

GRADE 8 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.

Life Science

Students will:

- learn the principles of the chemistry of food and respiration. Specifically, students will
 - learn that the energy for most life on earth comes from the sun
 - understand that living cells get their energy through chemical reactions
 - distinguish between the way that plants get energy (photosynthesis) and the way that animals get energy (respiration)
 - develop an in depth understanding of human nutrition and respiration
 - recognize the role of macronutrients (carbohydrates, fats, and proteins) and micronutrients (vitamins and minerals) in the human diet

Physical Science

Students will:

- understand the concepts of motion. Specifically, students will
 - distinguish between velocity and speed
 - recognize the difference between average and constant speed
- learn about forces. Specifically, students will
 - understand force as a push or pull that produces a change in the state of motion of an object
 - discover that an unbalanced force leads to a change in velocity
- study density and buoyancy. Specifically students will
 - understand that all objects, when immersed in a fluid, experience a buoyant force. This buoyant force is an upward force equal to the weight of the fluid displaced by the object
 - learn how to calculate the density of regular and irregular solids from measurements of mass and volume
 - be able to predict whether an object will sink or float
- develop an understanding of work as a relationship between force and distance
- understand the principles of energy. Specifically, students will
 - learn that energy is defined as the ability to do work

- distinguish work from energy (work is the transfer of energy)
 - develop an understanding of kinetic and potential energy
 - be aware that energy is conserved in a system
- learn that power is the relationship between work and time: a measure of work done and the time it takes to do it
- develop a more sophisticated understanding of electricity. Specifically, students will
 - review basic concepts and terms related to electricity
 - understand electricity as a flow of electrons
 - define and apply the concepts related to static electricity
 - learn about flowing electricity and currents
- study the Earth's magnetism
- understand the connection between electricity and magnetism
- learn about electromagnetic radiation and light. Specifically, students will
 - define waves and electromagnetic radiation
 - understand the electromagnetic spectrum
 - differentiate between refraction and reflection
- recognize the general properties of sound waves. Specifically, students will
 - describe wave properties and common features of waves
 - understand the principles of the Doppler effect
 - learn that sound waves and longitudinal, compression waves
 - define sound wave speed, frequency, and amplitude

Laboratory investigations

Students will:

- learn basic laboratory safety
- understand the use of laboratory equipment
- describe and apply the scientific method
- conduct experiments that directly link to topics being taught

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 Steinmetz
- Elizabeth Blackwell
- George Washington Carver

Materials

- Prentice Hall Science Series
 - Cells: Building Blocks of Life
 - Evolution: Change over time
 - Heredity: The Code of Life
 - Chemistry of Matter
 - Matter: Building Block of the Universe
- Material from the world wide web
- Teacher created materials

Instruction

- Classroom lectures
- Group discussions
- Small group presentations
- Science Fair
- Debates
- Laboratory Experiments and Dissections
- Twice monthly current event analyses
- Interactive presentations given by William Anderson of RE-SEED to illustrate principles of physical science

Sources:

E.D. Hirsch Curriculum
 Massachusetts Science and Technology/Engineering Curriculum Framework (2001)

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