

Shrewsbury Borough School District
Science Curriculum Guide
Grade 5
2015/ revised 2016

Mission Statement:

The mission of the Shrewsbury Borough School District, a system built on successful cooperation among family, school and community, is to prepare all students to achieve excellence and to become responsible citizens through rigorous educational programs consistent with New Jersey Core Content State Standards and which respect individual differences and diversity. Students will be prepared to meet the challenges presented in the regional high school and the world beyond.

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Approved by Shrewsbury Borough Board of Education:
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Implementation: September 2015

Course Philosophy

The performance expectations in fifth grade help students formulate answers to questions such as: “When matter changes, does its weight change? How much water can be found in different places on Earth? Can combining other substances create new substances? How does matter cycle through ecosystems? Where does the energy in food come from and what is it used for? How do lengths and directions of shadows or relative lengths of day and night change from day to day, and how does the appearance of some stars change in different seasons?” Fifth grade performance expectations include PS1, PS2, PS3, LS1, LS2, ESS1, ESS2, and ESS3 Disciplinary Core Ideas from the NRC Framework. 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, and communicating information; and to use these practices to demonstrate understanding of the core ideas.

Course Description

The grade five integrated science curriculum is driven by the Next Generation Science Standards. Each performance expectation has three dimensions: disciplinary core ideas, scientific and engineering practices, and crosscutting concepts. The disciplinary core ideas describe existing scientific knowledge. The science and engineering practices describe how to engage in scientific inquiry. The crosscutting concepts provide a framework for connecting scientific knowledge. The four units of study, which consist of *Living Things and Ecosystems*, *Earth Systems*, *Changes in Matter*, and *Earth, the Moon, and the Stars*, integrate three strands of Science: Earth Science, Life Science, and Physical Science. Students will be guided to develop an understanding of the role of decomposers, consumers, and producers in a healthy ecosystem. They study the geosphere, hydrosphere, atmosphere, and biosphere and learn how these systems interact. They develop models to examine patterns caused by the relative positions of Earth and the sun, and identify matter as particles of matter too small to be seen.

Scope and Sequence	
Course Title: Bring Science Alive! - Exploring Science Practices	Grade Level: 5

Unit 1- Living Things and Ecosystems	September - October
Unit 2 - Changes in Matter	November - January
Unit 3 - Earth Systems	February - April
Unit 4 - Earth, the Moon, and the Stars	May - June

Unit 1 Overview

Unit Title: Living Things and Ecosystems

Grade Level: 5

Recommended Pacing: 2 months - **block scheduling**

Unit Summary:

In a forest, you may see trees, birds, insects, ferns, moss, and mushrooms. Some things may be hidden from view like earthworms. All living things, or organisms, live in an ecosystem. An ecosystem includes all the plants and animals, as well as nonliving things, in one area. In this unit, you will read about ecosystems and how they function. You will learn how organisms interact with each other and with nonliving things to meet their needs.

Unit 1 NGSS:

5-PS3.Energy

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.

5-LS1. From Molecules to Organisms: Structures and Processes

5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water.

5-LS2. Ecosystems: Interactions, Energy, and Dynamics

5-LS2-a. Construct and use models of food webs to describe the transfer of matter among plants, animals, decomposers and the environment, and discuss the limitations of these models.

5-LS2-d. Ask questions about what organisms obtain from the environment and what they release back as waste matter into the environment.

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

5-ESS3.Earth and Human Activity

5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

3-5-ETS1. Engineering Design

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

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.

CCSS- ELA/Literacy

- RI.5.1 - Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
- RI.5.9 – Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.
- W.5.1 – Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

Math

- MP.2 – Reason abstractly and quantitatively.
- MP.4 – Model with mathematics.
- MP.5 – Use appropriate tools strategically.
- 5.MD.A.1 – Convert among different-sized standard measurement units within a given measurement system and use these conversions in solving multi-step, real world problems.

Unit 1 ISTE Standards:

1. a-d Creativity and Innovation- Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes through technology.
2. a-d Communication and Collaboration- Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
3. a-d Research and Information Fluency- Students apply digital tools to gather, evaluate, and use information.
4. a-d Critical Thinking, Problem Solving, and Decision Making- Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

Unit 1 Essential Questions:

What is an ecosystem?

What is the role of producers in an ecosystem?

What is the role of consumers in an ecosystem?

What is the role of decomposers in an ecosystem?

How do matter and energy move in an ecosystem?

What makes an ecosystem healthy or unhealthy?

How do ecosystems change?

How do humans change ecosystems?

Unit 1 Learning Targets

Students will be able to...

- use models to describe a phenomenon that includes the idea that energy in animals' food was once energy from the sun
- identify and describe the relevant relationships between plants, animals and energy
- use the models to describe causal accounts of the relationships between energy from the sun and animals' needs for energy

Unit 1 Learning Targets

Students will do...

- read for content mastery
- develop and use content related vocabulary
- analyze and interpret data to determine similarities and differences in findings
- cite specific textual evidence to support analysis of science and technical texts

<ul style="list-style-type: none"> ● identify a claim which includes the idea that plants acquire the materials they need for growth chiefly from air and water ● use reasoning to connect the evidence to support the claim with argumentation ● develop a model to describe a phenomenon that includes the movement of matter within an ecosystem identifying relevant components, including: matter, plants, animals, decomposers, and the environment ● describe the relationships among those components ● use the model to describe: the cycling of matter in the system, how interactions allow multiple species to meet their needs, how newly introduced species can affect the balance of interactions, and how changing an aspect will affect other aspects of the ecosystem 	<ul style="list-style-type: none"> ● complete a variety of laboratory activities to support the content ● write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization and analysis of relevant content ● view various content related videos
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Unit 1 Evidence of Learning
<p><u>Formative Assessments:</u></p> <ul style="list-style-type: none"> ● Associated tests/quizzes ● Exit tickets ● Labs and engineering based projects ● Homework

- Brain POP quizzes
- Reading Challenges
- Participation: individual and group
- Interactive Science notebook

Summative Assessments:

- Associated tests and quizzes
- Develop a model of a food chain and a food web with at least 5 pieces including the sun, a producer, consumers, and a decomposer which includes a written explanation of how matter and energy move through these models
- Lab work and engineering based projects

Lab Activities:

- owl pellet dissection
- explore the Conservation of Matter by completing an investigation of the mixing of sugar and yeast
- design a soilless farming system; observe results and provide improvements
- Bio domes Engineering Design Project
- Gizmos labs: Cell Energy Cycle; Plants & Snails; Energy Conversions; Food Chains; Forest Ecosystem; Prairie Ecosystem

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Unit 1 Materials/Equipment:

Required Lab Materials: forceps, owl poster, owl pellets, toothpicks, balloons, paper cups, graduated cylinders (100 mL), plastic spoons, sugar, triple beam balance, yeast, paper clips (large), yarn, bags (plastic sandwich size), cloth (cotton), containers (plastic, 1 & 2 liter with caps), craft sticks, filters (coffee), plates (paper), seeds from different climates including lima beans, sponges, safety glasses, disposable gloves, disinfectant wipes, masking tape, paper towels, water bottles with caps (500 mL), yellow construction paper, clear tape, soil, sand, pebbles, rocks, wire, plastic wrap, string, chopsticks

Materials/Equipment/Resources:

Gizmos subscription, Quizlet subscription, and Brain POP subscription

Teachers Domain video clips: www.nj.pbslearningmedia.org Biomes; Biome in a Bag; Biome in a Baggie; Virtual Field Trip: Wild Biomes; Where Creatures Live Exploration activity; Effects of Environmental Change Investigation activity; What is Biodiversity; Indicator Species; associated Biome videos

Mr. Parr's science songs: Ecosystems Song; My Biome Song

TCI [Bring Science Alive!](#) Grade 5

Smart Board, student Chrome books

Hydroponics kit

Virtual Owl Pellet dissection – www.kidwings.com

Learn How Early Aztec Chinampas Were the Precursor to Hydroponics

<http://www.history.com/videos/aztec-ingenuity#aztec-ingenuity>

Free wildlife photos and videos www.arkive.org

Animal Universe Game www.iknowthat.com/com/L3?Area=Habitats

Build an Online Habitat <http://swichzoo.com/games/habitatgame.htm>

How to Set Up a Terrarium <http://www.carolina.com/teacher-resources/Video/how-to-set-up-a-terrarium-video/tr11209.tr>

Collection of Sites: PBS Learning Media, Study Jams, Bill Nye, Discovery, Etc.

<http://www.watchknowlearn.org/Category.aspx?CategoryID=2309>

Collection of Resources on Plants http://www.internet4classrooms.com/science_elem_plants.htm

Kids Do Ecology <http://kids.nceas.ucsb.edu/biomes/indes.html#terrestrial>

NASA Mission: Biomes <http://earthobservatory.nasa.gov/Experiments/Biome/index.php>

Biomes <http://www.ucmp.berkeley.edu/glossary/gloss5/biome/>

Virtual Lab: Energy Pyramid http://www.mhhe.com/biosci/genbiio/virtula_labs/BL_02/BL_02.html

Simulations <http://phet.colorado.edu/en/simulations/category/by-level/elementary-school>

Interactive Food Web http://www.harcourtschool.com/sctivity/food/food_menu.html

Webcams, Animal Guides, Activities <http://www.montereybayaquarium.org/animas-and-experiences>

Articles, Webcams, Interactive Activities <http://nationalzoo.si.edu/education/>

Oregon Zoo <http://www.oregonzoo.org/discover/animals>

Conservation <http://www.worldwildllife.org/places>

New Jersey Endangered and Threatened Wildlife <http://www.state.nj.us/dep/fgw/tandespp.htm>

Interactive Activity <http://www.sheppardsoftware.com/content/animals/kidscorner/games/foodchaingame.htm>

NJ Osprey Population Data http://www.conservewildlifenj.org/downloads/cwnj_320.pdf

Modeling Interdependence <http://concord.org/stem-resources/experiment-ecosystems>

Virtual Ecosystem <http://concord.org/stem-resources/virtual-ecosystem>

Teacher Guide for Virtual Ecosystem

http://concord.org/sites/default/files/projects/er/materials/TeacherGuide_Activity10-TXMO-final.pdf

Effect of Climate on Ecosystems <http://concord.org/stem-resources/variations-and-adaptations>

Use a Model to Study the Effect of Competition <http://concord.org/stem-resources/competition>

Performance Tasks grades 5-8 <http://pals.sir.com/tasks/tasks5-8.html>

