

**Science / Accelerated 6
Year At A Glance**

Accelerated 6 Science Year-at-a-Glance
ARKANSAS STATE SCIENCE STANDARDS

<u>Unit 1</u> History of Earth	<u>Unit 2</u> Natural Selection	<u>Unit 3</u> Life Science: Growth, Development, and Reproduction of Organisms	<u>Unit 4</u> Physical Science: Thermal Energy	<u>Unit 5</u> Earth Systems: Water Cycle, Geology, weather, climate
3 weeks	3 weeks	4 weeks	4 weeks	13 weeks
<ul style="list-style-type: none"> ● A7-ESS2-2 ● A7-ESS2-3 ● A7-ESS3-2 ● A8-LS4-1 ● A8-ESS1-4 	<ul style="list-style-type: none"> ● A8-LS4-2 ● A8-LS4-3 ● A8-LS4-4 ● A8-LS4-6 	<ul style="list-style-type: none"> ● A6-LS3-2 ● A6-LS1-4 	<ul style="list-style-type: none"> ● A6-PS3-3 ● A6-PS3-4 ● A6-PS3-5 ● A7-PS1-4 ● A7-PS1-6 ● A7-ETS1-1 ● A7-ETS1-3 ● A7-ETS1-4 	<ul style="list-style-type: none"> ● A7-ESS2-1 ● A7-ESS3-1 ● A6-ESS2-4 ● A7-ESS2-2 ● A6-ESS2-5 ● A6-ESS2-6 ● A6-ESS2-5 ● A7-ESS3-2 ● A7-ETS1-1 ● A7-ETS1-2

Recurring

- **A6-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.
- **A6-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.
- **A6-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.
- **7-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.
- **7-ETS1-2** Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

[Unit 1](#)

[Unit 2](#)

[Unit 3](#)

[Unit 4](#)

[Unit 5](#)

Unit 1	History of Earth	Grade Level	Accelerated 6	Approx Length	3 weeks
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CPSD Power Standards with Student Learning Objectives

A7-ESS3-2 Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.

- Student Friendly Objectives:**
- I can identify what a natural hazard/catastrophic (devastating) event is.
 - I can analyze data to predict future catastrophic events.
 - I can research catastrophic events and technologies that mitigate (weaken) their effects.

Learning Indicators of Power Standards

<p>Students will know...</p> <ul style="list-style-type: none"> • Natural hazards can be interior processes (earthquakes, volcanic eruptions) , surface processes (mass wasting, tsunamis), or severe weather events (hurricanes, tornadoes, floods). • Some natural hazards are predictable (volcanic eruptions, severe weather) and some are unpredictable hazards (earthquakes) • Where different natural hazards are likely to occur and the warning signs of their arrival • Predictive measures in place to warn communities of natural hazards 	<p>And be able to...</p> <ul style="list-style-type: none"> • Collect and present data in a form that can reveal any patterns and relationships. • Organize and interpret data through tabulating, graphing, or statistical analysis to bring out meaning and relevance of data to be used as evidence. • Analyze a design by creating a model or prototype and collecting extensive data on how it performs, including under extreme conditions. • Analyze large data sets and identify correlations.
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Additional Arkansas State Standards

- ESS2-2 Construct an explanation based on evidence for how geoscience processes have changed Earth’s surface at varying time and spatial scales
- ESS2-3 Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of past plate motions.
- LS4-1 Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.
- ESS1-4

Unit 2	Natural Selection	Grade Level	Accelerated 6	Approx Length	3 weeks
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CPSD Power Standards with Student Learning Objectives

A8-LS4-4 Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individual’s probability of surviving and reproducing in a specific environment

Student Friendly Learning Objectives:

- I can predict an individual’s ability to compete for resources based on genetic variation.
- I can discuss how a population will change because of natural selection.
- I can contrast acclimation, adaptation, and evolution.
- I can interpret a graph relating to changes in population size.
- I can use evidence to explain how natural selection affects traits within a population.

Learning Indicators of Power Standards

<p>Students will know...</p> <ul style="list-style-type: none"> • Specific structural and behavioral adaptations of organisms in relation to the environment. • Failure to adapt results in extinction. • Natural selection only happens when there is genetic variation between organisms in a population and variation in the expression of that genetic variation. • Organisms best suited for their environment are more likely to survive and reproduce, making their traits more common in the population. • Natural selection leads to adaptation and is on-going. • Populations change over time due to competition for resources • Adaptation is when the majority of a population is anatomically, behaviorally, and physiologically is best suited for its environment • Changes in environment may result in expansion, decline, or extinction of a species or the emergence of a new species. • Evolution is genetic change within a population over long periods of time; individual organisms do not evolve. • Adaptations are genetically traceable. • Adaptations are for survival are both physical and behavioral. 	<p>And be able to...</p> <ul style="list-style-type: none"> • Use graphical data to account for changes within a population
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Additional Arkansas State Standards

- LS 4-2 Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.
- LS 4-3 Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.
- LS 4-6 Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in population over time.

Unit 3	Life Science: Growth & Development (Sex/Asex)	Grade Level	Accelerated 6	Approx Length	4 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. 					

Unit 4	Physical Science: Thermal Energy	Grade Level	Accelerated 6	Approx Length	4 weeks
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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 5	Earth Systems: Water Cycle, Geology, Weather, Climate	Grade Level	Accelerated 6	Approx Length	13 Weeks
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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.
7-ESS2-1 Develop a model to describe the cycling of Earth’s materials and the flow of energy that drives this process.

Student-Friendly Objectives:

- I can describe and model the water cycle.
- I can describe how the sun drives the water cycle
- I can describe how gravity impacts the water cycle
- I can describe Earth’s materials.
- I can explain the flow of energy that drives Earth’s processes.
- I can develop a model to describe the cycling of Earth’s materials.

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. ● Composition of the Earth ● Processes of the cycling of Earth’s materials <ul style="list-style-type: none"> ○ Melting ○ Crystallization ○ Weathering ○ Deformation ○ Sedimentation ● Arkansas-specific geologic materials: karst, bauxite, diamonds ● All Earth processes are the result of energy flowing and matter cycling within systems with energy derived from the Sun and Earth’s interior 	<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. ● Describe the composition of the Earth. ● Develop a model of the cycling of Earth’s materials: <ul style="list-style-type: none"> ○ Rock cycle ○ Physical and chemical weathering ○ Tectonic plates and activity ○ Energy flow originating from the Sun and Earth’s interior
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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-ESS3-5 Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.
- 7-ESS2-2 Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
- 7-ESS3-1 Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes