Grade 5 Science Course Overview Copied from: Science, Copied on: 08/31/22

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Cover

EAST BRUNSWICK PUBLIC SCHOOLS

East Brunswick New Jersey

Superintendent of Schools

Dr. Victor P. Valeski

Science

Science Grade 5

Course Number: 4105

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Course Overview

The K-12 science curriculum in all schools in New Jersey must be aligned with the New Jersey Student Learning Standards. These standards focus on the processes of science as well as content in three major areas: earth, life and physical science. Each of these areas of science needs to be addressed at every grade level in order to foster a strong science knowledge base for students as well as an appreciation and understanding of how science works to help people solve problems.

One of the strong points of the East Brunswick Schools' science curriculum is the emphasis on hands-on investigations of the natural world. Our science program emphasizes doing science, not reading about it in a book. The fifth grade science curriculum consists of three modules that were selected from two nationally-recognized programs – ***Full Option Science System (FOSS)*** and ***Science and Technology for Children (STC)***. The earth/environmental science unit is ***Ecosystems (STC)*** which focuses on ecological systems and how they function. The life science unit is ***Microworlds (STC)*** which introduces students to the study of microscopic organisms. The physical science unit is ***Levers and Pulleys (FOSS)*** which allows students to experiment with simple machines and how they work.

In addition to these science kits, the fifth grade curriculum includes two units of study that were developed by the teachers in the district. The ***Trashpower*** unit was developed to give students an understanding of how society deals with the waste and pollution that it generates from the activity of humans. The unit is particularly appropriate in this district because, not only do the students live in the most densely populated state in the nation, but the town itself is host to one of the largest sanitary landfills in the state (Edgeboro). The second unit is ***Rocketry***. Students investigate the science behind the operation of rockets (Newton's Laws). They construct and launch model rockets as the culminating activity of the unit.

Textbooks and other resources

Delta FOSS Levers & Pulleys, 2nd Edition, Copyright 2005

TG Foss Levers & Pulleys

Carolina STC Ecosystems, 3rd Edition, Copyright 2013

Carolina STC Microworlds, 2nd Edition, Copyright 2004

Standards

SCI.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.
SCI.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.
SCI.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.
SCI.5-ESS2-1	Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.
SCI.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.
SCI.5-ESS3-1	Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.
SCI.5-LS1-1	Support an argument that plants get the materials they need for growth chiefly from air and water.
SCI.5-LS2-1	Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.
SCI.5-PS1-1	Develop a model to describe that matter is made of particles too small to be seen.
SCI.5-PS2-1	Support an argument that the gravitational force exerted by Earth on objects is directed down.
SCI.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-PS1-3	Make observations and measurements to identify materials based on their properties.
5-PS1-4.3.1	Conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered.
5-PS1-3.PS1.A.1	Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation.)
5-PS2-1.7.1	Support an argument with evidence, data, or a model.

Grade 5 Science Planning Guide

Instructional Objectives	Instructional Activities/ Methods/Assignments
Unit 1: Microworlds be able to: • Determining which of various objects	**Unit 1: Microworlds** **Lesson 1:** Pre-unit Assessment: Observing a Penny

can magnify • Using magnifiers to observe living and non-living specimens • Using appropriate equipment and techniques to prep microscope slides for viewing	(T.G. pps.3-8) • Teacher assesses prior knowledge of magnifiers • Students set up a notebook to record their observations and ideas • Students learn to use hand magnifiers • Students discover something new in an everyday object
Unit 1: Microworlds, cont'd.	**Unit 1: Microworlds, cont'd.**
• Using a microscope to observe basic cell structure • Communicating detailed observations through writing, drawing and discussion • Making measurements of small objects, using hair-widths and millimeters • Exploring ways to slow movement of living microscopic specimens for closer observation	**Lesson 2:** Communicate Your Observations (T.G. pps.9-14) • Students have more practice making detailed observations • Students record their observations in both words and sketches
Unit 1: Microworlds,	

cont'd. • Using a microscope to observe basic cell structure • Communicating detailed observations through writing, drawing and discussion • Making measurements of small objects, using hair-widths and millimeters • Exploring ways to slow movement of living microscopic specimens for closer observation	**Unit 1: Microworlds, cont'd.** **Lesson 3:** Learning About Lenses (T.G. pps. 15-20) • Students experiment with different shapes to see which magnifies • Students discover the properties common to all objects that act as magnifiers
Unit 1: Microworlds, cont'd. • Using a microscope to observe basic cell structure • Communicating detailed observations through writing, drawing and discussion • Making	

measurements of small objects, using hair-widths and millimeters • Exploring ways to slow movement of living microscopic specimens for closer observation **Unit 1: Microworlds, cont'd.** • Using a microscope to observe basic cell structure • Communicating detailed observations through writing, drawing and discussion • Making measurements of small objects, using hair-widths and millimeters • Exploring ways to slow movement of living microscopic	**Unit 1: Microworlds, cont'd.** **Lesson 4:** Learning About Lenses: (T.G. pps. 21-24) • use lenses to explore several common objects • review the properties of magnifying lenses

specimens for closer observation	
Unit 1: Microworlds, cont'd.	**Unit 1: Microworlds, cont'd.**
• Using a microscope to observe basic cell structure • Communicating detailed observations through writing, drawing and discussion • Making measurements of small objects, using hair-widths and millimeters • Exploring ways to slow movement of living microscopic specimens for closer observation	**Lesson 5:** Learning to Use the Microscope (T.G. pps. 25-30) • Students acquire background information about the microscope • Students learn the function of the parts of the microscope and how to adjust th
Unit 1: Microworlds, cont'd.	**Unit 1: Microworlds, cont'd.**
• Using a microscope to	

observe basic cell structure • Communicating detailed observations through writing, drawing and discussion • Making measurements of small objects, using hair-widths and millimeters • Exploring ways to slow movement of living microscopic specimens for closer observation	**Lesson 6:** Practicing with the Microscope: (T.G. pps. 31-36) • Students continue practicing using microscopes • Students make detailed and careful observations of black and white newsprint dots that create images
Unit 1: Microworlds, cont'd.	**Unit 1: Microworlds, cont'd.**
• Using a microscope to observe basic cell structure • Communicating detailed observations through writing, drawing and discussion • Making measurements of small objects, using hair-widths and	**Lesson 7:** Field Of Vision: (T. G. pps. 37-42) • Students demonstrate an under-standing of field of view by measuring object u

millimeters • Exploring ways to slow movement of living microscopic specimens for closer observation **Unit 1: Microworlds, cont'd.** • Using a microscope to observe basic cell structure • Communicating detailed observations through writing, drawing and discussion • Making measurements of small objects, using hair-widths and millimeters • Exploring ways to slow movement of living microscopic specimens for closer observation **Unit 1: Microworlds, cont'd.**	**Unit 1: Microworlds, cont'd.** **Lesson 8:** Preparing Slides (T.G. pps. 43-53) • Preparing wet mount and well slides • Students learn to focus up and focus down with microscopes

• Using a microscope to observe basic cell structure • Communicating detailed observations through writing, drawing and discussion • Making measurements of small objects, using hair-widths and millimeters • Exploring ways to slow movement of living microscopic specimens for closer observation	**Unit 1: Microworlds, cont'd.**
Unit 1: Microworlds, cont'd. • Using a microscope to observe basic cell structure • Communicating detailed observations through writing, drawing and discussion • Making	**Lesson 9:** What Is It? (T.G. pps. 49-54) • Identify an unknown specimen due to observations • Application of viewing skills of 3-D objects under microscope • Proper well slide preparation

measurements of small objects, using hair-widths and millimeters • Exploring ways to slow movement of living microscopic specimens for closer observation	
Unit 1: Microworlds, cont'd. • Using a microscope to observe basic cell structure • Communicating detailed observations through writing, drawing and discussion • Making measurements of small objects, using hair-widths and millimeters • Exploring ways to slow movement of living microscopic specimens for closer observation	**Unit 1: Microworlds, cont'd.** **Lesson 10** Exploring Common Objects (T. G. pps. 55-60) • Students make discoveries as they make observations • Practice preparing slides of different types • Perfect light adjustment and focusing techniques with microscopes

Unit 1: Microworlds, cont'd. • Using a microscope to observe basic cell structure • Communicating detailed observations through writing, drawing and discussion • Making measurements of small objects, using hair-widths and millimeters • Exploring ways to slow movement of living microscopic specimens for closer observation	**Unit 1: Microworlds, cont'd.** **Lesson 11:** Looking Inside an Onion (T.G. pps 61-66) • Students examine and explore the internal structure of an onion • Students observe and describe the cells of an onion
Unit 1: Microworlds, cont'd. • Using a microscope to observe basic cell structure • Communicating	

detailed observations through writing, drawing and discussion • Making measurements of small objects, using hair-widths and millimeters • Exploring ways to slow movement of living microscopic specimens for closer observation	**Unit 1: Microworlds, cont'd.**
Unit 1: Microworlds, cont'd. • Using a microscope to observe basic cell structure • Communicating detailed observations through writing, drawing and discussion • Making measurements of small objects, using hair-widths and millimeters • Exploring ways to slow movement	**Lesson 12** Looking at Living Things: Volvox (T.G. 67-70) • Students learn the best way to handle living creatures and prepare slides for th • Students use microscope to observe microscopic creatures

of living microscopic specimens for closer observation	
Unit 1: Microworlds, cont'd.	**Unit 1: Microworlds, cont'd.**
• Using a microscope to observe basic cell structure • Communicating detailed observations through writing, drawing and discussion • Making measurements of small objects, using hair-widths and millimeters • Exploring ways to slow movement of living microscopic specimens for closer observation	**Lesson 13** Looking At Living Things: Blepharisma (T.G. pps. 71-74) • Students practice using microscope skills on living organisms • Students recognize individual microbes on slides • Students observe an organism reproducing by binary fusion
Unit 1: Microworlds, cont'd.	**Unit 1: Microworlds, cont'd.**
• Using a microscope to	

observe basic cell structure • Communicating detailed observations through writing, drawing and discussion • Making measurements of small objects, using hair-widths and millimeters • Exploring ways to slow movement of living microscopic specimens for closer observation	**Lesson 14** Looking At Living Things: Vinegar Eels (T.G. pps. 75-78) • Students use microscope skills to observe a very fast moving organism • Students experiment with methods to slow down the Vinegar Eel
Unit 2: Levers and Pulleys **Investigation 1:** **Levers** The be able to: • Gain experience constructing and using levers.	**Unit 1: Microworlds, cont'd.** **Lesson 15**

• Learn the concepts of lever arm, fulcrum, load and effort. • Experience one advantage that can be gained by using a lever-reduced effort. **Unit 2: Levers and Pulleys, cont'd.** **Investigation 1:** **Levers** • Collect organize and analyze data from lever experiments • Use scientific thinking processes to conduct investigations and build explanations: observing, communicating, comparing, organizing, and	Looking at Living Things: Hay and Grass Infusions (T.G. pps.79-82) • Students discover that microbes have developed in the grass and hay infusion • Students record their discoveries • Teacher evaluates individual student progress **Unit 1: Microworlds, cont'd.** **Lesson 16** Looking at Living Things: Hay and Grass Infusions 2 (T. G. pps. 83-86) • Students observe in greater detail microbes • Students make more completed and detailed records of observations • Teacher evaluates the student's progress

relating. Review for Summative Assessment Summative Assessment **Unit 2: Levers and Pulleys, cont'd.** **Investigation 1:** **Levers** • Collect organize and analyze data from lever experiments • Use scientific thinking processes to conduct investigations and build explanations: observing, communicating, comparing, organizing, and relating. Review for Summative Assessment Summative Assessment **Investigation 2**	**Unit 1: Microworlds, cont'd.** **Lesson 17** Post Unit Assessment (T. G. pps. 87-88)

More Leverage • Learn to identify Class 1, 2, and 3 levers. • Diagram levers to show. placement and the direction of the load effort. • Analyze common tools in terms of levers. • Analyze pictures of tools in terms of levers	
Investigation 2 **More Leverage, cont'd.**	**Unit 2: Levers and Pulleys**
• Use scientific thinking processes to conduct investigations and build explanations:	**Investigation 1:** **Levers**

observing, communicating, comparing, organizing and relating.	**Part 1** **Introduction to Levers** • Develop a sense of how levers work • Vocabulary • Learn how to use a spring scale
Investigation 2 **More Leverage, cont'd.**	
• Use scientific thinking processes to conduct investigations and build explanations: observing, communicating, comparing, organizing and relating.	**Unit 2: Levers and Pulleys, cont** **Investigation 1:** **Levers**

Investigation 2 **More Leverage, cont'd.**	**Part 2** **Lever Experiment A** • Conduct experiment • Discover relationship between load, fulcrum and effort • Gather and graph data.
• Use scientific thinking processes to conduct investigations and build explanations: observing, communicating, comparing, organizing and relating.	**Unit 2: Levers and Pulleys, cont** **Investigation 1:** **Levers** **Part 3** **Lever Experiment B**

Investigation 2 **More Leverage, cont'd.**	• Conduct experiment • Discover relationship between load, fulcrum and effort • Gather and graph data.
Review for Summative Assessment	
Summative Assessment	

Investigation 2

More Leverage

Part 1: Lever Classes

- Explore arrangements of the fulcrum, effort and load on the lever arm.
- Classify levers

Investigation 3: **Pulleys** • Assemble and investigate one- and two-pulley systems. • Learn vocabulary associated with the pulley systems. • Discover the advantages of using pulley: • Diagram pulley systems.	**Investigation 2** **More Leverage, cont'd.** **Part 2: Lever Diagrams** • Use each class lever.
Investigation 3:	

Pulleys, cont'd. • Use scientific thinking processes to conduct investigations and build explanations: observing, communicating, comparing, organizing, and relating.	**Investigation 2** **More Leverage, cont'd.**
Investigation 3: **Pulleys, cont'd.** • Use scientific thinking processes to conduct investigations and build explanations: observing, communicating,	**Part 3:** **Real World Levers** • Investigate tools and determine lever class.

comparing, organizing, and relating.	
Investigation 4: Pulleys at Work • Investigate pulley systems with one and two pulleys • Discover the relationship between the number of ropes pulling on a load and the effort required to pull a load • Record and compare the distance moved by the load and the effort in four different pulley systems	**Investigation 2** **More Leverage, cont'd.** **Part 4:** **Lever Pictures** • Analyze pictures and identify lever class.

Investigation 4: Pulleys at Work, cont'd. • Using scientific thinking processes to conduct investigations and building explanations: observing, communicating, comparing, organizing, and relating	**Investigation 2** **More Leverage, cont'd.**
Investigation 4: Pulleys at Work, cont'd. Review for Summative Assessment Summative Assessment	

Unit 3: Ecosystems • Students record and discuss their thoughts about how living things depend on each other. • Students observe and discuss a riverbank environment	**Investigation 3:** **Pulleys** **Part 1: One-Pulley** **Systems** • Set up one-pulley system • Quantify and compare effort.

Unit 3: Ecosystems, cont'd. • Students share what they know about a terrestrial environment • Students think about the terraria and aquaria as models of environments • Students set up their terraria • Students make detailed records about items they have placed in their terraria • Students predict what will happen in their terraria in the next week	**Investigation 3:** **Pulleys, cont'd.** **Part 2: Two-Pulley Systems** • Investigate two pulleys used together • Diagram 4 pulley systems

Unit 3: Ecosystems, cont'd. • Students discuss the needs of organisms in an aquatic environment • Students set up their aquaria by adding gravel, water, elodea, duckweed, and algae • Students observe, quantify, and record information about the organisms they place in their aquaria	**Investigation 3:** **Pulleys, cont'd.** **Part 3: Pulley Game** • Play game setting up different pulley systems • Review pulleys systems from previous lessons
Unit 3: Ecosystems, cont'd. • Students discuss the needs of organisms in an aquatic environment • Students set up their aquaria by adding gravel,	

water, elodea, duckweed, and algae • Students observe, quantify, and record information about the organisms they place in their aquaria	
	Investigation 4: Pulleys at Work
Unit 3: Ecosystems, cont'd.	**Part 1: Effort in Pulley Systems**
• Students discuss information on aquatic plants and algae gained through observation and reading • Students complete their aquaria by adding mosquito fish and snails • Students continue to record their observations of plants, algae, and animals in their aquaria and plants in their terraria	• Predict the effort required to lift the load • Identify the direction of the effort • Students collect data systematically for analysis

	Investigation 4: Pulleys at Work, cont'd.
Unit 3: Ecosystems, cont'd. • Students discuss what they have read and observed • Students offer evidence of dependent and interdependent relationships in their ecosystems • Students predict what changes might occur in both their aquaria and terraria • Students read about germination	**Part 2: Measuring Distance** • Determine the relationship between the mechanical advantage and the distance **Investigation 4: Pulleys at Work, cont'd.** **Part 3: Choosing Your Own Investigation** • Students investigate and design a lever or a pulley system
Unit 3: Ecosystems, cont'd.	

• Students continue to observe plant growth in their terraria • Students make observations and record descriptions of the animals they add to their terraria • Students identify and record similarities and differences between crickets and isopo	
Unit 3: Ecosystems, cont'd.	**Unit 3: Ecosystems**
• Students continue to discuss their concepts of the word 'ecosystem' • Through reading, students learn more about crickets and isopods	**Lesson 1: Pre-Unit Assessment: Thinking about Ecosystems** Students will use student investigation booklet pp. 3-5 Students will discuss food chains, food webs, and energy flow in the riverbank comm

Unit 3: Ecosystems, cont'd. • Students discuss their terrestrial and aquatic ecosystems from observations and readings • Students explore food chains and consider the impact organisms have on one another • Students create a web of their terrestrial ecosystems and compare it with Lesson 5's aquatic web **Unit 3: Ecosystems, cont'd.** • Students predict how one ecosystem might influence the other	**Unit 3: Ecosystems, cont'd.** **Lesson 2: Setting Up the Terrarium** Observe materials using an observation table Students fill out table of what will be in the terrarium Students build their terrarium Students fill out diagram MAKE 3 CLASS CONTROL MODELS FOR EACH CLASS YOU TEACH (THES

Unit 3: Ecosystems, cont'd. • Students observe, describe, and compare stable and disturbed eco-columns • Students become familiar with pH paper • Students identify and discuss natural causes that can disturb an ecosystem • Students read and write about human-made disturbing forces, or pollutants	**Unit 3: Ecosystems, cont'd.** **Lesson 3: Setting Up the Aquarium** Students build their aquaria Students observe the materials Students diagram their aquaria During the 3 days of student observations of their aquaria and terraria, students make can use the following: Brainpop Ecosystems Food Chains Land Biomes

• Students reflect through a self-assessment	**Unit 3: Ecosystems, cont'd.**
	Lesson 3: Setting Up the Aquarium, cont'd.
Unit 3: Ecosystems, cont'd. • Students discuss and analyze the causes and effects of three types of pollution • Students plan experiments to study the effects of pollution • Students determine variables and controls and prepare to use simulations in a scientific investigation • Students predict the possible effects of pollutants in their class model ecosystems	Photosynthesis Plant Growth Seed Plants Six Kingdoms Soil Plant Adaptations to Aquatic Life http://www.mbgnet.net/bioplants/adapt.html Farming in Space http://voyager.cet.edu/iss/activities/newfarming.html MAKE 3 CLASS CONTROL MODELS FOR EACH CLASS YOU TEACH (THES
Unit 3: Ecosystems, cont'd.	**Unit 3: Ecosystems, cont'd.**
• Students test and record the pH of our Ecosystems • Students	**Lesson 4: Adding Animals to the Aquarium**

implement their pollution experiments • Mix and measure chemicals • Students maintain the record keeping system in their interactive notebook	Add animals to aquaria Observe plants and algae Observe animals in aquaria and draw observations Reading Selection in Student Investigations Booklet on pages 26-28
Unit 3: Ecosystems, cont'd. • Students will write a formal lab report forming a hypothesis, analyzing data, answering questions, and form a conclusion based on evidence	**Unit 3: Ecosystems, cont'd.**

	Lesson 5: Observing the Completed Aquarium Discuss living and non-living things in their ecosystems Discuss interdependent relationships Reading selection on page 31 in Student Investigations Booklet
Unit 3: Ecosystems, cont'd. • Students observe and record the effects pollutants have on the ecosystems • Students observe the control eco-column • Students connect the death of the producers to the viability of the consumers within the eco-columns • Students understand the importance of plants in the environment	**Unit 3: Ecosystems, cont'd.** **Lesson 6: Adding Animals to the Terrarium** Create a Venn Diagram to compare and contrast Aquarium plants and Terrarium plant Observe and add animals to terraria Record animal characteristics using Observation Chart/ Diagram

Unit 3: Ecosystems, cont'd. • Students discuss the effects of pollutants and make final observations • Student teams review data collected • Students draw conclusions	Reading Selection pages 38-40 in Student Investigations Booklet **Unit 3: Ecosystems, cont'd.** **Lesson 6: Adding Animals to the Terrarium, cont'd.** Create a Venn Diagram to compare and contrast Aquarium plants and Terrarium plant Observe and add animals to terraria Record animal characteristics using Observation Chart/ Diagram Reading Selection pages 38-40 in Student Investigations Booklet **Unit 3: Ecosystems, cont'd.** **Lesson 7: Joining the Terrarium and Aquarium** Discuss the terms: producers, consumers, and scavengers

Unit 3: Ecosystems, cont'd. • Class draws conclusions about the effect of each pollutant • Students examine results • read about the Chesapeake Bay	Discuss how the two ecosystems relate to each other Discuss and observe eco-columns and predict what might occur over time Make Terrestrial Food Chain Wheel **Unit 3: Ecosystems, cont'd.** **Lesson 7: Joining the Terrarium and Aquarium, cont'd.** Discuss the terms: producers, consumers, and scavengers Discuss how the two ecosystems relate to each other
Unit 3: Ecosystems, cont'd. • Class draws	Discuss and observe eco0columns and predict what might occur over time

conclusions about the effect of each pollutant • Students examine results • read about the Chesapeake Bay	Make Terrestrial Food Chain Wheel **Unit 3: Ecosystems, cont'd.** **Lesson 8: Upsetting the Stability** Teachers will lead discussion about pollution and lead the acidity activity TG p. 85 Teachers will introduce vocabulary Read about and discuss Acid Rain Student manual pp. 48-49 Read and discuss about Crops and Cows—What's the Problem Student manual p. 51 Read and discuss When Salt isn't Safe Student manual p. 52 **Teach in connection with Non-point Pollution pp. 48-54 in the Trash Power Manua
Unit 3: Ecosystems, cont'd. • Class draws conclusions about the effect of each pollutant • Students examine	**Unit 3: Ecosystems, cont'd.** **Lesson 10: Planning Pollution Experiments**

results • Read about the Chesapeake Bay	Option 1: Pollute half of the students eco-columns Option 2: Pollute the Teacher's class model Discuss the concept of a controlled experiment *discuss variables Eco-column pollutant activity planning TG p. 101-103 *See fact sheets TG pp. 104-106
Unit 4: Trash Power	**Unit 3: Ecosystems, cont'd.** **Lesson 11: Setting up our Pollution Experiment**

	Students will conduct experiment by polluting eco-columns Students will gather data using the table on activity sheet 11-A
	Unit 3: Ecosystems, cont'd.
Unit 4: Trash Power • To define - trash, natural resources, renewable resources, and nonrenewable resources. • To sort and classify trash.	**Lesson 11: Setting up our Pollution Experiment** Students will conduct experiment by polluting eco-columns Students will gather data using the table on activity sheet 11-A

• To develop an understanding of human's influence on the ecological process. • To develop a community profile of East Brunswick regarding solid waste management. **Unit 4: Trash Power, cont'd.** • To develop an understanding of human's need to find a viable solution to solid waste management. • To develop an understanding of alternative energy sources.	**Unit 3: Ecosystems, cont'd.** **Lesson 12: Observing Early Effects of Pollution** Students will observe the effects of the pollutants on their ecosystems and they will cc

Unit 4: Trash Power, cont'd. • To develop an understanding of human's need to find a viable solution to solid waste management. • To develop an understanding of alternative energy sources.	**Unit 3: Ecosystems, cont'd.** **Lesson 13: Where do the Pollutants Go?** Students continue to observe ecosystems and comparing them to the control experime Students will analyze their results to of the Pollution experiment using Record Sheet 1

	Unit 3: Ecosystems, cont'd.
Unit 4: Trash Power, cont'd.	
	Lesson 14: Drawing Conclusions about our Experiment
• To develop an understanding of human's need to find a viable solution to solid waste management.	Students will draw conclusions about the results of the pollutants in their eco-columns Students will read the reading selection, "The Chesapeake Bay: An Ecosystem in Dar Students will make connections from their reading to their experiments Students will view video Living on the Edge and make connections from their experir
• To develop an understanding of alternative energy sources.	**Unit 3: Ecosystems, cont'd.** Students will draw conclusions about the results of the pollutants in their eco-columns

Unit 4: Trash Power, cont'd. • To develop an understanding of human's need to find a viable solution to solid waste management. • To develop an understanding of alternative energy sources.	Students will read the reading selection, "The Chesapeake Bay: An Ecosystem in Dar Students will make connections from their reading to their experiments Students will view video Living on the Edge and make connections from their experir **Unit 3: Ecosystems, cont'd.** Students will draw conclusions about the results of the pollutants in their eco-columns Students will read the reading selection, "The Chesapeake Bay: An Ecosystem in Dar Students will make connections from their reading to their experiments Students will view video Living on the Edge and make connections from their experir

Unit 4: Trash Power, cont'd. • To define key terms – sanitary landfill, methane gas, leachate, clay liner, NIMBY, cap, source reduction, and ground water. • To review the concepts of "decomposers" as related to natural recycling (sunlight ® plant and animal life ® decomposers ® raw materials ® plant life).	**Unit 4: Trash Power** ******* ENRICHMENT ACTIVITIES** Use the Enrichment Activities section of the Trash Power manual to supplemer *******ADDITIONAL RESOURCES** Use the websites and activities listed at the end of each unit ******* CURRENT EVENTS ***** be responsible for completing Current Event Article **Unit 4: Trash Power** # Section 1
Unit 4: Trash Power, cont'd. • To explore and	• Students will answer Trash Power questions on Student Manual page 2. • dissect classroom trash, categorize, record, and graph data (bar graph).

develop an understanding of the positive and negative aspects related to sanitary landfills. • Write a formal lab report: form a hypothesis, list materials, procedures, record observations, form conclusions from evidence.	• Discuss with class terms natural, renewable, and nonrenewable resource using • complete "Challenge" on Student Manual pages 11. **Unit 4: Trash Power, cont'd.** • Research on Materials (see additional resources) • Discuss alternative energy sources pages 16-27. • review and discuss solid waste facts and complete the Community Profile on **Additional Resources and Activi**
Unit 4: Trash Power, cont'd. • To explore and develop an understanding of the positive and negative aspects related to sanitary landfills. • Write a formal lab	DNR kids Website: Solid Waste and Recycling http://www.metrokc.gov/DNR/kidStudents willeb/solid_waste_main.htm **Unit 4: Trash Power, cont'd.**

report: form a hypothesis, list materials, procedures, record observations, form conclusions from evidence.	Trash Pizza (Activity) http://www.kid-at-art.com/htdoc/lesson Natural Resources http://www.eco-pros.com/naturalresour http://www.brainpop.com/science/ourfragileenvironment/naturalresources/ (video an Mineral Search ***http://www.urbanext.uiuc.edu/world/minerals.html***
Unit 4: Trash Power, cont'd. • To introduce key terms – absorb, aquatic life, sludge, biodegradable, non-biodegradable, refuse, contamination, water pollution, industrial waste, sewage, and algae. • To explore and develop an understanding of the positive and negative aspects related to ocean dumping.	**Unit 4: Trash Power, cont'd.** ***Solid Waste*** http://www.brainpop.com/technology/scienceandindustry/wastemanagement/ (video a http://www.epa.gov/oStudents will/kids/index.htm (Planet Protectors Club interactive Fossil Fuels http://www.brainpop.com/technology/energytechnology/fossilfuels/ (video and quiz)

Unit 4: Trash Power, cont'd.	Gas and Oil http://www.brainpop.com/science/energy/gasandoil/ (video and quiz)
• To develop an understanding for the environmental impact of oil spills and the process of cleaning these spills. • To provide an opportunity for students to work as team members to analyze specific water pollution case studies.	**Unit 4: Trash Power, cont'd.** Plastic from Petroleum http://www.brainpop.com/science/matterandchemistry/plastic/ (video and quiz) Air Pollution http://www.brainpop.com/science/ourfragileenvironment/airpollution/ (video and qui Alternative Energy Sources http://www.brainpop.com/science/energy/energysources/ (video and quiz)
Unit 4: Trash Power, cont'd.	

- To introduce key terms – composting, natural garbage, decay, decomposition, bacteria, decomposer, nutrients, decomposable waste, and decomposition resistant waste.
- To explore and develop the positive and negative aspects of composting.

Unit 4: Trash Power, cont'd.

Section – 2

Sanitary Landfills

- read and discuss pages 34-35 of the Student Manual.

Landfill / Ocean Dump Lab

- create a landfill and an ocean dump in closed containers with teacher assistanc sketch and label each environment and record observations for approx. 6 week

Unit 4: Trash Power, cont'd.

Unit 4: Trash Power, cont'd.

- To introduce key terms – composting, natural garbage, decay, decomposition, bacteria, decomposer, nutrients, decomposable waste, and decomposition

Section – 2, cont'd.

Sanitary Landfills

** need to bring in a closed container, and a variety of garbage from home. **

resistant waste. • To explore and develop the positive and negative aspects of composting. **Unit 4: Trash Power, cont'd.** • To introduce key terms – incineration, resource recovery, dioxins, scrubber, and pollutants. • To explore the positive and negative impacts of incineration and resource recovery. • To provide an opportunity for students to work as team members to debate	• record predictions and observations using Student Manual page 44. • view the video "The Rotten Truth About Garbage" and respond to questions c **Unit 4: Trash Power, cont'd.** **Section – 2, cont'd.** **Sanitary Landfills** • Diagram a Sanitary Landfill: draw and label a side view of a sanitary landfill, pipes and methane gas pipes and generator. **Sanitary Landfills** *******Additional Resources***** The Garbage Story: Dealing with Solid Waste http://gtm-media.discoveryeducation.com/videos/The%20Garbage%20Story%20Dealing%20wit **Unit 4: Trash Power, cont'd.**

environmental issues.	
Unit 4: Trash Power, cont'd.	**Section – 2, cont'd.** **Sanitary Landfills**
1. To introduce key terms – incineration, resource recovery, dioxins, scrubber, and pollutants.	What's a Landfill http://www.kid-at-art.com/htdoc/educate.html
1. To explore the positive and negative impacts of incineration and resource recovery.	Energy Kids Page http://www.eia.doe.gov/kids/energyfacts/saving/recycling/solidwaste/landfiller.html Landfill Links: http://www.dmoz.org/Kids_and_Teens/School_Time/Science/Environment/Garbage/I
1. To provide an opportunity for students to work as team members to debate environmental issues.	**Unit 4: Trash Power, cont'd.** **Section – 3** ***Water Pollution***

Unit 4: Trash Power, cont'd.

- To introduce key terms – litter and open dumping.
- To explore the
- Environmental impact of littering and open dumping.

****Ecosystems coordinates with this se**

- read and discuss vocabulary as Ocean Dumping is introduced to class using S
- Teacher will discuss with class what an oil spill is and its environmental effect

Unit 4: Trash Power, cont'd.

Section – 3, cont'd.

Water Pollution

- view the video "Bottom of the Barrel" and respond to questions on Student M

Oil Spill Lab

- explore means of cleaning up an oil spill using items brought in from home ar
- view the video "Down the Drain" and respond to questions on Student Manua

Unit 4: Trash Power, cont'd.

- To introduce key terms – litter and open dumping.
- To explore the effects of open dumping.
- Environmental impact of littering and open dumping.

Unit 4: Trash Power, cont'd.

Section – 3, cont'd.

Water Pollution

- read and analyze various water pollution case studies using Student Manual p

***** Additional Resources ***

Clean Water Program

http://www.oceansidecleanwaterprogram.org/kids.asp

Dawn Dish Detergent Fighting to Help Animal Oil Spill Victims

****

Unit 4: Trash Power, cont'd.

Unit 4: Trash Power, cont'd.

Section – 3, cont'd.

Water Pollution

• To introduce key terms – reuse, reduce, and recycle. • To interpret data in order to recycle • To develop an understanding of the recycling processes.	Water Pollutants http://www.worldalmanacforkids.com/WAKI-ViewArticle.aspx?pin=x-wa017800a&article_id=192&chapter_id=4&chapter_title=Environment&article_title= Non-Point Source Pollution http://www.epa.gov/nps/kids/ http://www.chewonki.org/cleanwater/water_pollution.asp (facts, activities and teache **Unit 4: Trash Power, cont'd.** # Section – 3, cont'd. ***Water Pollution*** http://www.brainpop.com/science/ourfragileenvironment/waterpollution/ (video an http://www.water-pollution.org.uk/ (interactive site)
Unit 4: Trash Power, cont'd. • To introduce key	http://response.restoration.noaa.gov/audience_catalog.php?RECORD_KEY%28audie(audience_chosen)=2 (oil spill information) http://library.thinkquest.org/CR0215471/oil_spills.htm (oil spill facts, excellent graph

terms – reuse, reduce, and recycle.

- To interpret data in order to recycle

- To develop an understanding of the recycling processes.

Unit 4: Trash Power, cont'd.

Unit 4: Trash Power, cont'd.

- To introduce key terms – reuse, reduce, and recycle.

Unit 4: Trash Power, cont'd.

Section – 3, cont'd.

Water Pollution

http://www.chewonki.org/cleanwater/energy_choices.asp (facts, activities and teache

Unit 4: Trash Power, cont'd.

• To interpret data in order to recycle • To develop an understanding of the recycling processes.	**Section – 4** **Composting** • read and discuss "Garbage to Soil" on Student Manual page 73. • read and discuss composting using Student Manual pages 74-78. **Garbage Eater Lab** • identify the benefits of composting organic materials. Student Manual page 79.
Unit 4: Trash Power, cont'd. • To introduce key terms – reuse, reduce, and recycle.	**Unit 4: Trash Power, cont'd.** **Section – 4, cont'd.** **Composting** • Students create a compost heap using construction paper to make soil, organic **Rotting Bananas Lab**

• To interpret data in order to recycle • To develop an understanding of the recycling processes.	• predict, observe the effects of yeast on bananas (keep a control). complete a v decomposition, and draw conclusions from evidence.
Unit 4: Trash Power, cont'd. • To introduce key terms – reuse, reduce, and recycle. • To interpret data in order to recycle	**Unit 4: Trash Power, cont'd.** **Section – 4, cont'd.** ******* Additional Resources ***** Earth 911 http://earth911.org/composting/ Composting for Kids http://sustainable.tamu.edu/slidesets/kidscompost/cover.html Kids Recycle http://www.kidsrecycle.org/composting.php United Streaming Video: "Grossology: Kid Rot" http://player.discoveryeducation.com/index.cfm?guidAssetId=76EA436F-B721-4F23

• To develop an understanding of the recycling processes.	**Unit 4: Trash Power, cont'd.** # Section – 5 ## Incineration and Resource Recovery • read and discuss Student Manual pages 82-83. • To Burn or to Not to Burn Student Manual pages 84-86. **Mock Town Council Meeting** • Class will be divided into research and presentation teams to answer problem c *******Additional Resources***** **Unit 4: Trash Power, cont'd.**
Unit 4: Trash Power, cont'd. • To introduce key terms – reuse, reduce, and recycle. • To interpret data in order to recycle	# Section – 6 ## Littering and Open Dumping • Introduction questions about littering Student Manual page 106. • read and discuss open dumping and the related health hazards as a result of so 107.

• To develop an understanding of the recycling processes.	• take a walking field trip around school to collect litter.
	Unit 4: Trash Power, cont'd.
	# Section – 6, cont'd.
	## Littering and Open Dumping
Unit 4: Trash Power, cont'd.	• chart items from their litter collection on Student Manual page 108.
	******* Additional Activities *****
• To introduce key terms – reuse, reduce, and recycle.	Littering and Environmental Issues http://www.brainpop.com/science/ourfragileenvironment/humansandtheenvironment/
• To interpret data in order to recycle	
• To develop an	

understanding of the recycling processes.	**Unit 4: Trash Power, cont'd.** # Section – 7 ## Packaging • explore the package problem by going on a package hunt to locate items with pages 112-114. • work with a partner to evaluate a packaged item that they have brought from h
Unit 4: Trash Power, cont'd. • To introduce key terms – reuse, reduce, and recycle. • To interpret data in order to recycle • To develop an understanding of the recycling processes.	**Unit 4: Trash Power, cont'd.** # Section – 8 ## Reducing, Reusing, and Recycling • review key terms and set up an experiment "Reusing Your School Waste" on S for about 1 week.

	• complete conclusion on Student manual page 89. collect their lunch trash and complete Student Journal pages 120-121. **Unit 4: Trash Power, cont'd.** # Section – 8, cont'd. ## Reducing, Reusing, and Recycling **Trash Art**
Unit 4: Trash Power, cont'd. • To introduce key terms – reuse, reduce, and recycle. • To interpret data in order to recycle • To develop an understanding of the recycling processes.	• Turn Trash Into Treasure Student Manual page 122. • learn the steps to recycling paper, plastic and glass. Recycling Processes: plas page 134. **Unit 4: Trash Power, cont'd.**

Unit 5: Rocketry • Students will be able to understand key terms involved in the operation of rockets – Newton's Third Law of Motion, thrust, lift, gravity, drag, telemetry, ignition, lift off, burnout, coasting period, apogee, ejection, soft landing, Robert Goddard, friction, and force.	**Section – 8, cont'd.** **Reducing, Reusing, and Recycling** **Trash Art** ***** OPTIONAL ACTIVITIES * **United Streaming: Reducing, Reusing, a Environmental ConcernA segment of Re Recycling: Environmental Concerns** http://player.discoveryeducation.com/index.cfm?guidAssetId=427F2D1C-A09D-4D8 **Unit 5: Rocketry** • Students will be introduced to a short history of rockets and the key terms ass

Unit 5: Rocketry, cont'd.	• Students will watch a virtual rocket launch to become familiar with a launch s http://inventors.about.com/library/inventors/blrocket.htm • Students will review the parts of a model rock assembly and the functions of e
• Students will be able to identify the various parts of the model rocket and the function of each part. • To create a direct correlation between concepts trajectory and airplane flight with the trajectory, powers, and flight of a rocket. • To recognize that motion can be slowed or delayed by forces such as friction and air resistance.	**Unit 5: Rocketry , cont'd.** • Students will study the flight phases of a model rocket and the terms associate • Students will develop an understanding for Newton's Third Law of Motion th action there is an equal and opposite reaction – Blow up a balloon and let it go in the balloon goes down). • Students will engage in "force & motion experiments" to investigate Newton **Unit 5: Rocketry , cont'd.**
Unit 5: Rocketry , cont'd.	• begin assembling their model rockets following the specific instructions provi • review model rocketry safety code using *Estes website.*

• To recognize that everything on or near the earth is pulled toward the earth's center by gravitational force.	• use *altimeter device* to track the model rockets altitude, plot data on chart, an • launch model rockets on "Rocket Day".
• To develop an understanding of the principles of flight as related to Newton's Third Law of Motion, and the correlation of flight pattern and distance.	**Unit 5: Rocketry , cont'd.** • Teacher will lead a debriefing about "Rocket Day". ******** OPTIONAL ACTIVITIES **** • On "Rocket Day" students can watch the videos *"October Sky"* and/or *"Apoll* ***** Please note these videos are rated PG-13 and you need to have parent permissio*
Unit 5: Rocketry , cont'd. • To provide an opportunity for students to work collaboratively to assemble and	

launch a model rocket.	

Grading and Evaluation Guidelines

Common assessments are used throughout the units.

Other Details

SCED

53235 Science (Grade 5)
Science (Grade 5) courses build on the study of various systems. They may include identification and description of cycles, comparisons of forms of matter and energy, forces, or content consistent with state academic standards. Students may make comparisons and interpret and analyze information.