

Science: (*Interactive Science*, Pearson)

Middle School students develop understanding of core ideas in the areas of Earth and space sciences, physics chemistry, and life sciences. They build upon previously learned concepts through hands-on exploration of advanced content, application of science and engineering practices, and crosscutting themes.

Science and Engineering Practices:

Ask questions and define problems: Students specify relations between variables, and ask challenging questions

Develop, refine, and use models to describe, test, and predict abstract phenomena and complex design systems

Plan/carry out investigations that use multiple variables; provide evidence to support explanations or solutions

Analyze and interpret quantitative data, distinguishing between correlation & causation; support explanations

Use mathematics and computational thinking to identify patterns in large data sets; apply mathematical statistics

Construct explanations/design solutions supported by multiple source of evidence; support explanations

Engage in arguments from evidence: construct convincing, evidence-based arguments to support/refute theories

Obtain, evaluate, & communicate information: evaluate the merit and validity of ideas and methods; refute claims

Crosscutting Concepts with Other Disciplines:

Patterns; Cause and Effect; Scale, Proportion and Quantity; Systems and System Models; Energy; Structure and Function; Stability and Change

Grade 6 Units of Study: Earth Sciences

Earth's Place in the Solar System

Develop and use models to describe the cyclic patterns and the role of gravity

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

Atmosphere and Hydrosphere

Develop/use models to describe how patterns of atmospheric & oceanic circulation determine regional climates

Use WeatherBug technology to collect data; provide evidence for complex interactions of air masses

Geosphere: Earth's Surface Processes

Construct a scientific explanation based on evidence from rock strata

Determine how geoscience processes have changed Earth's surface

Geosphere: Earth's Internal Processes

Analyze and interpret data to provide evidence of past plate motions

Forecast future catastrophic events and explore the development of technologies to mitigate their effects

Engineering Project: Invention Convention

Use the engineering design process to discover, design, and test solutions to a real world problem

Grade 7 Units of Study: Physical Sciences

Energy and Motion

Apply Newton's Laws to solve problems involving colliding objects

Construct/interpret graphical displays of data; present arguments to support claims related to energy transfer

Gravity and Energy Related to Position

Design and conduct an experiment to provide evidence that fields exist between objects

Develop a model to describe that different amounts of potential energy are stored in a system

Chemical Energy and Reactions

Develop models to describe the atomic composition of simple molecules

Predict changes in particle motion when thermal energy is added or removed

Use the periodic table to predict bonding patterns among elements

Construct, test, and modify a system/device that releases or absorbs thermal energy by chemical processes

Science/Engineering Projects:

Greater San Diego Science and Engineering Fair:

Design and conduct an investigation to discover a solution to a problem found in the world

Model Rocketry:

Apply knowledge of physics to develop a fin design and investigate the effects fin designs have on the flight of a rocket

Grade 8 Units of Study: Life Sciences

Biochemistry

Construct models that describe the biomolecules of life

Cells and Body Systems

Conduct an investigation to provide evidence that living things are made of a cell or cells

Describe the function of a cell as a whole and how parts of cells contribute to the function

Use argument supported by evidence for how the body is a system of interacting subsystems composed of cells

Inheritance and Genetics

Develop and use a model to describe patterns of inheritance

Evidence of Evolution and Natural Selection

Describe how genetic variations of traits increase some individuals' probability of surviving and reproducing

Ecosystems

Evaluate competing design solutions for maintaining biodiversity and ecosystem services

Engineering Projects:

Entrepreneur Project - a STEAM co-curricular project

Expose students to the entrepreneurial world

Learn design thinking and hone engineering practices to create a problem and develop a marketable solution

Present the product and business model to a panel of "prospective investors"

Bridge Building

Hone engineering design practices to build a bridge that can withstand the most vertical weight