URBANDALE COMMUNITY SCHOOL DISTRICT

Course Title: **SIxth Grade Science**

Description: In sixth grade science the content focus is on Physical, Earth and Life Science. Engineering practices are incorporated throughout the topic areas. Students will:

- Create models that describe particle motion for substances in different states of matter.
- Design a device that releases or absorbs thermal energy.
- Develop a model to describe the function of a cell.
- Conduct an investigation to provide evidence that living things are made of cells.
- Design a model to describe the cycling of Earth's materials.
- Analyze and interpret data on natural hazards to create a mitigation plan.

Physical Sciences (Matter and its Interactions)

Reporting Topic	Grade Level Standards	Competency Statement
Temperature and Particle Movement (#1) (Book J)	• 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. (6-PS1-4)	Students will develop a model that predicts and describes how the movement of particles change when thermal energy is added or removed.
Atomic Composition (#2) (Book J)	• Develop models to describe the atomic composition of simple molecules and extended structures. (6-PS1-1)	Students will develop a model to describe the atomic composition of simple and complex molecules
Chemical Reactions (#3) (Book J)	• Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. (6-PS1-2) **(Endo/Exothermic)** • 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. (6-PS1-5) **(Conservation of matter)** • Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.* (6-PS1-6) **(Cold Pack Project)**	Students will compare the reactants and products of a chemical equation to determine if mass is conserved. Analyze properties to determine if a chemical reaction has occurred.

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LIfe Sciences (Molecules to Organisms)		
Reporting Topic	**Grade Level Standards**	**Competency Statement**
Body Systems #2	• Use arguments supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. (6-LS1-3) • Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. (6-LS1-8)	Students will support how the body is a system of subsystems composed of groups of cells.
Cell Theory #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-LS1-1) • 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-LS1-2)	Students will conduct an investigation to provide evidence that living things are made of cells and describe how cells function.
Inheritance of Traits #4 Unit 3, lesson 1 and 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. (6-LS3-2)	Students will create a model to describe the results of asexual reproduction in regards to genetic variation.
Earth Sciences (Earth's Systems and Human Activity)		
Reporting Topic	**Grade Level Standards**	**Competency Statement**
Natural Hazards (#3) (Book G)	• Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. (6-ESS3-2)	Students will analyze and interpret data to describe and predict natural hazards.
Plate Tectonics (#1) (Book F)	• Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions. (6-ESS2-3) **(Plate Tectonics)** • Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. (6-ESS2-2) **(Earth's Systems)**	Students will analyze data to provide evidence for plate tectonics.

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Rock Cycle	• Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. (6-ESS2-1) **(Rock Cycle)**	Students will create a model of the rock cycle that provides evidence of changes on Earth's surface.
Natural Resources (#2) (Book G)	• 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. (6-ESS3-1)	Students will explain the impact humans have on natural resources and why they are unevenly distributed on Earth.

Engineering (Book A, Unit 1)

Reporting Topics	Grade Level Standards	Competency Statement
Defining Problems	• 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-ETS1-1)	Students will define the criteria and constraints of a design problem taking into account several factors.
Designing Solutions	• Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. (6-ETS1-2)	Students will design solutions using a systematic process to determine how well they meet criteria and constraints.
Evaluating Solutions	• 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-ETS1-3)	Students will evaluate design solutions using a systematic process to determine how well they meet criteria and constraints.
Testing Solutions	• 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. (6-ETS1-4)	Students will develop a model to generate data for testing and modification to achieve optimal design.

Retake options: Video version of labs, two different versions of a CSA, two different model options