes up a *protein*
Transcription	Process in which *RNA* is made from *DNA*
Vaccine	A preparation of dead or weakened *pathogen* that is used to induce formation of antibodies or immunity against the *pathogen*
Variation	Differences in the frequency of *genes* and traits among individual organisms within a *population*
Vascular plants	A plant that has phloem and xylem
Virus	An infectious particle composed of a *protein* capsule and a nucleic acid core, which is dependent on a *host* organism for replication

Appendix

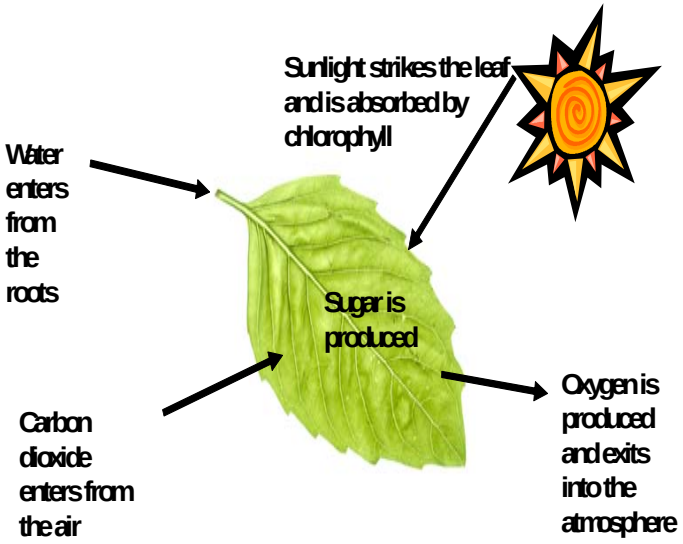
Resources for Grade 10 Science Alternate Assessment

Resource	Where to find it
Animals and Plants	Arkansas Game and Fish Commission (AGFC): http://www.agfc.com/education-class/programs.aspx Plant and animal characteristics: https://www.epa.ie/Education/PrimarySchools/Nature/FiletoDownload,5694,en.pdf Parts of a plant: http://www.primaryresources.co.uk/online/powerpoint/flower.ppt http://its.guilford.k12.nc.us/webquests/plantquest/ http://www.uen.org/utahlink/activities/view_activity.cgi?activity_id=6988
Body Systems	http://www.sciencenetlinks.com/interactives/systems.html http://www.getbodysmart.com/ http://www.medtropolis.com/VBody.asp
Cells	http://pers.dadeschools.net/prodev/world_of_cells.htm http://www.cellsalive.com/
Classification	http://www.ric.edu/ptiskus/Six_Kingdoms/Index.htm http://tosaweb.ncsd.k12.wy.us/faculty/lbell/Taxonomy/six_kingdoms.html http://watershed.csumb.edu/ron/roncor/cor/did.htm http://www.middleschoolscience.org/activities.htm http://sciencespot.net/Pages/kdzinsect.html http://www.everythingabout.net/articles/biology/animals/arthropods/insects/ http://forestry.about.com/od/treeidentification/a/leaf_collection.htm
Ecology	Missouri Botanical Gardens: http://www.mbgnet.net/ How to make a terrarium: http://www.instructorweb.com/lesson/maketerrarium.asp Biodiversity: http://www.naturalheritage.com/ State Parks: http://www.arkansasstateparks.com/ Food Chains and Biomes: http://www.picadome.fcps.net/lab/currl/food_chain/default.htm http://www.thewildclassroom.com/biomes/biomes/index.html http://www.harcourtschool.com/activity/food/food_menu.html Cycles: http://www.kidzone.ws/water/ http://epa.gov/climatechange/kids/carbon_cycle_version2.html Ecosystems: http://necsi.org/projects/evolution/co-evolution/pred-prey/co-evolution_predator.html http://members.aol.com/bowermanb/ecosystems.html Human impact: http://www.census.gov/main/www/popclock.html http://www.sci.sdsu.edu/classes/biology/bio100/vandergast/Lecture20notes.html http://www.hobart.k12.in.us/jkousen/Biology/impact.html
Effects of Sports Drinks	http://www.smartplay.net/whatsnew/downloads/energyflyer.pdf

Evolution	http://www.pbs.org/wgbh/evolution/educators/lessons/index.html http://www.nps.gov/archive/brca/geodetect/Paleontology/threadsotime.htm http://www.bbc.co.uk/sn/prehistoric_life/dinosaurs/making_fossils/ http://necsi.org/projects/evolution/cover/evolution_cover.html
Genetics	Interactive Genetics website: http://www.dnalc.org/home.html Elementary genetics: http://www.ology.amnh.org/genetics/index.html http://www.genetics.gsk.com/kids/heredity01.htm http://www.yourgenome.org/ http://www.wsu.edu/DrUniverse/genetics.html Geneticists: http://www.pbs.org/wgbh/aso/databank/index.html Punnett squares: http://www.emints.org/ethemes/resources/S00001476.shtml DNA model: http://school.discovery.com/lessonplans/programs/modeldna/ Interactive DNA model: http://learn.genetics.utah.edu/units/basics/builddna/ Mutations: http://learn.genetics.utah.edu/units/disorders/sloozeworm/scenario.cfm http://www.msichicago.org/exhibit/genetics/mutations.html
Hot and Cold Packs	http://nobel.scas.bcit.ca/debeck_pt/science/hotColdPack/pack_p1.htm
Lab Descriptions	Diffusion and other labs: http://www.biology-resources.com/biology-experiments2.html#Diffusion Collecting water from a plant: http://scene.asu.edu/habitat/activities/leaf_transpiration.html Anerobic Respiration (fermentation): http://www.lesaffreyeastcorp.com/SoY/educators.html http://www.funsci.com/fun3_en/exper1/exper1.htm Assorted: http://www.middleschoolscience.com/life.htm http://www.madsci.org/ http://school.discovery.com/ http://powayusd.sdcoe.k12.ca.us/pusdcves/er_fourth.htm
Properties of Water	Arkansas Project Wet:: http://www.adeq.state.ar.us/water/branch_planning/watershed_outreach_education/projectwet.htm Iowa Project Wet: http://www.uni.edu/~iowawet/H2OProperties.html
Recipe	Amish Bread recipe: http://www.armchair.com/recipe/bake002.html
Reproduction	Asexual reproduction: http://biology.about.com/library/gallery/blhydra.htm http://www.saburchill.com/chapters/chap0031.html Sexual reproduction: http://www.saburchill.com/chapters/chap0037.html Insect metamorphosis video: http://www.pbs.org/wgbh/nova/satoyama/transform.html Frog metamorphosis pictures: http://www.countrysideinfo.co.uk/metimage.htm
Science News	http://science.nasa.gov/ http://www.cnn.com/TECH/space/ http://www.eurekalert.org/ http://www.pbs.org/saf/educators.htm http://www.nasa.gov/vision/space/livinginspace/index.html http://pumas.jpl.nasa.gov/ http://health.discovery.com/

Unitedstreaming videos, blackline masters and quizzes on a variety of science topics	www.unitedstreaming.com Animal Adaptations Basics of Biology, The: How Living Things are Structured Biologically Speaking: Genetics and Heredity Biologically Speaking: Systems of the Human Body Biology: The Science of Life: Ecology: Organisms in Their Environment Biology: The Science of Life: Making New Life: The Basics of Reproduction Biology: The Science of Life: The Flow of Matter and Energy in the Living World: Photosynthesis and Cellular Respiration Biomes: Our Earth's Major Life Zones Cheese Factory Energy and the Chemistry of Life Evolution Greatest Discoveries with Bill Nye: Genetics Importance of Plants, The Learning About Ecology Life Science: Viruses Natural Selection of Plants and Animals Reproduction in Organisms Simply Science: Maintaining Equilibrium TLC Elementary School: Life Cycles
Viruses	http://www.bam.gov/ http://www.archives.gov/exhibits/influenza-epidemic/

Photosynthesis



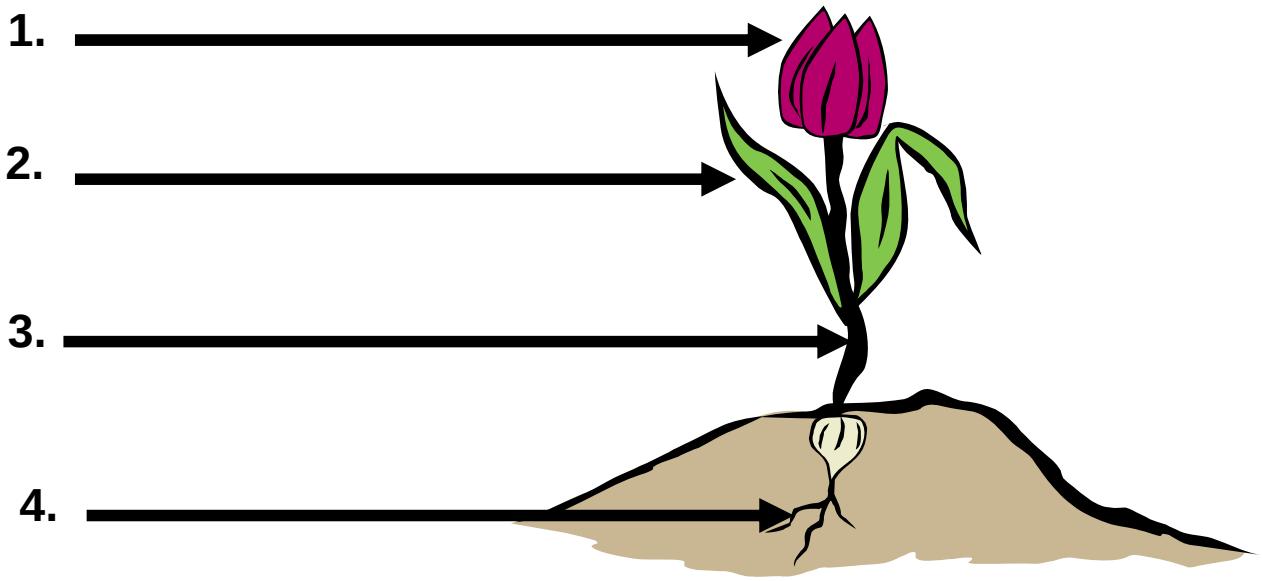
Respiration

Organisms take in oxygen which cells use to convert the sugar into energy.

Organisms release carbon dioxide from cells as a waste product.

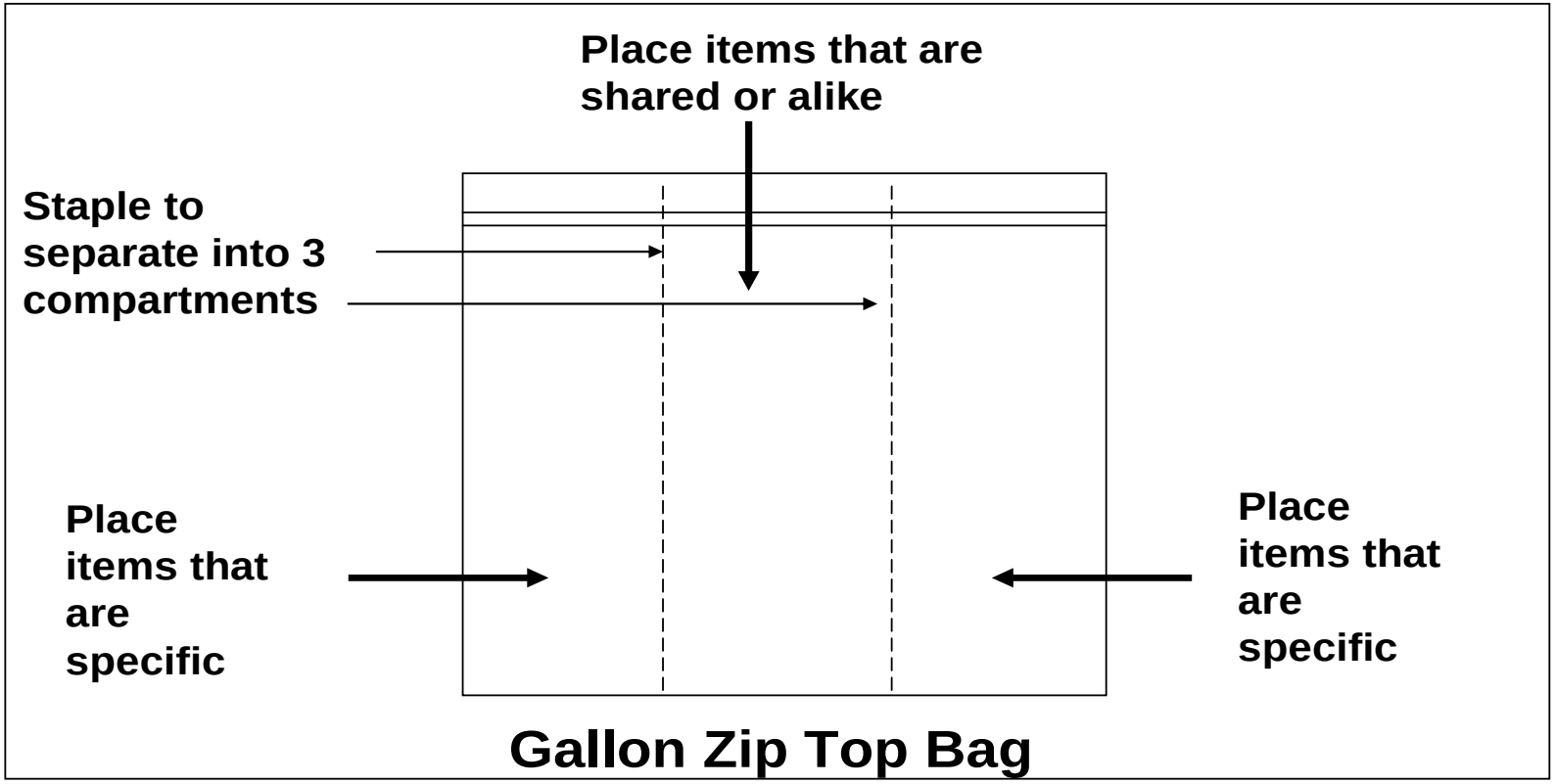
Organisms take in sugar from the food they eat.

Label the Parts of a Plant



Stem **Root** **Flower** **Leaf**

Physical Example of a Venn Diagram



Pollination Activity

Use pipe cleaners as bee legs (6) and tape to the bee.

Place powder in the center of the flower to represent “pollen”. Press “bee legs” into pollen then “fly” your bee to another student’s “flower” and land on their “flower”. This simulates the act of cross-pollination.