

## **MIDDLE SCHOOL SCIENCE**

The goal of St. Michael School's Middle School Science program is to help students develop a foundation in earth, physical, and life sciences. This is achieved through lectures, activities, small group discussions, debates, current event analyses, and laboratory experiments. Classroom activities are supplemented by readings from the textbook series.

### **Earth and Space Science**

Students will:

- learn the principles of plate tectonics. Specifically, the students will
  - understand that the surface of the earth is in constant movement and that the present features of the earth come from ongoing history
  - differentiate between the layers of the earth including the crust, the mantle, the outer core, and the inner core
  - describe the movements of the crustal plates which lead to both slow (e.g., formation of mountains and ocean basins) and rapid (e.g., earthquakes and volcanoes) changes in the earth's surface
  - recognize the evidence for long-term movement of plates
- understand basic oceanography. Specifically, the student will
  - differentiate between the surface of the ocean, the subsurface land features, and the ocean bottom
  - understand that the composition of seawater is a dilute solution of salts which come from weathering and erosion of continental rocks
  - be able to explain the cause and effects of surface currents, subsurface currents, tides, and waves
- learn the principles of astronomy. Specifically, the student will
  - describe the concept of gravity including Newton's law of universal gravitation
  - learn about the different type of stars, supernovas, black holes, and constellations
  - understand that astronomical distance is measured in light years
  - recognize that the earth is made up of countless galaxies
- understand the history of the Earth. Specifically, the student will
  - explain how fossils are a record of the Earth's history and past life forms and how fossils are formed (molds, casts, trace, petrification, etc.).
  - recognize the organization of geological time including the four major eras and the periods associated with the eras.
  - describe the organisms present in each era and the changing features of the Earth

## Life Science

Students will:

- understand the structure and function of cells. Specifically, the student will
  - recognize that all organisms are composed of cells, and that many organisms are single celled.
  - compare and contrast plant and animal cells including major organelles
  - understand that within cells, many of the basic functions of organism are carried out
  - describe the hierarchical organization of multicellular organisms from cells to tissues to organs to systems to organisms
  
- learn the principles of heredity, cell division and genetics. Specifically, the student will
  - recognize that every organism requires a set of instructions that specifies its traits. These instructions are stored in the organism's chromosomes. Heredity is the passage of these instructions from one generation to another.
  - understand that cell division is the basic process for growth and reproduction
  - differentiate between mitosis (growth and asexual reproduction) and meiosis (sexual reproduction)
  - describe how change occurs from one generation to another: either mutation or mixing of traits through sexual reproduction
  - learn that Gregor Mendel's experiments led to our understanding of dominant and recessive genes
  - discuss our modern understanding of chromosomes and genes

## Physical Science

Students will:

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## Laboratory investigations

Students will:

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### **Science Biographies**

Students will:

- learn about scientists who have been instrumental in our understanding of the world that surrounds us. Efforts are made to place equal emphasis on female scientists and those from a variety of ethnic backgrounds.
  - Marie Curie
  - Lewis Howard Latimer
  - Charles Drew
  - Dr. Daniel Hale Williams
  - Isaac Newton
  - Alfred Wegner
  - Charles Darwin
  - Mary Anning
  - Antoine Lavoisier
  - Lise Meitner
  - Dmitri Mendeleev
  - Rosalind Franklin
  - Francis Crick
  - James Watson
  - Severo Ochoa
  - Barbara McClintock
  - Albert Einstein
  - Dorothy Hodgkin
  - James Maxwell
  - Charles Steinmeitz
  - Elizabeth Blackwell
  - George Washington Carver

### **Materials**

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### **Instruction**

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