

Melvin Kreps Middle School

Seventh Grade Science

Course Description:

The Seventh Grade science program is composed of integrated science modules which use a hands-on, inquiry based science approach. Students engage in active investigations in physical science, life science, and earth/ environmental science.

Students in grade seven conduct investigations and enhance application of mathematical skills in evaluating and analyzing variables of data. They continue to develop skills of the scientific inquiry process, as they become active learners, engaged in a wide range of activities that allow them to explore and encourage critical thinking. The year begins with a unit devoted to the understanding of weather, both as a process and a means to understanding their everyday world. This unit will continue throughout the year as students maintain an ongoing weather station to gather data and seek explanations for changes in day to day occurrences. In the second quarter, students acquire knowledge of the uses, properties and chemical processes of the small particles that compose matter and describe interactions of matter and energy before moving on to forms of energy, energy transformations, and a concentrated unit on electricity. Life science is the focus in third quarter. They will explore cells and cellular organization, before studying single and multi-cellular organisms. Seventh graders will also conduct in depth study of plants and their processes, followed by a unit devoted to investigating local environmental issues in an attempt to propose possible solutions to environmental dilemmas. Seventh-grade students gain understanding and are able to recognize that technology can create environmental and economic conflicts that affect the quality of life. Students in the seventh grade science course use a constructivist approach to learn about major life groups. Students will enhance study begun in sixth grade on the transfer of energy through the interactions of organisms and the environment. The resulting appreciation of living things and non-renewable/ renewable resources will foster student commitment and sensitivity to environmental protection and issues facing them in the future.

Course Goals:

The goals for this course are that each student will meet the NJCCCS set for proficiency demonstrating an understanding of scientific concepts and process skills. Students should:

- Design and construct conceptual and physical models.
- Look for relationships between structure and function of materials and systems.
- Organize and analyze data from investigations with physical objects and systems.
- Apply mathematics in the context of science.
- Acquire vocabulary associated with topics and investigations.
- Gain confidence in their abilities to solve problems.
- Learn that there is often more than one solution to a problem.
- Communicate ideas to peers and work in a collaborative scientific manner.
- Use scientific thinking processes to conduct investigations and build explanations:
 - observing, communicating, comparing, organizing, and relating.
- When given a problem, plan and conduct experiments in which they apply scientific methods.
- Distinguish between factual statements and inferences.
- Raise questions about objects, events, and processes that can be answered through scientific investigation
- Accept and use scientific evidence to help resolve ecological problems
- Articulate and discuss contrasting viewpoints about current topics and issues in science.

Inherent in the Science curriculum are the following study skills. These skills are not studied in isolation. Rather, it is expected that they will be integrated into curriculum, assessment and instruction.

- Reading for Meaning

- Task Analysis
- Time Management
- Building Vocabulary
- Active Listening Strategies
- Working with Graphs
- Following Directions
- Using Scientific Measuring Tools
- Note taking Strategies
- Working with the Metric System
- Sequencing
- Developing and Testing an Hypothesis
- Categorizing

Projected Units/ Topics

Thinking and Working Like a Scientist (imbedded in the weather unit)

Introduce instructional procedures and methodologies to be used throughout the year

- How does one work safely and effectively with others in the science environment?
- How can scientific processes be used to solve real-world problems?
- How can I answer my own questions?
- What steps might be used to solve a scientific question?
- What is the difference between variables, controls and constants?
- How does a scientist record information?
- How does a scientist make notations?
- How does accuracy in record keeping provide credibility for peer review?
- How can two separate groups of scientists have different conclusions using the same data?
- How can technology be used to display scientific data?
- How can the Internet be used to research scientific discoveries?

Weather and Climate

- Composition of the Atmosphere
- Air Pressure/ Air Quality
- Layers of Atmosphere
- Energy in the Atmosphere
- Winds
- Air masses
- Fronts
- Storms

Resources and Alternate Energy

- Conserving Land/ Soil
- Waste Disposal/ Recycling
- Pollution and Solutions
- Fossil Fuels
- Renewable Energy
- Energy Conservation

States of Matter

- States of Matter
- Mixtures and Solutions
- Physical and chemical properties
- Gas Behavior
- Atoms
- Elements

- Metals, Nonmetals, and Metalloids

Energy Transformations/ Heat

- Forms of Energy
- Energy Transformations
- Energy Conservation
- Temperature and Heat Transfer

Electricity

- Charge and Static Electricity
- Electric Current
- Circuits
- Power
- Electrical Safety

Cells/ Life Processes

- Organization of Living Systems: Cells/Tissues/Organs/Organ Systems
- Cell processes
- Using energy (respiration/ photosynthesis)

Living Things

- Classifying Living Things
- Bacteria and Viruses
- Fungi and Protists

Plants

- Plant Kingdom
- Photosynthesis and Light
- Vascular and Nonvascular Plants
- Seed Plants
- Gymnosperms & Angiosperms
- Plant Technologies

Resources:

- Prentice Hall Science Explorer Texts / on line portal
- Current Science (7/8)
- Scholastic Super Science (6/7)
- Teacher Portal on On-Course (web portal)
- Science Kits/ Materials
- Glencoe on line text/ peripherals Life and Physical Science

Major Student Activities

The seventh grade science course incorporates a wide range of teaching methodologies and authentic assessment strategies that are designed to consistently engage students in their own learning and assessment. These include, but are not limited to:

- demonstrations
- direct instruction /lecture
- small discussion groups
- cooperative learning
- discovery investigations
- interactive notebooks
- learning journals (blogs)

- learning stations
- simulations
- choice boards
- problem based/inquiry learning
- labs and lab reports
- oral/visual presentations
- interactive note-taking
- position essays
- streaming video
- webquests
- scavenger hunts
- field trips/ field journals
- video presentations/ filming

Major Evaluation Strategies:

Assessments are ways to measure what students are learning and alter instruction to accommodate needs and proficiencies. A variety of assessment methods are used to evaluate student understanding.. The science classroom affords teachers generous opportunities to assess pupils authentically as they perform a variety of meaningful tasks. Students will be routinely observed researching and communicating ideas, announcing hypotheses, conducting experiments, gathering and recording data, presenting results, etc. Means of assessment should include:

- Anecdotal records
- Checklists for task/lab completion
- Rubrics
- Formal and informal student observations
- Summative evaluation
- Presentations
- Tests: end of unit or chapter quizzes
- Dialogue, reflection and feedback
- Teacher check lists that document such attributes as:
 - motivation
 - responsibility
 - teamwork
 - positive work habits
 - familiarity/facility with equipment, supplies, specimens, etc.
- Benchmark Assessments
- Projects
- Learning Stations/ small group customized investigations
- Reflective Journals
- Rubric Based Performance Assessments
- Portfolios
- Teacher Observation
- Student Goal Setting Conferences
- Self Assessment
- Peer Assessment

Technology Integration

- Web Portal for Scaffolding
- Webquests
- Scavenger Hunts
- Web Based Mini Units
- WIKIS/ On Line Journals
- Simulations/ Migration on line Tracker
- United Streaming
- Science Explorer On Line Edition & Teacher Resource Components
- Glencoe On Line Text Student Addition & Teacher Resource Components
- NSTA on Line journal & Sci-Links
- Inspiration
- Data Inspire
- flex-cams, digital cameras, microscopes
- Photo-Story 3
- Teacher Tube