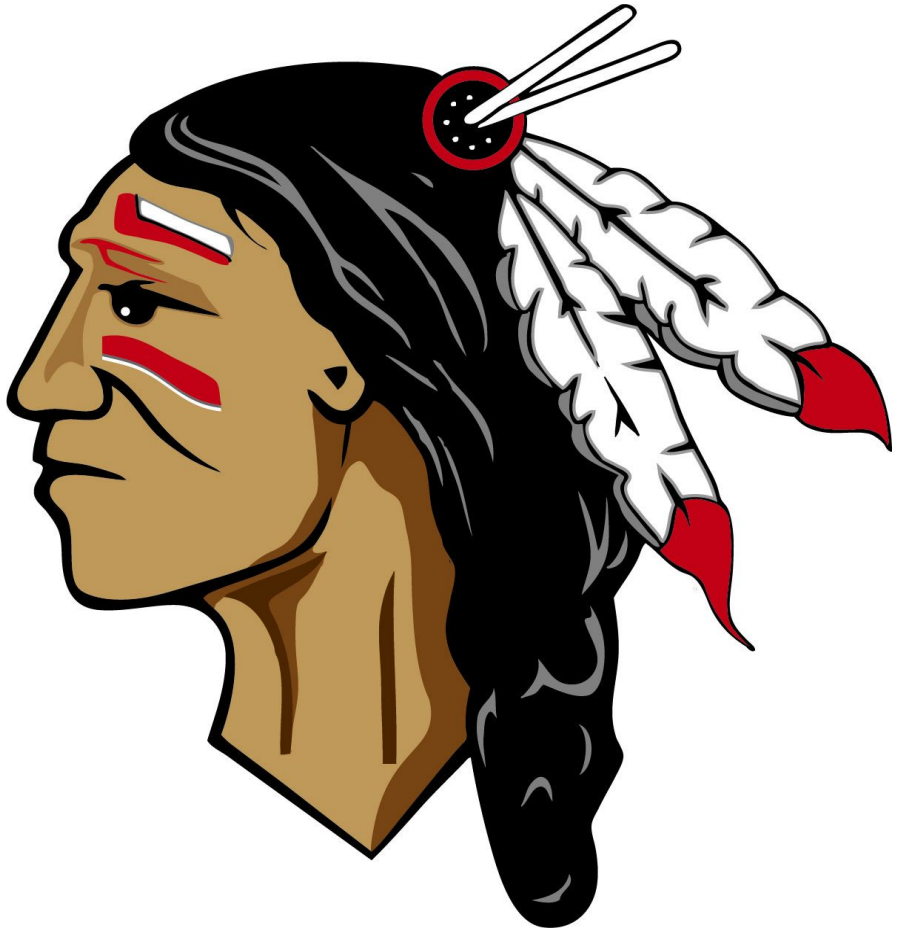
Westside Middle School
6th Grade Science Curriculum Map
2017-2018

Teacher: Crawley & Newell **Revised:** 9.21.17



Map is still under construction and will be revised throughout the year.

WESTSIDE MIDDLE SCHOOL 6TH GRADE SCIENCE CURRICULUM MAP

Teacher: Crawley & Newell

Quarter 1

Topic: Energy & Water Cycle

Essential Questions:

Students will consider……

- What devices could be developed that affect thermal energy transfer? (6-PS3-3)
- How would you show that temperature (average kinetic energy) and energy transfer is affected by the type of materials and the mass of the materials used? (6-PS 3-4)
- What arguments could you use to support the law of conservation of energy? (6-PS 3-5)
- How can data be used to achieve an optimal design of an object or tool? (6-ETS1-4)
- How can we model and describe the effect of energy from the sun and gravity on the cycling of water through Earth's systems? 6-ESS2-4

Students will…..

- Understand the rules and procedures that are to be followed while conducting a science lab.
- Be able to distinguish scientific method.
- Be able to distinguish between qualitative and quantitative.
- Be able to distinguish between insulators and conductors; temperature and heat.
- Be able to identify which way thermal energy will flow and identify the outcome.
- Be able to predict which object will have greater thermal energy transfer and will be able to do the same using types of matter instead of mass.
- Model the way thermal energy flows and depends on types of matter and mass, through the use of a engineering project.
- Be able to model and describe the movement of water within the water cycle.

AR STANDARDS / SKILLS

CONTENT VOCABULARY WITHIN THE STANDARD WILL BE TAUGHT THROUGHOUT DAILY OBJECTIVES / GOALS.

Physical Science

6-PS3-3 Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.* [AR Clarification Statement: Examples of devices could include an insulated box, a solar cooker, and a polystyrene foam cup.] [Assessment Boundary: Assessment does not include calculating the total amount of thermal energy transferred.]

6-PS3-4 Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample. [Clarification Statement: Examples of experiments could include comparing final water temperatures after different masses of ice have melted in the same volume of water with the same initial temperature, the temperature change of samples of different materials with the same mass as they cool or heat in the environment, or the same material with different masses when a specific amount of energy is added.] [Assessment Boundary: Assessment does not include calculating the total amount of thermal energy transferred.]

6-PS3-5 Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. [AR Clarification Statement: Examples of empirical evidence used in arguments could include a diagram, flowchart, or other representation of the energy before and after the transfer in the form of temperature changes or motion of an object.] [Assessment Boundary: Assessment does not include calculations of energy.]

Earth Science

6-ESS2-4 Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. [Clarification Statement: Emphasis is on the ways water changes its state as it moves through the multiple pathways of the hydrologic cycle. Examples of models can be conceptual or physical.] [Assessment Boundary: A quantitative understanding of the latent heats of vaporization and fusion is not Assessed.]

Science/Engineering Practices	Disciplinary Core Idea	Crosscutting Concepts:	
Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in 6–8 builds on K–5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or design solutions. ● Plan an investigation individually and collaboratively, and in the design: identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim. (6-PS3-4) **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories. ● Apply scientific ideas or principles to design, construct, and test a design of an object, tool, process or system. (6-PS3-3) Engaging in Argument from Evidence Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed worlds. ● Construct, use, and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon. (6-PS3-5) **Connections to Nature of Science** **Scientific Knowledge is Based on**	**PS3.A: Definitions of Energy** ● Temperature is a measure of the average kinetic energy of particles of matter. The relationship between the temperature and the total energy of a system depends on the types, states, and amounts of matter present. (6-PS3-3, **6-PS3-4) PS3.B: Conservation of Energy and Energy Transfer** ● When the motion energy of an object changes, there is inevitably some other change in energy at the same time. (6-PS3-5) ● The amount of energy transfer needed to change the temperature of a matter sample by a given amount depends on the nature of the matter, the size of the sample, and the environment. (6-PS3-4) ● Energy is spontaneously transferred out of hotter regions or objects and into colder ones. (6-PS3-3) ETS1.A: Defining and Delimiting an Engineering Problem The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that is likely to likely to limit possible solutions. **(6-PS3-3) ETS1.B: Developing Possible Solutions** ●A solution needs to be tested, and then modified on the basis of the test results in order to improve it. There are systematic processes for evaluating solutions with respect to how well they meet criteria and constraints of a problem. (6-PS3-3) _____ **ESS2.C: The Roles of Water in Earth's Surface Processes** ●Water continually cycles among land,	**Scale, Proportion, and Quantity** ●Proportional relationships (e.g. speed as the ratio of distance traveled to time taken) among different types of quantities provide information about the magnitude of properties and processes. **(6-PS3-4) Energy and Matter** ●Energy may take different forms (e.g. energy in fields, thermal energy, and energy of motion). (6-PS3-5) ●The transfer of energy can be tracked as energy flows through a designed or natural system. (6-PS3-3) _____ **Energy and Matter** ●Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter. (6-ESS2-4)	

Empirical Evidence ● Science knowledge is based upon logical and conceptual connections between evidence and explanations (6-PS3-4, 6-PS3-5) _____ **Developing and Using Models** Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems. ●Develop a model to describe unobservable mechanisms. (6-ESS2-4)	ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. (6-ESS2-4) ●Global movements of water and its changes in form are propelled by sunlight and gravity. (6-ESS2-4)		

Activities/Skills	Assessments	Resources	Vocabulary
• Science Notebook • KLEWS Chart • The Mysterious Drinking Bird • Hand Boilers • Heat, Temperature, and Conduction: Washers and Water • Heat Transfer Lab • Design Challenge • Kesler Science Stations ---------- • Uncovering:Earth and Environmental Science-"Where Did the Water in the Puddle Go?" • Project Wet-"The Incredible Journey" • Kesler Science Stations	• Pre/Post Test • Exit Slips • Graphs • Writing/CER/Reflections • Projects/Models	• Ducksters • NASA: Design Challenge • Kesler Science ---------- • Uncovering:Earth and Environmental Science • Project Wet • Kesler Science	energy transferred matter mass kinetic energy temperature sample minimize maximize investigation particle insulator conductor motion thermal energy transfer heat ---------- hydrologic cycle transpiration circulation evaporation precipitation condensation ground water perspiration gravity respiration

Quarter 2

Topic: Structure and Function of Cells

Essential Questions:

Students will consider…

- How can we prove that all living things are made of cells?(6-LS 1-1)
- How can you use a model to describe the functions of a cell and its parts? (6-LS 1-2)
- What arguments support that the body is a system of interacting subsystems? (6-LS 1-3)
- How does your brain process stimuli from the outside world? (6-LS 1-8)

I will…..

- Understand the structure of a plant and animal cell.
- Understand the function of a plant and animal cell.
- Comprehend cell theory.
- Provide supporting evidence for how the body is a system composed of cells.
- Develop an understanding of sensory receptors and their connection to the brain.

AR STANDARDS / SKILLS

CONTENT VOCABULARY WITHIN THE STANDARD WILL BE TAUGHT THROUGHOUT DAILY OBJECTIVES / GOALS

Life Science

6-LS1-1. Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. [Clarification Statement: Emphasis is on gathering evidence that living things are made of cells, distinguishing between living and nonliving things, and understanding that living things may be made of one cell or many and varied cells.]

6-LS1-2. Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. [Clarification Statement: Emphasis is on the cell functioning as a whole system and the primary role of identified parts of the cell, specifically the nucleus, chloroplasts, mitochondria, cell membrane, and cell wall.] [Assessment Boundary: Assessment of organelle structure/function relationships is limited to the cell wall and cell membrane. Assessment of the function of the other organelles is limited to their relationship to the whole cell. Assessment does not include the biochemical function of cells or cell parts.

6-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. [Clarification Statement: Emphasis is on the conceptual understanding that cells form tissues and tissues form organs specialized for particular body functions. Examples could include the interaction of subsystems within a system and the normal functioning of those systems.] [Assessment Boundary: Assessment is limited to circulatory, excretory, digestive, respiratory, muscular, and nervous systems. Assessment does not include the mechanism of one body system independent of others.]

6-LS1-8. Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. [Assessment Boundary: Assessment does not include mechanisms for the transmission of this information.]

Science/Engineering Practices	Disciplinary Core Idea	Crosscutting Concepts:	
Developing and Using Models Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems. ● Develop and use a model to describe phenomena. (6-LS1-2) **Planning and Carrying Out Investigations** 6-8 builds on K-5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions. ● Conduct an investigation to produce data to serve as the basis for evidence that meet the goals of an investigation. (6-LS1-1) **Engaging in Argument from Evidence** Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s). Use an oral and written argument supported by evidence to support or refute an explanation or a model for a phenomenon. (MS-LS1-3) **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 6-8 builds on K-5 experiences and progresses to evaluating the merit and validity of ideas and methods. ●Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence. (MS-LS1-8)	**LS1.A. Structure and Function** ● All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular). ● Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell. (6-LS1-1) ● In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions. (6-LS1-2) (6-LS1-3) **LS1.D:Information Processing** ●Each sense receptor responds to different inputs electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories. (6-LS1-8)	**Cause and Effect** ●Cause and effect relationships may be used to predict phenomena in natural systems. (6-LS1-8) **Scale, Proportion, and Quantity** ●Phenomena that can be observed at one scale may not be observable at another scale. (6-LS1-1) **Systems and System Models** ●Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. (6-LS1-3) **Structure and Function** ●Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the relationships among its parts; therefore complex natural structures/systems can be analyzed to determine how they function. (6-LS1-2) ----------**Connections to Engineering, Technology, and Applications of Science** **Interdependence of Science, Engineering, and Technology** ●Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. (6-LS1-1) ---------- **Connections to Nature of Science** **Science is a Human Endeavor** ●Scientists and engineers are guided by habits of mind such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas. (6-LS1-3)	

Activities/Skills	Assessments	Resources	Vocabulary/Terms
• Introduction to Cells • Plants vs. Animal Cells • Organelle Trail • Science Notebooking • Kesler Science Stations •	• Pre/Post Test • Exit Slips • Writing/CER/Reflections • Projects/ Models	• Introduction to Cells • Plants Vs. Animal Cells • Organelle Trail • Kesler Science	cell organelle nucleus chloroplast mitochondria cell membrane cell wall chlorophyll stimuli receptors behavior transmission unicellular multicellular organism synthesis

Quarter 3

Topic:

Essential Questions:

Students will consider……

I will…..

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AR STANDARDS / SKILLS

CONTENT VOCABULARY WITHIN THE STANDARD WILL BE TAUGHT THROUGHOUT DAILY OBJECTIVES / GOALS.

Science/Engineering Practices	Disciplinary Core Idea	Crosscutting Concepts:	

Activities/Skills	Assessments	Resources	Vocabulary/Terms

Quarter 4

Topic:

Essential Questions:

Students will consider……

I will…..

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AR STANDARDS / SKILLS

CONTENT VOCABULARY WITHIN THE STANDARD WILL BE TAUGHT THROUGHOUT DAILY OBJECTIVES / GOALS.

Science/Engineering Practices	Disciplinary Core Idea	Crosscutting Concepts:	
Activities/Skills	**Assessments**	**Resources**	**Vocabulary/Terms**