

Grade 7 Accelerated Science Year at a Glance 2018-2019

Seventh Grade Accelerated Science Year-at-a-Glance <u>ARKANSAS STATE SCIENCE STANDARDS</u>				
<u>Unit 1</u> Physical Science: Matter and Energy	<u>Unit 2</u> Life Science: Cells and Organ Systems	<u>Unit 3</u> Life Science: Growth and Development	<u>Unit 4</u> Life Science: Ecosystems and Human Impact	<u>Unit 5</u> Earth and Space Science: Earth's Place in the Universe
9 weeks	6 weeks	7 weeks	6 weeks	6 weeks
<ul style="list-style-type: none"> ● A7-PS1-5 ● A7-PS1-1 ● A7-PS1-2 ● A7-PS1-6 ● A7-LS1-7 	<ul style="list-style-type: none"> ● A6-LS1-3 ● A6-LS1-1 ● A6-LS1-2 ● A6-LS1-8 	<ul style="list-style-type: none"> ● A6-LS1-5 ● A8-LS3-1 ● A8-LS4-5 	<ul style="list-style-type: none"> ● A7-LS2-3 ● A6-ESS3-3 ● A6-ESS3-4 ● A7-LS2-1 ● A7-LS2-3 ● A7-LS2-4 ● A7-LS2-5 ● A7-PS1-3 	<ul style="list-style-type: none"> ● A8-ESS1-2 ● A8-PS2-4 ● A8-ESS1-1 ● A8-ESS1-3
<u>Recurring</u>				
<ul style="list-style-type: none"> ● A7-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. ● A7-ETS1-2 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. ● A8-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. ● A8-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. ● A8-ETS1-4 Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved. 				

[Unit 1](#)

[Unit 2](#)

[Unit 3](#)

[Unit 4](#)

[Unit 5](#)

Unit 1	Physical Science: Matter and Energy	Grade Level	Accelerated 7	Approx Length	8 Weeks
CPSD Power Standards with Student Learning Objectives					
<p>A7-PS1-5 Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.</p> <p>Student-Friendly Objectives:</p> <ul style="list-style-type: none"> ● I can create a model that distinguishes (similarities/differences) between elements, compounds, and mixtures. ● I can explain the law of conservation of matter. ● I can tell the difference between a physical and chemical change. ● I can demonstrate that regardless of physical/chemical changes that occur, mass is conserved. 					
Learning Indicators of Power Standards					
<p>Students will know...</p> <ul style="list-style-type: none"> ● Distinguishable traits of elements, compounds, and mixtures ● Physical and chemical properties of a substance ● Physical and chemical changes of a substance ● The characteristics of a substance 			<p>And be able to...</p> <ul style="list-style-type: none"> ● Create models of molecules that vary in complexity. ● Make sense of the law of conservation of matter. ● Compare/contrast physical and chemical changes. 		
Additional Arkansas State Standards					
<ul style="list-style-type: none"> ● A7-PS1-1 Develop models to describe the atomic composition of simple molecules and extended structures. ● A7-PS1-2 Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. ● A7-PS1-6 Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes. ● A7-LS1-7 Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism. 					

Unit 2	Life Science: Cells and Organ Systems	Grade Level	Accelerated 7	Approx Length	8 Weeks
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CPSD Power Standards with Student Learning Objectives

A6-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 describe the relationship between the hierarchy of living things.
- 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

<p>Students will know...</p> <ul style="list-style-type: none"> ● Systems in multicellular organisms are made up of smaller parts that perform specific functions but work together in the body(organs) ● How to defend their understandings of interacting subsystems within the body ● How organ systems work with one another ● The body is composed of organs which are made of tissues that contain specialized cells. ● The body's organs are made of four main types of tissue-nervous, muscle, epithelial, and connective. ● Hierarchy of living things(cells, tissues, organs, organ systems) ● The basic function of the cell wall and cell membrane - it is a semi-permeable barrier allowing osmosis and active transport, and cell wall adds support. ● DR I.L. MCSNEER with focus of circulatory, excretory, digestive, respiratory, muscular, and nervous ● How to identify the different organs within a system 	<p>And be able to...</p> <ul style="list-style-type: none"> ● Construct, use and present arguments to support claims on the how a body system of interacting subsystems is composed of group of cells. ● Ranking the levels of organization in living things. ● Demonstrating how materials can move through a membrane. ● Distinguishing between plant and animal cells. ● Communicating evidence discovered in an investigation.
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Additional Arkansas State Standards

- A6-LS1-1 Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers of types of cells.
- A6-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.
- A6-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 3	Life Science: Growth and Development	Grade Level	Accelerated 7	Approx Length	6 Weeks
CPSD Power Standards with Student Learning Objectives					
<p>A6-LS1-5 Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.</p> <p>Student-Friendly Objectives:</p> <ul style="list-style-type: none"> ● I can determine if a population is thriving or declining. ● I can create a scientific argument. 					
Learning Indicators of Power Standards					
<p>Students will know...</p> <ul style="list-style-type: none"> ● Environmental factors such as climate, food abundance, soil conditions, sunlight, ecosystem characteristics, predators, population density ● Genetic factors such as structural adaptations, behavioral adaptations, mutations, natural selection over time ● Growth measures such as population growth or decline, reproduction rate per season, habitat expansion ● Attributes of a scientific explanation 			<p>And be able to...</p> <ul style="list-style-type: none"> ● Measure, document, and evaluate environmental and genetic factors related to organism growth. ● Construct a viable argument. 		
Additional Arkansas State Standards					
<ul style="list-style-type: none"> ● A8-LS3-1 Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism. ● A8-LS4-5 Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms. 					

Unit 4	Life Science: Ecosystems and Human Impact	Grade Level	Accelerated 7	Approx Length	8 Weeks
CPSD Power Standards with Student Learning Objectives					
<p>A7-LS2-3 Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.</p> <p>Student-Friendly Objectives:</p> <ul style="list-style-type: none"> ● I can develop a model that describes the flow of energy within an ecosystem. ● I can develop a model that shows the cycling of matter within an ecosystem. ● I can tell the difference in living and nonliving parts of an ecosystem. 					
Learning Indicators of Power Standards					
<p>Students will know...</p> <ul style="list-style-type: none"> ● How cycling of matter and flow of energy interrelate in ecosystems ● Living and nonliving parts in an ecosystem 			<p>And be able to...</p> <ul style="list-style-type: none"> ● Describe the flow of energy and cycling of matter in an ecosystem. ● Distinguish between living and nonliving parts of an ecosystem. 		
Additional Arkansas State Standards					
<ul style="list-style-type: none"> ● A6-ESS3-3 Apply scientific principles to design a method for monitoring and minimizing human impact on the environment. ● A6-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. ● A7-LS2-1 Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. ● A7-LS2-2 Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. ● A7-LS2-4 Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. ● A7-LS2-5 Evaluate competing design solutions for maintaining biodiversity and ecosystem services. ● A7-PS1-3 Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. 					

Unit 5	Earth and Space Science: Earth's Place in the Universe	Grade Level	Accelerated 7	Approx length	5 Weeks
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CPSD Power Standards with Student Learning Objectives

A8-ESS1-2 Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.

Student-Friendly Objectives:

- I can explain how a planet affects the course of a comet.
- I can demonstrate *why* the planets orbit the Sun.
- I can determine my weight on different planets.

Learning Indicators of Power Standards

Students will know...

- Definitions of gravity, mass, weight, density, force, ellipse, astronomical unit, star, planet, dwarf planet, asteroid, comet
- How density affects gravity
- The order of planets and their relative distances from the Sun and each other along their orbits
- The nature and characteristics of rocky planets versus gas giants
- The probable origins of the asteroid belt and the results of impacts with the surface of other bodies

And be able to...

- Distinguish how the Sun and planets influence the path of an object through the solar system.
- Explain how the motion of the solar system reflects that of the Milky Way and other galaxies.
- Explain how the motion of the solar system is driven by the gravity of the Sun and the mass of the planets.
- Differentiate between mass and weight.

Additional Arkansas State Standards

- A8-PS2-4 Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.
- A8-ESS1-1 Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses or the sun and moon, and seasons.
- A8-ESS1-3 Analyze and interpret data to determine scale properties of objects in the solar system.