Grade 7 Science Year at a Glance 2018-2019

Seventh Grade Science Year-at-a-Glance ARKANSAS STATE SCIENCE STANDARDS			
Unit 1 **Physical Science**	**Unit 2** **Earth and Space Science**	**Unit 3** **Life Science: Cycling of Matter and Energy**	**Unit 4** **Human Impacts**
14 weeks	7 weeks	10 weeks	4 weeks
• **7-PS1-5** • 7-PS1-1 • 7-PS1-2 • 7-PS1-3 • 7-PS1-4 • 7-PS1-6	• **7-ESS2-1** • **7-ESS3-2** • 7-ESS2-2 • 7-ESS2-3 • 7-ESS3-1	• **7-LS2-3** • 7-LS1-6 • 7-LS1-7 • 7-LS2-1 • 7-LS2-2 • 7-LS2-4 • 7-LS2-5	• **7-ESS3-2**
Recurring			
• **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. • **7-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. • **7-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 1	Physical Science	Grade Level	7	Approx length	14 Weeks

CPSD Power Standards with Student Learning Objectives

7-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.

Student-Friendly Objectives:

- I can create a model that describes the law of conservation of mass.
- I can tell the difference between a physical and chemical change.

Learning Indicators of Power Standards

Students will know…	And be able to…
● Distinguishable traits of elements, compounds, and mixtures ● Physical and chemical properties of a substance ● Physical and chemical changes of a substance ● During a chemical reaction, atoms from reactants are combined and rearranged to form new substances ● During a chemical reaction, the total number of each type of atom does not change; mass is conserved	● Compare/contrast physical and chemical changes. ● Create models of molecules that vary in complexity. ● Relate the mass of substances before and after a chemical reaction mathematically. ● Model the law of conservation of matter.

Additional Arkansas State Standards

- 7-PS1-1 Develop models to describe the atomic composition of simple molecules and extended structures.
- 7-PS1-2 Analyze and interpret data on the properties of substances before and after the substances interact to determine of a chemical reaction has occurred.
- 7-PS1-3 Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.
- 7-PS1-4 Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.
- 7-PS1-6 Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.

Unit 2	Earth and Space Science	Grade Level	7	Approx Length	6 Weeks

CPSD Power Standards with Student Learning Objectives

7-ESS2-1 Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.

7-ESS3-2 Analyze and interpret data on natural hazards to forecast future catastrophic events [...](The second half of the standard is covered in Unit 4)

Student-Friendly Objectives:

- 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

Students will know...

- Composition of the Earth
- Processes of the cycling of Earth's materials
  - 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

And be able to...

- Describe the composition of the Earth.
- Develop a model of the cycling of Earth's materials:
  - Rock cycle
  - Physical and chemical weathering
  - Tectonic plates and activity
  - Energy flow originating from the Sun and Earth's interior

Additional Arkansas State Standards

- 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-ESS2-3 Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence on the past plate motions.
- 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.

Unit 3	Life Science: Cycling of Matter and Energy	Grade Level	7	Approx Length	10 Weeks

CPSD Power Standards with Student Learning Objectives

7-LS2-3 Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.

Student-Friendly Objectives:

- 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 demonstrate how conservation of mass is maintained in an ecosystem.

Learning Indicators of Power Standards

Students will know…

- Matter and energy cycle within ecosystems
- Biotic and abiotic parts in an ecosystem
- Structure and components of food chains and webs
  - Producers
  - Consumers
  - Decomposers

And be able to…

- Distinguish between living and nonliving parts of an ecosystem.
- Describe the flow of energy and cycling of matter in an ecosystem.
- Develop a model that illustrates the cycling of matter and flow of energy within an ecosystem.
- Model that matter is cycled and conserved through all processes.

Additional Arkansas State Standards

- 7-LS1-6 Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.
- 7-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 the matter moves through an organism.
- 7-LS2-1 Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
- 7-LS2-2 Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
- 7-LS2-4 Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
- 7-LS2-5 Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

Unit 4	Human Impact	Grade Level	7	Approx Length	3 Weeks

CPSD Power Standards with Student Learning Objectives

7-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

Students will know…	And be able to…
● What a catastrophic event is ● Natural hazards ● Technologies that mitigate natural hazards	● Map the history of natural disasters to make predictions ● Determine the differences between catastrophic events and natural hazards ● Research and interpret data on catastrophic events and mitigating technologies ● Evaluate technology's effectiveness at mitigating natural catastrophic events

Additional Arkansas State Standards

- None