

## Seventh and Eighth Grades Science

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**Course Description:** The 7<sup>th</sup> and 8<sup>th</sup> grade science program works on a two year rotation. One year the focus is on life science and the next year the focus is on physical science. Each year begins with a large interdisciplinary project and ends with a unit on earth science.

**Year 1: Physical Science.** We begin the year with a River Study unit. This unit encompasses many different science disciplines. After the river study we will begin the physical science study with a unit on Newton's Laws of Motion and Gravity. As we look at how the law's of motion, gravity, and other forces affect the world we live in the class will take part in several design projects. After these are complete the class will begin an introduction to chemistry. The class will cover the basics of the atomic model, the periodic table, and simple chemical reactions. During this time the class will also review the states of matter and phase change.

### Unit: River Study

**Essential Question:** What are the physical, chemical, and biological components of the First Branch of the White River? How do these factors influence each other?

- Temperature, Velocity, Flow Rate, Substrate
- Dissolved Oxygen, pH,
- Macro-invertebrates, eco-indicator species,

**Essential Questions:** What benefits do humans get from healthy river systems and how do our actions impact the health of a river ecosystem?

- Human uses
- Erosion, Stream Dynamics, and Riparian Buffers
- Point and non-point pollution, algal blooms

### Unit: Physical Science

**Essential Question:** What physical forces govern the movement of objects?

- Newton's Laws of Motion
- Gravity
- Friction

**Essential Question:** How do humans design and build devices to withstand the forces of the physical world?

- Simple Machines
- Mechanical Advantage

- Design projects (egg drop devices, mouse trap powered cars, bridges)

### **Unit: Chemistry**

**Essential Question:** What are the underlying structures of all matter?

- The Atom and sub atomic particles
- Periodic Table of Elements

**Essential Question:** How do elements react and bond to form new substances?

- Chemical Compounds
- Ionic and Covalent bonding
- The amazing water molecule

### **Unit: Earth Science-Weather and Climate**

**Essential Question:** What is in the earth's atmosphere and what role does it play in our weather and climate?

- Layers of the Atmosphere and chemical composition
- Daily weather vs. long term climate patterns
- Greenhouse gases

**Essential Question:** What was the climate like in order for continental glaciers to form and how did those glaciers shape the land around us?

- Changes in sun/earth geometry
- Glacial movement and glacial features

**Essential Question:** How have humans changed the composition of our atmosphere and what affects does this have on our health?

- Ozone Depletion
- Acid Rain
- Air pollution

**Year 2: Life Science.** This year begins with a unit on earth and space science. The students will learn to build a scale model of the solar system. The middle school life science course is designed to give students an introduction to the study of living organisms through a variety of different experiences, including classroom activities, labs, and trips to the surrounding forests and streams. This course is divided into three main life science units (Cell structure and functions, Heredity, Classification). This class ends with a unit on plate tectonics and geology.

### **Unit: The Solar System and Beyond**

**Essential Question:** How is the universe organized? How does earth compare to the rest of the planets in our solar system?

- Universe, Galaxy, Solar System
- Composition of our solar system
- Forces causing motion in the universe
- Scale modeling

**Essential Question:** How does the relationship between the sun and the earth create seasons and long term climate patterns?

- Tilt of Earth and Angle of Solar Incidence
- Solstices and Equinoxes, Significant lines of latitude
- Days and years

### **Unit: Cells**

**Essential Question:** How are you quite similar to a slime mold?

- Commonalities and Characteristics of all living things
- Cell structures
- Osmosis and diffusion

**Essential Question:** What functions do cells perform?

- Cellular Respiration and Photosynthesis
- Mitosis and Meiosis

### **Unit: Heredity and Genetics**

**Essential Question:** Why are you actually quite different than a slime mold?

- Chromosomes, Genes, DNA
- Sexual Reproduction vs. Asexual Reproduction, Mutations
- Physical characteristics

**Essential Question:** How can you predict physical traits of offspring?

- Gregor Mendel and physical traits of pea plants
- Punnet Squares
- Dominant and Recessive alleles

**Unit: Classification:**

**Essential Question:** How do we classify all living organisms?

- Physical Characteristics and Genetics
- System of Classification
- 6 Kingdoms, Invertebrates vs. Vertebrates, 5 classes of Vertebrates

**Essential Question:** What tools can help us identify organisms that are new to us?

- Field Guides, Dichotomous Keys
- Winter Tree Identification

**Unit: Plate Tectonics**

**Essential Question:** What is the internal structure of the earth and what role does the structure play in the movement of plates?

- Inner Core, Outer Core, Asthenosphere, Lithosphere
- Uranium, radioactive decay, and thermal energy
- Convection currents

**Essential Question:** What is the evidence that supports the theory of plate tectonics?

- Shape of continents and location of mountain ranges
- Fossil Records
- Mineral composition of rock
- Age of rock
- Magnetism of rock

**Essential Question:** How do tectonic plates interact and what happens when they do?

- Convergent, Divergent, and Conservation Boundaries
- Mountain ranges, deep ocean trenches, mid-ocean ridges, rift valleys
- Earthquakes, volcanoes, thermal vents