

Grade 6 Science Year at a Glance 2018-2019

Sixth Grade Science Year-at-a-Glance ARKANSAS STATE SCIENCE STANDARDS			
Unit 1 Life Science: Structure, Function, and Info Processing	Unit 2 Life Science: Growth, Development, and Reproduction of Organisms	Unit 3 Physical Science: Energy Transfer	Unit 4 Earth and Space Science: Water Cycle, Weather, and Climate/Human Impact
13 weeks	5 weeks	5 weeks	13 weeks
<ul style="list-style-type: none"> ● 6-LS1-1 ● 6-LS1-3 ● 6-LS1-2 ● 6-LS1-8 	<ul style="list-style-type: none"> ● 6-LS3-2 ● 6-LS1-4 ● 6-LS1-5 	<ul style="list-style-type: none"> ● 6-PS3-3 ● 6-PS3-4 ● 6-PS3-5 	<ul style="list-style-type: none"> ● 6-ESS2-4 ● 6-ESS3-4 ● 6-ESS2-5 ● 6-ESS2-6 ● 6-ESS3-3 ● 6-ESS3-5
<u>Recurring</u>			
<ul style="list-style-type: none"> ● 6-ETS1-1 Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. ● 6-ETS1-2 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. ● 6-ETS1-3 Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. ● 6-ETS1-4 Develop a model to generate data for iterative testing and modifications of a proposed object, tool, or process such that an optimal design can be achieved. 			

[Unit 1](#)

[Unit 2](#)

[Unit 3](#)

[Unit 4](#)

Unit 1	Life Science: Structure, Function, and Info Processing	Grade Level	6	Approx length	13 weeks
---------------	--	--------------------	---	----------------------	----------

CPSD Power Standards with Student Learning Objectives

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.

6-LS1-3 Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.

Student-Friendly Objectives:

- I can provide evidence that living things are made of cells.
- I can distinguish between types of cells.
- I can distinguish between unicellular or multicellular organisms.

- I can explain how cells are organized to develop tissues, organs and organ systems.
- I can describe how subsystems interact with each other in the body.
- I can identify the four main types of body tissues and their functions.

Learning Indicators of Power Standards

Students will know...

- Cells are the smallest units of life
- Differences between plant and animal cells
- Living things are unicellular or multicellular
- Different types of cells (blood, skin, muscle, and nerve)
- Organelles (cell wall, cell membrane, mitochondria, chloroplast, nucleus) and their functions

- Components of a closed system
- Systems in multicellular organisms are made up of smaller parts that perform specific functions but work together in the body(organs)
- How organ systems work with one another
- The body is composed of organs which are made of tissues that contain specialized cells: nervous, muscle, epithelial, and connective
- Hierarchy of living things (cells, tissues, organs, organ systems)

And be able to...

- Identify the parts of a cell, describe their function, and defend why they are needed to keep the organism alive.
- Distinguish between plant and animal cells.
- Use a microscope safely and correctly in order to collect evidence.
- Communicate evidence discovered in an investigation.

- Identify different organs within a system.
- Rank the levels of organization in living things (cell, tissue, organ, organ system).
- Use evidence discovered in an investigation to explain how the body is a system of interacting subsystems composed of cells.
- Describe how organ systems interact: circulatory, excretory, digestive, respiratory, muscular, and nervous.

Additional Arkansas State Standards

- 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.
- 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.

Unit 2	Life Science: Growth, Development, and Reproduction of Organisms	Grade Level	6	Approx Length	5 weeks
CPSD Power Standards with Student Learning Objectives					
<p>6-LS3-2 Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.</p> <p>Student-Friendly Objectives:</p> <ul style="list-style-type: none"> • I can create a punnett square to determine the probability of characteristics being passed from parent to offspring. • I can compare and contrast asexual and sexual reproduction. • I can give an example of genetic variation within a species. • I can explain that organisms pass traits from one generation to the next. 					
Learning Indicators of Power Standards					
<p>Students will know...</p> <ul style="list-style-type: none"> • Environmental and genetic factors influence the growth of organisms • Asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation • Genes determine the traits that are passed from parent to offspring • Physical traits are phenotypes that are determined by the genes present in your genotype • It takes two alleles to make a genotype • The difference between a homozygous and a heterozygous genotype 			<p>And be able to...</p> <ul style="list-style-type: none"> • Compare and contrast asexual and sexual reproduction. • Demonstrate that genetic variation occurs within a species. • Explain that organisms pass traits from one generation to the next. • Use a punnett square to determine genetic variation. • Determine the probability of traits passing to an offspring from a parent. 		
Additional Arkansas State Standards					
<ul style="list-style-type: none"> • 6-LS1-4 Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. • 6-LS1-5 Construct a scientific explanation based on evidence for how environmental and genetic factors influence the (physical) growth of organisms. 					

Unit 3	Physical Science: Energy Transfer	Grade Level	6	Approx Length	4 weeks
---------------	-----------------------------------	--------------------	---	----------------------	---------

CPSD Power Standards with Student Learning Objectives

6-PS3-3 Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.

Student-Friendly Objectives:

- I can explain how the properties of a substance affect how heat is transferred.
- I can **design** a device that holds heat in or keeps heat out.
- I can **construct** a device that holds heat in or keeps heat out.
- I can **test** a device that holds heat in or keeps heat out.

Learning Indicators of Power Standards

Students will know...

- Heat always moves from high temperature to low temperature
- Heat transfers: conduction, convection, and radiation
- Energy takes different forms: kinetic and potential, thermal, mechanical, electrical, chemical, nuclear, and electromagnetic (only thermal is assessed)
- The more mass an object has, the more energy it takes to heat it
- Less dense objects rise and more dense objects sink (Convection)
- The difference between heat and temperature
- Every energy transfer involves some degree of heat exchange
- The relationship between changes in thermal energy over time

And be able to...

- Trace the path of energy as it is transferred from one place to another.
- Argue and defend when kinetic energy of an object changes, energy is transferred to or from the object (use empirical evidence in flowcharts, diagrams, motions of objects, and temperature changes).
- Apply design, construction, and testing to minimize or maximize thermal energy transfer (does not include calculations of thermal energy transference.)
- Use appropriate measurement devices for temperature and mass.
- Chart, record, and graph two-variable data (time and temperature).
- Compare and analyze multiple data sets (time and temperature).

Additional Arkansas State Standards

- 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.
- 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.

Unit 4	Earth and Space Science: Water Cycle, Weather, and Climate/Human Impacts	Grade Level	6	Approx Length	14 Weeks
---------------	--	--------------------	---	----------------------	----------

CPSD Power Standards with Student Learning Objectives

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.

6-ESS3-4 Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth’s systems.

Student-Friendly Objectives:

- I can describe and model the water cycle.
- I can provide evidence that Earth’s systems are affected by human population and consumption.
- I can gather data to construct arguments.

Learning Indicators of Power Standards

<p>Students will know...</p> <ul style="list-style-type: none"> • The Earth’s water cycle process that transfers between land, ocean, and atmosphere • The differences between evaporation, condensation, and precipitation. • Global movement of water is powered by the sun and gravity. • The force of gravity is the downward pull of matter. • The role of humans and their impact on the Earth’s systems - hydrosphere, biosphere, atmosphere, and geosphere • Negative impacts on the Earth are comparative to human population and natural resource consumption increases unless activities and technology are engineered to combat those negative impacts • Examples of natural resources-renewable and nonrenewable • Per-capita consumption is affected by population density, socioeconomic status, regional governmental regulations (hunting, water usage, land allocation, etc), technology, proximity to resources, etc 	<p>And be able to...</p> <ul style="list-style-type: none"> • Model how the water cycle is driven by the energy from the sun and gravity. • Describe the role of the sun and gravity in the water cycle. • Provide evidence of human interaction with Earth’s systems and how it has impacted Earth over time (land usage, water usage and pollution). • Use maps, tables, graphs of global and regional temperatures, atmospheric levels of gases such as carbon dioxide and methane, and rates of human activities to determine cause of rise in global temperatures (emphasis: humans’ role).
---	--

Additional Arkansas State Standards

- 6-ESS2-5 Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.
- 6-ESS2-6 Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.
- 6-ESS3-3 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
- 6-ESS3-5 Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.