

**TREYNOR COMMUNITY SCHOOL DISTRICT
CURRICULUM FRAMEWORK**

Subject:	Science
Course:	Grade 6 Science
Grade Level(s):	6
Prerequisites:	None

Course Description: In sixth-grade science, students engage in the core science ideas of structure of matter and chemical reactions, structure and function of living things, Earth materials and systems, and engineering design. Activities include, but are not limited to, using models, providing arguments with evidence, obtaining and analyzing data about relationships and interactions among observable components of different systems. Students have the opportunity to analyze and interpret data on the properties of substances, develop a model to describe the cycling of Earth’s materials and the flow of energy that drives this process, analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects, and define the criteria and constraints of a design problem to ensure a successful solution.

Examples of sixth graders’ work in science include the following:

- Analyze and interpret data on the properties of substances.
- Develop a model to describe the cycling of Earth’s materials and the flow of energy that drives this process.
- Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
- Define the criteria and constraints of a design problem to ensure a successful solution.

Content Standards: In order that our students may achieve the maximum benefit from their talents and abilities, the sixth graders of the Treynor Community School who demonstrate understanding can . . .

I. Physical Science

1. Matter and Its Interactions

- 1) Develop a model to describe the atomic composition of simple molecules and extended structures.

- 2) Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.
 - 3) 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.
 - 4) 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.
 - 5) Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.
- 2. Motion and Stability: Forces and Interactions**
- 1) Support an argument that the gravitational force exerted by Earth on objects is directed down.
- 3. Energy**
- 1) Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.

II. Life Science

1. From Molecules to Organisms: Structures and Processes

- 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.
- 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.
- 3) Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
- 4) Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.
- 5) 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.

III. Earth and Space Science

1. Earth's Systems

- 1) Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.
- 2) Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

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

2. Earth and Human Activity

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

IV. Engineering, Technology, and Application of Science

1. Engineering Design

- 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 solution.
- 2) Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
- 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 that better meet the criteria for success.
- 4) Develop a model to generate data for interactive testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.