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UNIT NARRATIVE

In the cells and energy unit, we continue to focus on Lake Mendota. At the end of unit 1, we looked at lake Mendota in winter. In unit 2 we will look at lake Mendota in the summer. We will start out the unit by doing an experiment to model how the tilted Earth causes the seasons. We will then look at the organisms that live in lake water. In this unit, students will learn to use the microscopes. Since many of the organisms that live in lake water are unicellular, we will study the differences in unicellular and multicellular organisms and the cell theory. We will compare and contrast prokaryotic and eukaryotic cells. This leads us into looking at the differences in plant and animals cell and heterotrophs and autotrophs. Plants are autotrophs and obtain their energy through the process of photosynthesis. Photosynthesis is an example of a chemical change in which a new substance is formed. We will end the unit by studying the evidence of chemical change.

CONTENT STANDARDS

Below are the standards **taught** and **assessed** in this unit. TEKS in Bold are assessed on 8th grade STAAR.

Content Standards
6.6E- identify the formation of a new substance by using the evidence of a possible chemical change, including production of a gas, change in thermal energy, production of a precipitate, and color change.
6.8A- compare and contrast kinetic energy ~~with gravitational, elastic~~, and chemical potential energies
6.8B- describe how energy is conserved through transfers and transformations in systems such as ~~electrical circuits, food webs, amusement park rides,~~ or photosynthesis
6.9A- model and illustrate how the tilted Earth revolves around the Sun, causing changes in seasons
6.13A- describe the historical development of cell theory and explain how organisms are composed of one or more cells, which come from pre-existing cells and are the basic unit of structure and function
6.13B identify and compare the basic characteristics of organisms, including prokaryotic and eukaryotic, unicellular and multicellular, and autotrophic and heterotrophic

UNDERSTANDINGS AND QUESTIONS

Important big ideas and processes for the unit.

Key Understandings

- Earth has seasons because its axis is tilted. Earth's axis is always pointed in the same direction, so different parts of Earth get the Sun's direct rays throughout the year.
- All living organisms share several key characteristics or functions: order, sensitivity or response to the environment, reproduction, growth and development, regulation, homeostasis, and energy processing.
- The cell theory states that all biological organisms are composed of cells; cells are the unit of life and all life come from preexisting cells.
- Cells can be classified as prokaryotic, containing no nucleus, or eukaryotic, containing a nucleus.
- Organisms can be unicellular, made up of only one cell, or multicellular, containing many cells.
- Autotrophs make their own food for energy; while heterotrophs must consume food to obtain energy.
- Plants are autotrophs and obtain their energy through the process of photosynthesis.
- Energy cannot be created or destroyed; only transformed from one form to another or transferred from one substance to another.
- In a chemical reaction, the elements of the original substances are rearranged and grouped into a different order, and the new substance(s) have different properties from those of the original substances.

Key Questions

- What causes the seasons?
- How do we know something is living?
- Where do cells come from?
- What is the simplest unit of life?
- How can we distinguish a prokaryotic cell from a eukaryotic cell?

- How many cells does an organisms need to be considered living?
- How does energy cycle in the environment?
- How does energy transform from radiant energy to chemical energy?
- In what ways can energy be transformed (converted) from one form to another? Justify with examples.
- In what ways does the law of conservation of energy apply to energy transformations (conversions)?
- In what ways are different forms of energy classified as potential or kinetic energy?

ROADMAP

Suggested daily guide for instruction in this unit.

Lesson	Objective(s) and Standard(s)	Instructional Notes	Resources
Lesson 1: Reason for The Seasons: Experimental Design	SWBAT understand experimental design and the different types of scientific investigation. **TEKS** 6.1B use scientific practices to plan and conduct descriptive, comparative, and experimental investigations and use engineering practices to design solutions to problems	• In this lesson students will learn about experimental design and identify the three different types of scientific investigation. • Students will identify independent and dependent variables, constants, and will formulate hypotheses. • Students will apply the information they learned during class a to real life scenarios. • The experimental design in this lesson will be used in the lesson the following day. <u>Vocabulary</u> Descriptive Investigation Comparative Investigation Experimental Investigation Independent Variable Dependent Variable Constants IVCDV Chart Control Group Experimental Group	Lesson 01: Reason for the Seasons - Experimental Design

Lesson	Objective(s) and Standard(s)	Instructional Notes	Resources
Lesson 2: Reason for the Seasons	SWBAT investigate how the seasons change based on the tilt of Earth's axis. **TEKS** 6.9A- model and illustrate how the tilted Earth revolves around the Sun, causing changes in seasons;	• In this lesson students will investigate the relationship between the tilt of the Earth and Earth's seasons. • Students will conduct an investigation to simulate how the Earth rotates on its axis and how the four seasons are determined based on the Earth's position. • Students will make observations and record the electrical current produced by a solar cell at different points on the globe. <u>Vocabulary</u> Season Axis Latitude Longitude	Lesson 02: Reason for the Seasons Investigation
Lesson 3: Seasons	SWBAT investigate how the seasons change based on the tilt of Earth's axis. **TEKS** 6.9A- model and illustrate how the tilted Earth revolves around the Sun, causing changes in seasons;	Students will engage in a reading to learn and modeling activity and apply data they collected from yesterday's investigation. Students will then write a scientific explanation in CER format to answer the question, "What causes the Seasons on Earth." <u>Vocabulary</u> Season Axis Latitude Longitude	Lesson 03: Seasons
Lesson 4: Introduction to Microscopes	SWBAT use the microscopes to view microscopic objects and make scientific drawings. **TEKS** 6.1D use appropriate tools such as …microscopes, slides, …	In this lesson, students will be learning how to use a compound microscope using prepared slide. <u>Vocabulary</u> Course Adjustment knob Eye piece Field of View Fine adjustment knob Objective lens Stage Stage Total Magnification	Lesson 04: Introduction to Microscopes

Lesson	Objective(s) and Standard(s)	Instructional Notes	Resources
Lesson 05: Life in the Water	SWBAT use the microscope to observe microorganisms in pond water and distinguish between multicellular and unicellular organisms. **TEKS** 6.13B identify and compare the basic characteristics of organisms, including prokaryotic and eukaryotic, unicellular and multicellular, and autotrophic and heterotrophic;.	• Students will engage in a reading to learn in order to discover the similarities and differences in multicellular and unicellular organisms. • Student will observe pond water to observe and sketch organisms. Students will classify the organisms as unicellular or multicellular. • Students will complete a Venn diagram from description of unicellular and multicellular organisms. <u>Vocabulary</u> Microorganisms Multicellular Unicellular	Lesson 05: Life in the Water
Lesson 06: Characteristics of Life	SWBAT Classify objects as living, once living or nonliving based on its characteristics **TEKS** 6.13A- describe the historical development of cell theory and explain how organisms are composed of one or more cells, which come from pre-existing cells and are the basic unit of structure and function;	• Students will participate in student discourse and engage in argument from evidence to determine if something is living or not. • Students will participate in a reading to learn to analyze the 8 characteristics of life. • Student will engage in a lab activity in which they will be asked to classify objects as living, once living or nonliving based on its characteristics <u>Vocabulary</u> Abiotic Biotic Cell Homeostasis Response Stimuli	Lesson 06: Characteristics of Life

Lesson	Objective(s) and Standard(s)	Instructional Notes	Resources
Lesson 07: Cell Theory and Function of Cells	SWBAT describe the contribution of scientist to the cell theory and summarize the components of the cell theory **TEKS** 6.13A- describe the historical development of cell theory and explain how organisms are composed of one or more cells, which come from pre-existing cells and are the basic unit of structure and function;	• Students will engage in a lab investigation using the microscope to explore the history of the development of the cell theory. • The students will then complete a reading to learn to review the cell theory and the functions of cells. • Students will describe the contributions of Hooke, Von Leuwenhoek, Schleiden, Schwann, and Virchow to the cell theory. <u>Vocabulary</u> Cell Theory	Lesson 07: Cell Theory and Function of Cells
Lesson 8: Prokaryotic vs Eukaryotic (plant and Animal) Cells	SWBAT describe the differences in prokaryotic and eukaryotic cells and plant and animal cells organisms **TEKS** 6.11C identify the basic characteristics of organisms, including prokaryotic and eukaryotic, unicellular and multicellular, autotrophic and heterotrophic.	• Students will engage in an Explore Learning Gizmo to view different types of prokaryotic and eukaryotic plant and animal cells. • Students will engage in an Explore Learning Gizmo to view structures and organelles in prokaryotic and eukaryotic plant and animal cells • Students will complete a fill-in-the-blank paragraph comparing prokaryotic and eukaryotic plant and animal cells. Students will also complete a chart to identify the structures and organelles in prokaryotic and eukaryotic plant and animal cells. <u>Vocabulary</u> Prokaryotic cell Eukaryotic cell Micron Nucleoid region Nucleus Chloroplasts Cell wall Organelle	Lesson 8: Prokaryotic vs Eukaryotic (plant and animal) Cells

Lesson	Objective(s) and Standard(s)	Instructional Notes	Resources
Lesson 09: Heterotrophs, and Autotrophs	SWBAT compare and contrast autotrophs and heterotrophs and use the characteristics of organisms to classify them into kingdoms. **TEKS** 6.11C identify the basic characteristics of organisms, including prokaryotic and eukaryotic, unicellular and multicellular, autotrophic and heterotrophic.	• Students will sort organism cards based on listed characteristics. • Student will watch a video over autotrophs and heterotrophs and take notes. • Students will the complete a table to pull information from the last several lessons together. They will identify the characteristics (prokaryotic and eukaryotic, unicellular and multicellular, autotrophic and heterotrophic) of the 6 kingdoms. • Student will then use the cards from activity one and classify them into kingdoms based on their characteristics. • Students will also observe the xylem in celery to engage them in the concept of photosynthesis <u>Vocabulary</u> Heterotroph Autotroph Xylem Phloem	Lesson 09: Heterotrophs and Autotrophs
Lesson 10: Photosynthesis a Chemical Change	SWBAT identify how energy is conserved when radiant energy is transformed to chemical potential energy during the transformation of energy during photosynthesis **TEKS** 6.8A- compare and contrast kinetic energy ~~with gravitational, elastic~~, and chemical potential energies; and 6.8B- describe how energy is conserved through transfers and transformations in systems such as ~~electrical circuits, food webs, amusement park rides,~~ or photosynthesis;	• Students will observe two teacher demonstrations in which they observe that glucose and oxygen are the products of photosynthesis. • Students will participate in a reading to learn about the process of photosynthesis. • Students will investigate the optimal conditions for photosynthesis using an Explore Learning Gizmo. • Students will complete a model (diagram) of photosynthesis in which they will have to identify the reactants and products of photosynthesis. <u>Vocabulary</u> Chemical potential energy Conservation of energy Conservation of mass Photosynthesis Radiant energy	Lesson 10: Photosynthesis a Chemical Change

Lesson	Objective(s) and Standard(s)	Instructional Notes	Resources
Lesson 11: Evidence of Chemical Changes	SWBAT identify and justify with evidence of a chemical change **TEKS** 6.6E- identify the formation of a new substance by using the evidence of a possible chemical change, including production of a gas, change in thermal energy, production of a precipitate, and color change.	• Students will model the chemical reaction that takes place during photosynthesis. • Students will observe 4 chemical changes demonstrations. • Student will conduct a reading to learn to learn about the evidence of a chemical change. • Student will read a description of a chemical change and identify the evidence that supports the claim that it is a chemical change. <u>Vocabulary</u> Chemical Change Chemical reaction Products Precipitate Reactants	Lesson 11: Evidence of chemical changes
Lesson 12: Modeling a Chemical Change	SWBAT investigate and model a chemical change by conducting an investigation and gathering evidence. **TEKS** 6.6E- identify the formation of a new substance by using the evidence of a possible chemical change, including production of a gas, change in thermal energy, production of a precipitate, and color change. 6.8B- describe how energy is conserved through transfers and transformations in systems such as ~~electrical circuits, food webs, amusement park rides,~~ or photosynthesis;	• Students will conduct an investigation of a chemical reaction that produces all the indicators of a chemical change. • Students will then use Legos to model the reaction that occurred. Students will see that the reaction follows the conservation of mass. • Student will write a scientific explanation using CER format using evidence from the lab to answer the question, did a chemical change occur in the bag.	Lesson 12: Modeling a Chemical Change
1 Flex Days	There is one flex days built into this unit to use as needed. Flex days can be used for lessons that take longer than one day or for reteaching material the students may not have gotten during tier 1 instruction. If there is no reteaching that needs to be done, you should plan enrichment activities, NOT to take the exam early.		
Unit Exam	**Test Name:** SCI_6thScience_F25_UE2		

UNPACKED STANDARDS

Focus standards for this unit.

Standards Clarification		
Standards	**Specificity**	**Notes/Explanations/Examples**

6.6E- identify the formation of a new substance by using the evidence of a possible chemical change, including production of a gas, change in thermal energy, production of a precipitate, and color change.	Cognition: identify
	Content: formation of a new substance from a chemical change
	Including, but not limited to:
	• Chemical change – the formation of a new substance with different properties; cannot be undone by physical means
	• Identify evidence of chemical change
	  ○ Production of a gas
	  ▪ Odor
	  ▪ Bubbling
	  ○ Change in thermal energy
	  ○ Production of a precipitate
	  ▪ Precipitate – the formation of solids from a solution
	  ○ Color change (permanent)
	  ○ Production of light
		STAAR:
		• This is the first time that students have been introduced to chemical changes.
		• Although not identified as a Supporting Standard, this student expectation builds the foundation for the content of Readiness Standard 8.5E.
		TxCCRS:
		• VII. Chemistry – A2 – Recognize and classify pure substances (elements, compounds) and mixtures.
		• VII. Chemistry – E1 – Classify chemical reactions by type. Describe the evidence that a chemical reaction has occurred.
		• VII. Chemistry – H2 – Understand energy changes and chemical reactions.

6.8A- compare and contrast kinetic energy ~~with gravitational, elastic~~, and chemical potential energies;	Cognition: compare and contrast
	Content: kinetic energy and potential energy
	Including, but not limited to:
	• Potential energy – stored energy of an object because of its position or shape
	  ○ Gravitational- energy that is stored in an object due to it's position
	  ○ Elastic- energy stored as a result of deformation of an elastic object, such as the stretching of a spring
	  ○ Chemical- -the energy stored in the chemical bonds of a substance
	• Kinetic energy – energy of motion
		STAAR:
		• This is the first-time students have been introduced to potential and kinetic energy.
		• Students should be able to identify examples of kinetic and potential energy.
		• Students may be assessed on points of greatest and least PE or KE in relationship to one another within the same system.
		• This concept is not explicitly taught again before the STAAR assessment in Grade 8**.**
		TxCCRS:
		VIII. Physics – D1 – Understand potential and kinetic energy.
		VIII. Physics – D2 – Understand conservation of energy

6.8B- describe how energy is conserved through transfers and transformations in systems such as ~~electrical circuits, food webs, amusement park rides,~~ or photosynthesis;	Cognition: describe Content: how energy is conserved through transfers transformations Including, but not limited to: • Law of conservation of energy	

Standards Clarification		
Standards	**Specificity**	**Notes/Explanations/Examples**
	○ Energy can neither be created nor destroyed; it just changes form • Transformations between forms of energy ○ Chemical ○ Thermal ○ Light (radiant) ○ Mechanical ○ Electrical • Example of energy transformation ○ Energy in a flashlight battery changes from chemical energy to electrical energy to light energy • Possible additional examples may include: ○ Hot air balloon rising ○ An engine causing a car to move ○ A wind turbine system ○ A hydroelectric power plant ○ One animal consuming another animal An animal consuming a plant (producer)	
6.9A- model and illustrate how the tilted Earth revolves around the Sun, causing changes in seasons;	Cognition: model and illustrate Content: how the tilted Earth revolves around the Sun Including, but not limited to: • The tilted Earth revolves around the Sun ○ Causing changes in seasons ○ Causing length of daylight hours (equator vs other locations on the Earth during different seasons) ○ Compare number of daylight hours at different locations on Earth based on season ○ Revolution ▪ Planets revolve around the Sun in a counterclockwise motion	
6.13A- describe the historical development of cell theory and explain how organisms are composed of one or more cells, which come from pre-existing cells and are the basic unit of structure and function;	Cognition: describe Content: cell theory Including, but not limited to: • Cell theory ○ All organisms are composed of one or more cells ○ The cell is the basic unit of structure and function in living organisms	**STAAR:** • This student expectation builds the foundation for the content of Biology Readiness Standard 5.A and Supporting Standard 5.C. **TxCCRS:** • VI. Biology – F2 – Describe, compare, and contrast structures and processes that allow gas exchange, nutrient uptake and processing, waste excretion,

Standards Clarification		
Standards	**Specificity**	**Notes/Explanations/Examples**
	○ All cells come from pre-existing cells by cell reproduction (except the original cell) • Characteristics of Life 1. Be made of one or more cells 2. Grow and develop 3. Use energy for growth and maintenance 4. Be based on a universal genetic code 5. Reproduce 6. Maintain a stable internal environment (homeostasis) 7. Respond to the environment 8. Change over time as a group	nervous and hormonal regulation, and reproduction in plants, animals, and fungi; give examples of each.
6.13B identify and compare the basic characteristics of organisms, including prokaryotic and eukaryotic, unicellular and multicellular, and autotrophic and heterotrophic;	Cognition: identify and compare Content: basic characteristics of organisms Including, but not limited to: • Characteristics used to classify organisms into kingdoms ○ Prokaryotic (no nucleus) or eukaryotic (nucleus) ○ Unicellular or multicellular ○ Autotrophic (producer) or heterotrophic consumer)	**STAAR:** • This is the first time students have been introduced to taxonomic classification. This concept is not revisited before the STAAR assessment in Grade 8. • This student expectation builds the foundation for the content of Biology Readiness Standard B.8B and Supporting Standards B.6B, B.8A, and B.8C. **TxCCRS:** • VI. Biology – E1 – Know ways in which living things can be classified based on each organism's internal and external structure, development, and relatedness of DNA sequences.

VERTICAL STANDARDS

This section details the **progression** of key student expectations/standards** in the courses **before** and **after** this course. This will help you understand what **prior knowledge skills to build upon** and guide you in knowing what **skills you are preparing your students** for in the subsequent course.

5th Grade	6th Grade	7th Grade
	6.6E - identify the formation of a new substance by using the evidence of a possible chemical change, including production of a gas, change in thermal energy, production of a precipitate, and color change.	7.6C distinguish between physical and chemical changes in matter;

5.7A Investigate and describe the transformation of energy in systems such as energy in a flashlight battery changes from chemical energy to electrical energy to light energy	6.8A - compare and contrast kinetic energy ~~with gravitational, elastic~~, and chemical potential energies;	7.8C explain the relationship between temperature and the kinetic energy of the particles within a substance.
	6.8B - describe how energy is conserved through transfers and transformations in systems such as ~~electrical circuits, food webs, amusement park rides,~~ or photosynthesis; .	7.8A investigate methods of thermal energy transfer into and out of systems, including conduction, convection, and radiation;
5.9 The student is expected to demonstrate that Earth rotates on its axis once approximately every 24 hours and explain how that causes the day/night cycle and the appearance of the Sun moving across the sky, resulting in changes in shadow positions and shapes.	6.9A - model and illustrate how the tilted Earth revolves around the Sun, causing changes in seasons;	7.9C analyze the characteristics of Earth that allow life to exist such as the proximity of the Sun, presence of water, and composition of the atmosphere.
	6.13A- describe the historical development of cell theory and explain how organisms are composed of one or more cells, which come from pre-existing cells and are the basic unit of structure and function;	7.13B describe the hierarchical organization of cells, tissues, organs, and organ systems within plants and animals;
	6.13B identify and compare the basic characteristics of organisms, including prokaryotic and eukaryotic, unicellular and multicellular, and autotrophic and heterotrophic	7.14B describe the characteristics of the recognized kingdoms and their importance in ecosystems such as bacteria aiding digestion or fungi decomposing organic matter.

VOCABULARY GLOSSARY

Domain-specific words and definitions for this unit.

Key Content Vocabulary
Abiotic: a nonliving condition or thing, as climate or habitat, that influences or affects an ecosystem and the organisms in it.
Autotroph: organisms, known as producers in a food chain, capable of synthesizing their own food by a process known as photosynthesis; all plants and some forms of bacteria and other organisms
Axis: the line about which a rotating body, such as the Earth, turns
Biotic: pertaining to, or produced by life or living organism
Cell: a basic unit of structure and function in living organisms
Cell theory: states that the cell is the basic unit of life, all living organisms are composed of cells, and all cells come from pre-existing cells

Cell Wall: controls what enters and exits the cell
Chemical Change: the formation of a new substance with different properties, cannot be undone by physical means
Chemical potential energy: energy stored in the bonds of atoms and molecules of substances (e.g., food, biomass, petroleum, natural gas, and propane contain store chemical potential energy)
Chemical reaction: a process in which one or more substances, the reactants, are converted to one or more different substances, the products.
Chloroplasts: organelle in plant cells that is the site of photosynthesis
Comparative Investigation – the purpose is to draw conclusions
Constants: All factors are held the same in order to create a "fair test" experiment. Also known as the controlled variables.
Control Group- a standard of comparison for checking or verifying the results of an experiment where all variables must be held constant; for experiments, a control (standard of comparison for checking or verifying the results of an experiment) is necessary
Course Adjustment knob: located on the arm of the microscope moves the stage up and down to bring the specimen into focus.
Descriptive Investigation- the purpose is to determine relationships
Dependent Variable: the variable being tested and measured in an experiment and is 'dependent' on the independent variable.
Eukaryotic cell: a cell that has a membrane-bound nucleus and other membrane-bound organelles
Eye piece: the piece of glass at one end, where you put your eye in order to look through
Experimental Group - the group(s) being tested with the independent variable; each experimental group has only one factor different from each other, everything else must remain constant
Experimental Investigation – the purpose is to determine a causal relationship
Field of View: the maximum area visible when looking through the microscope eyepiece
Fine adjustment knob: part of the microscope that is used for focusing finer details of specimen being viewed
Heterotroph: organisms, known as consumers in a food chain, which cannot synthesize their own food; carnivores, herbivores and omnivores
Homeostasis: an organism's ability to maintain a stable internal environment when external changes occur
Independent Variable: the variable the experimenter manipulates or changes and is assumed to have a direct effect on the *dependent variable.*
IVCDV Chart: Independent Variable, Constant, Dependent Variable chart. A graphic organizer to help you identify the parts of an investigation.
Latitude: lines that run North and South from the equator
Law of Conservation of Energy: states that energy is neither created or destroyed; it only changes forms
Law of Conservation of Mass: states that matter is neither created nor destroyed in chemical reactions.
Longitude: lines that run East and West
Micron: the units used to measure in microscopy
Microorganisms: an organism that can be seen only through a microscope. Microorganisms include bacteria, protozoa, algae, and fungi.
Multicellular: organisms made of many cells
Nucleoid region: area of a prokaryotic cell where genetic material is located
Nucleus: organelle in eukaryotic cells that contain the cell's genetic material and controls the rest of the cell's functions
Objective lens: lens or system of lenses that forms an image of an object
Organelle: structures found in eukaryotic cells
Phloem: a two-way passage in plants that transports glucose sugar throughout the plant.
Photosynthesis: the process by which plants use radiant energy from the sun, water, and carbon dioxide to create oxygen and chemical potential energy in the form of sugar

Precipitate: the formation of solids from a solution
Products: are substances that are produced in the reaction.
Prokaryotic cell: a simple, single-celled (unicellular) organism that lacks a nucleus, or any other membrane-bound organelles.
Radiant energy: energy that is transferred by electromagnetic radiation, such as light, X-rays, gamma rays, and thermal radiation
Response: an organisms actions that take place due to a stimulus
Reactants: are substances that start a chemical reaction.
Season: a period of the year that is distinguished by special
climate conditions. The four seasons—spring, summer, fall, and winter—follow one another regularly. Each has its own light, temperature, and weather patterns that repeat yearly.
Stage: a small platform on a microscope where the specimen is mounted for examination
Stimuli: anything that can trigger a physical or behavioral change. Stimuli can be external or internal
Total Magnification: found by multiply the magnification of the eyepiece lens and the objective lens magnification
Unicellular: organisms made of one cell
Xylem: a type of plant tissue that forms the water passageway from roots to stems to leaves

Consumable Materials and Lab Supplies for Unit 1 (1 per group of 4 students unless noted)

Lesson	Commercial Vendor	Lab Supplies Science Vendor- Wards
Lesson 1: Reason for the Seasons Experimental Design	None	None
Lesson 2: Reason for the Seasons Investigation	Globe Solar Cell with 2 lead wires Incandescent light bulb Digital multimeter Light fixture	Meter stick
Lesson 3: Seasons	<u>Teacher:</u> Scissors Marker Glue Cut out of a STAR to model Polaris <u>Per group of students:</u> One Styrofoam ball Paper or Styrofoam plate One wooden skewer One wide rubber band Small snack or dixie up Small pen flashlight	Protractor
Lesson 4: Introduction to Microscopes	None	Microscope Microscope slide Coverslips Prepared slides

		Small beaker or cup for water Pipette or medicine dropper
Lesson 5: Life in the Water	Freshwater sample from a local pond, lake, or creek (or Ward's® Pond Protist Mixture, Dry Mix	Microscope Microscope slide Coverslips Prepared slides Amoeba, paramecium, hydra, etc.
Lesson 6: Characteristics of Life	<u>Sewer Lice</u> • 10-20 Raisins • Carbonated beverage that could pass for "sewer-water" (Squirt, or Mountain Dew, or sprite with food coloring), 500 mL <u>Characteristics of Life Lab</u> *(These can be substituted- you want a combination of living, nonliving and dormant)* • Dried leaf that has changed colors • Cork • A natural sea sponge. • Yeast • Pinto beans or unpopped popcorn kernels • Resurrection plant (Available from science supply companies or online) • Rock • Modeling clay • Nail or screw • Meal worms • Plant • Mold- grow on bread or cheese	<u>Sewer Lice</u> • Beaker <u>Characteristics of Life Lab</u> • Containers or small cups for all organisms
Lesson 7: Cell Theory	If you do not have prepared slides you will need the following: Cork (from cork stopper) Pond water Onion or Elodea (from pet store) Onion root	Microscopes Slides and cover slips <u>Prepared slides or make slides of:</u> Cork Cells Unicellular organisms or pond water Plant cell (onion or elodea) Animal cell (cheek cell) Methylene blue or iodine Onion root mitosis
Lesson 8: Prokaryotic vs Eukaryotic (plant and animal) Cells	Computers for Gizmos	
Lesson 9: Autotroph and Heterotroph	Celery Red or blue food coloring	2 large beakers Hand lens

		Knife to cut celery Petri dishes or small dose cups for pieces of celery
Lesson 10: Photosynthesis a Chemical Change	<u>Sweet Stuff Teacher Demonstration</u>: Green Onion Stems <u>Release of Oxygen Teacher Demo:</u> Baking Soda Elodea sprigs or spinach leaves	<u>Sweet Stuff Teacher Demonstration</u>: Hot plate safety goggles 400 mL Beaker 3 test tubes Dextrose sugar Water Test tube clamp test tube rack Graduated cylinder Benedict's Solution <u>Release of Oxygen Teacher Demo:</u> Water Light source with 100-watt bulb. A clamp light works well.
Lesson 11: Evidence of a Chemical Change	<u>Modeling Photosynthesis Lab</u> In a resealable bag per group • 12 white paper clips • 18 yellow paper clips • 6 red paper clips Or • 12 orange candies (skittles) • 18 yellow candies (skittles) • 6 red candies (skittles) <u>Teacher Demonstrations:</u> Demonstration 1: Vinegar and Baking Soda • Vinegar • Baking soda • Pie pan • Spoon Demonstration 2: Vinegar and Milk • Vinegar • Milk Demonstration 3: Bromothymol Blue and CO_2 • straw Demonstration 4: Alka Seltzer Tablet in Water Materials: • Alka Seltzer tablet • Balloon	<u>Teacher Demonstrations:</u> Demonstration 1: Vinegar and Baking Soda • Thermometer Demonstration 2: Vinegar and Milk • Thermometer • Graduated cylinder • beaker Demonstration 3: Bromothymol Blue and CO_2 • Bromothymol blue • Erlenmeyer flask Demonstration 4: Alka Seltzer Tablet in Water • Thermometer • Erlenmeyer flask • water
Lesson 12: Observing and Modeling a Chemical Change	<u>Wet Lab</u> •2 spoons •Baking Soda •Resealable bag	<u>Wet Lab</u> • Calcium Chloride (If you do not have in lab (should be on Wards order) it can be purchase as Damp Rid in the laundry/home section of Walmart)

	<u>Modeling: (This amount will make 12 sets)</u> 24 2x4 Yellow Legos 24 2x4 Black Legos 12 2x4 Green Legos 24 2x4 Blue Legos 72 2x4 Yellow Legos 24 2x1 White Legos	• Test tube • Graduated cylinder • Phenol Red (This should have been ordered from Wards but can also be purchased a pool supply stores) • Beaker • Balance • Goggles