MIDDLE COUNTRY CENTRAL SCHOOL DISTRICT
SCIENCE K-12

1. The Middle Country CSD science program provides students with a strong background in the use of scientific method, a thorough grasp of life and physical science content, scientific literacy, an awareness of real-world science connections, and an understanding of science-related career opportunities.

    a. Elementary School Curriculum and major learning objectives, in preparation for the Grade 4 NYS Science Assessment and subsequent science coursework.

        i. Skills

- Students use mathematical analysis, scientific inquiry, and engineering design, as appropriate, to pose questions, seek answers, and develop solutions.
- Students access, generate, process, and transfer information using appropriate technologies.
- Students safely and accurately utilize laboratory tools.
- Students observe, analyze, and report observations of objects and events.
- Students plan, design, and implement short-term and long-term investigations, recording data, and identifying conclusions from their results.

        ii. Content

- Students investigate physical science understandings in the following areas:
    - Scientific Inquiry
    - Measurement
    - Properties and States of Matter
    - Water Exploration
    - Universe
    - Force
    - Electricity and Magnetism
    - Design Technology
    - Density & Buoyancy
    - Geology/Weather
- Students investigate life science understandings in the following areas:
    - Plants
    - Mammals
    - Amphibians, Reptiles, & Fish
    - Insects
    - The Living Environment/Organism Relationships

b. Middle School Curriculum and major learning objectives, in preparation for the Grade 8 NYS Science Assessment and subsequent science coursework.

i. Skills

- Students use mathematical analysis, scientific inquiry, and engineering design, as appropriate, to pose questions, seek answers, and develop solutions.
- Students access, generate, process, and transfer information, using appropriate technologies.
- Students safely and accurately utilize laboratory tools.
- Students develop and use a dichotomous key.
- Students manipulate a compound microscope to view microscopic objects.
- Students, given the latitude and longitude of a location, indicate its position on a map and determine the latitude and longitude of a given location on a map

ii. Content

- The Earth and celestial phenomena can be described by principles of relative motion and perspective.
- Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.
- Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.
- Energy exists in many forms, and when these forms change energy is conserved.
- Energy and matter interact through forces that result in changes in motion.
- Living things are both similar to and different from each other and from nonliving things.
- Organisms inherit genetic information in a variety of ways that result in continuity of structure and function between parents and offspring.
- Individual organisms and species change over time.
- The continuity of life is sustained through reproduction and development.
- Organisms maintain a dynamic equilibrium that sustains life.

- Plants and animals depend on each other and their physical environment.
- Human decisions and activities have had a profound impact on the physical and living environments.

c. High School Curriculum and major learning objectives, in preparation for Regents examinations, AP coursework and examinations, as well as varied elective content and related science coursework.

i. Skills

- Students use chromatography and/or electrophoresis to separate molecules.
- Students design and carry out a controlled, scientific experiment based on biological processes.
- Students determine the relationships among velocity, slope, sediment size, channel shape, and volume of a stream.
- Students determine the changing length of a shadow based on the motion of the Sun.
- Students explain the placement of an unknown element in the Periodic Table based on its properties.
- Students construct, interpret, and use solubility curves to distinguish among saturated, supersaturated, and unsaturated solutions.
- Students construct and interpret graphs of position, velocity, or acceleration versus time.
- Students describe and explain the exchange between potential energy, kinetic energy, and internal energy for simple mechanical systems, such as a pendulum, a roller coaster, a spring, or a freely falling object.

ii. Content

- A wide variety of content to address the spectrum of students' scientific interest. Course-specific content is offered in the following science classes:
  - Regents Living Environment
  - Regents Earth Science
  - Regents Chemistry
  - Regents Physics
  - Science Research
  - Medical Professions
  - Meteorology
  - Astronomy
  - Oceanography

- Environmental Studies
- Marine Studies
- Forensic Science
- AP Biology
- AP Environmental Science
- AP Chemistry
- AP Physics

2. On-line links and resources

a. NYS Science Curricula

- Science P-12: http://www.p12.nysed.gov/ciai/mst/sci/home.html
- Elementary: http://www.p12.nysed.gov/ciai/mst/sci/documents/elecoresci.pdf
- Intermediate (Middle School): http://www.p12.nysed.gov/ciai/mst/sci/documents/intersci.pdf
- Living Environment: http://www.p12.nysed.gov/ciai/mst/sci/documents/livingen.pdf
- Earth Science: http://www.p12.nysed.gov/ciai/mst/sci/documents/earthsci.pdf
- Chemistry: http://www.p12.nysed.gov/ciai/mst/sci/documents/chemist.pdf
- Physics: http://www.p12.nysed.gov/ciai/mst/sci/documents/phycoresci.pdf

b. NYS Next Generation Science Standards (NGSS) website: http://www.p12.nysed.gov/ciai/mst/sci/ngss.html

c. The National Academies Press "A Framework for K-12 Science Education" http://www.nap.edu/catalog/13165/a-framework-for-k-12-science-education-practices-crosscutting-concepts

d. Elementary Resources

- NSTA Science Matters: Tips for Busy Parents http://www.nsta.org/sciencematters/tips.aspx
- PBS Exploring Science http://www.pbs.org/parents/education/science/
- BrainPopJr https://www.brainpopjr.com/science/
- NOAA Education Resources http://www.education.noaa.gov/Special_Topics/Elementary_Science_Resources.php
- NAO Robot Software & Resources https://community.aldebaran-robotics.com/

e. Secondary Resources

- Regents Examination Preparation http://www.regentsprep.org/
- Science News Current Events https://www.sciencenews.org/
- Science Daily Current Events/Research Articles http://www.sciencedaily.com/
- Scientific American Science News/Articles http://www.sciencedaily.com/
- BrainPop https://www.brainpop.com/science/
- Calculate your AP score: http://appass.com/calculators/
- AP Biology Course Home http://apcentral.collegeboard.com/apc/public/courses/teachers_corner/2117.html?excmpid=MTG243-PR-21-cd
- AP Environment Science Course Home http://apcentral.collegeboard.com/apc/public/courses/teachers_corner/2128.html
- AP Chemistry Course Home http://apcentral.collegeboard.com/apc/public/courses/teachers_corner/2119.html?excmpid=MTG243-PR-22-cd
- AP Physics C Course Home http://apcentral.collegeboard.com/apc/public/courses/teachers_corner/2264.html?excmpid=MTG243-PR-34-cd
- Science & Engineering Career Information http://www.sciencebuddies.org/science-engineering-careers