

**TREYNOR COMMUNITY SCHOOL DISTRICT
CURRICULUM FRAMEWORK**

Subject: Science
Course: Grade 8 Science
Grade Level(s): 8
Prerequisites: None

Course Description: Students in eighth grade engage in Science and Engineering Practices and apply Crosscutting Concepts to deepen their understanding of science. Core ideas included in 8th grade include the following: Matter and Interactions, Motion and Stability: Forces and Interactions, Energy and Waves, Ecosystems, Biological Evolution: Unity and Diversity, Earth’s Systems/Earth and Human Activity, and Engineering Design. Your child will have multiple opportunities to demonstrate science learning, including, but not limited to, using models, providing evidence to support arguments, obtaining and analyzing data about relationships and interactions among observable components of different systems.

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

I. Physical Science

1. Waves and Their Applications in Technologies for Information Transfer

- Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.
- Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.
- Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.

II. Life Science

1. Biological Evolution: Unity and Diversity

- 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.

- 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.
- Analyze displays of pictorial data to compare patterns of similarities in the embryo development across multiple species to identify relationships not evident in the fully formed anatomy.
- Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.
- Use mathematics representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.

III. Earth and Space Science

1. Earth's Place in the Universe

- Analyze and interpret data to determine scale properties of objects in the solar system.

2. Earth's Systems

- Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.
- Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.
- 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.

3. Earth and Human Activity

- Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
- Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.
- Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

IV. Engineering, Technology, and Application of Science

1. Engineering Design

- Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principals and potential impacts on people and the natural environment that may limit possible solution.
- Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
- 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 be better meet the criteria for success.
- 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.