SCHOOL DISTRICT OF THE CHATHAMS

Science
Grade 5
Full Year

Course Overview

Students are able to describe that matter is made of particles too small to be seen through the development of a model. Students develop an understanding of the idea that regardless of the type of change that matter undergoes, the total weight of matter is conserved. Students determine whether the mixing of two or more substances results in new substances. Through the development of a model using an example, students are able to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. They describe and graph data to provide evidence about the distribution of water on Earth. Students develop an understanding of the idea that plants get the materials they need for growth chiefly from air and water. Using models, students can describe the movement of matter among plants, animals, decomposers, and the environment and that energy in animals' food was once energy from the sun. Students are expected to develop an understanding of patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. The crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; energy and matter; and systems and systems models are called out as organizing concepts for these disciplinary core ideas. In the fifth grade performance expectations, students are expected to demonstrate grade-appropriate proficiency in developing and using models, planning and carrying out investigations, analyzing and interpreting data, using mathematics and computational thinking, engaging in argument from evidence, and obtaining, evaluating, and communicating information; and to use these practices to demonstrate understanding of the core ideas.

New Jersey Student Learning Standards
The New Jersey Student Learning Standards (NJSLS) can be located at www.nj.gov/education/cccs/2020/.

<u>Physical Science</u>
5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen.
5-PS1-2. Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.
5-PS1-3. Make observations and measurements to identify materials based on their properties.
5-PS1-4. Conduct an investigation to determine whether the mixing of two or more substances results in new substances
5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down.
5-PS3-1. Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.

<u>Life Science</u>
5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water.

5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Earth & Space Sciences
5-ESS1-1. Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.
5-ESS1-2. Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky
5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.
5-ESS2-2. Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.
5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment

Engineering, Technology & Applications of Science
3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Technology Standards
9.4.5.IML.2: Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3).
9.4.5.IML.3: Represent the same data in multiple visual formats in order to tell a story about the data
9.4.5.TL.2: Sort and filter data in a spreadsheet to analyze findings.
9.4.5.TL.3: Format a document using a word processing application to enhance text, change page formatting, and include appropriate images, graphics, or symbols.

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9.2.5.CAP.1: Evaluate personal likes and dislikes and identify careers that might be suited to personal likes.

Career Ready Practices
CRP4. Communicate clearly and effectively and with reason.
CRP5. Consider the environmental, social and economic impacts of decisions.
CRP7. Employ valid and reliable research strategies.
CRP11. Use technology to enhance productivity.

Interdisciplinary Connections
English Language Arts:
Reading
RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
RI.5.7 Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.
RI.5.8 Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s).
RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.

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Writing
W.5.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information.
W.5.7 Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.
W.5.8 Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
W.5.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.

Speaking and Listening
SL.5.5 Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.

Mathematics**:**
5.NBT.A.1 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
5.NBT.A.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
5.NF.B.7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.
5.MD.A.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real-world problems.
5.MD.C.3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
5.MD.C.4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.
5.G.A.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

Units of Study

Unit 1: Structure and Properties of Matter *(~30 days)*
- How can properties be used to identify materials?
- What kind of model would best represent/describe matter as made of particles that are too small to be seen?
- How can properties change when matter is heated or cooled?
- How can matter change when mixed with another substance?

Unit 2: Matter and Energy in Organisms and Ecosystems *(~30 days)*
- How does energy flow through an ecosystem?
- How do organisms in an ecosystem get the materials they need to survive and grow?
- How is the energy obtained from food used by plants and animals?
- How do interactions in the system of plants, animals, decomposers, and the environment allow multiple species to meet their needs?

Unit 3: Space Systems: Stars and the Solar System *(~30 days)*
- What effect does Earth's gravitational force have on objects?

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- What effect does the relative distance from Earth have on the apparent brightness of the sun and other stars?
- What patterns do we notice when observing the sky?

Unit 4: Earth Systems *(~30 days)*
- In what ways do the geosphere, biosphere, hydrosphere, and/or atmosphere interact?
- How do individual communities use science ideas to protect Earth's resources and environment?

Learning Objectives/Discipline Standards of Practice

Learning Objectives:
Physical Science
- Matter can be bulk matter (macroscopic observable matter; e.g., as sugar, air, water).
- Particles of matter are too small to be seen.
- When matter is heated or cooled properties can change
- Properties of materials can be used to identify those materials.

Life Science
- All living things use energy.
- Energy originally comes from the Sun
- Plants the energy they get from sunlight to produce food.
- Some plants can be grown without soil at all.
- The food animals eat is either other animals or plants (or both), to obtain energy for bodily functions and materials for growth and repair

Earth Science
- Components of the Earth's biogeochemical systems include: Geosphere, Hydrosphere, Atmosphere, & Biosphere
- Water on earth can be found in Oceans, Lakes, Rivers, Glaciers, Ground water, Polar ice caps.
- The majority of water on Earth is found in the oceans.
- Most of the Earth's freshwater is stored in glaciers or underground.
- A small fraction of freshwater is found in lakes, rivers, wetlands, and the atmosphere.
- The positive and negative effects on the environment as a result of human activities.
- The sun and other stars are natural bodies in the sky that give off their own light.
- The apparent brightness of a variety of stars, including the sun.
- A luminous object close to a person appears much brighter and larger than a similar object that is very far away from a person
- The apparent motion of the sun from east to west results in patterns of changes in length and direction of shadows throughout a day as Earth rotates on its axis.
- The length of the day gradually changes throughout the year as Earth orbits the sun, with longer days in the summer and shorter days in the winter.
- Some stars and/or groups of stars (i.e., constellations) can be seen in the sky all year, while others appear only at certain times of the year.
- That objects dropped appear to fall straight down.
- That people live all around the spherical Earth, and they all observe that objects appear to fall straight down.

Discipline Standards of Practice:
Science and Engineering Practices
- Plan and Carryout and Investigation
- Asking Questions and Defining Problems

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- Analyzing and Interpreting Data
- Constructing Explanations and Designing Solutions
- Obtaining, Evaluating, and Communicating Information
- Engaging In Argument From Evidence
- Developing and Using Models

Crosscutting Concepts

- Patterns
- Cause and Effect
- Interdependence of Science, Engineering, and Technology
- Influence of Engineering, Technology, and Science on Society and the Natural World
- System and System Models
- Scale, Proportion, and Quantity
- Scientific Knowledge Assumes an Order and Consistency in Natural Systems
- Influence of Engineering, Technology, and Science on Society and the Natural World
- Connections to Nature of Science
- Science is a Human Endeavor

Instructional Resources and Materials
Whole class resources have been identified with an asterisk.

Resources

- Discovery Education
- Generation Genius

Materials

- Science Notebook

Assessment Strategies
Assessment is designed to measure a student's mastery of a course standard and learning objective. Assessment can be used for both instructional purposes (formative assessment) and for evaluative purposes (summative assessment).

The following is a general list of the many forms assessment may take in learning.

- Science journals
- Investigations
- Class discussions
- Claim, evidence, reasoning

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