

Unit Title: Save Our Water

Class: 7th Grade Science

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School:

Approximate Timeline: October 7-Nov.8

School Level: Middle School

Area(s) of Core Content: Science

Targeted Standards:

Academic Expectation 1--Apply Communication and Math Skills:

-1.1 Students use reference tools such as dictionaries, almanacs, encyclopedias, and computer reference programs and research tools such as interviews and surveys to find the information they need to meet specific demands, explore interests, or solve specific problems.

-1.2 Students make sense of the variety of materials they read.

-1.3 Students make sense of the various things they observe.

-1.4 Students make sense of the various messages to which they listen.

-1.5 - 1.9 Students use mathematical ideas and procedures to communicate, reason, and solve problems.

-1.10 Students organize information through development and use of classification rules and systems.

-1.11 Students write using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes.

-1.12 Students speak using appropriate forms, conventions, and styles to communicate ideas and information to different audiences for different purposes.

-1.16 Students use computers and other kinds of technology to collect, organize, and communicate information and ideas.

Demonstrators for Academic Expectation 1.1

-Use a variety of research tools and evaluate the effectiveness of each relevant to a specific need or problem.

-Analyze and compare information accessed from different sources.

-Gather information through observation on a specific need or problem.

Demonstrators for Academic Expectation 1.2

-Construct meaning and evaluate print materials read in and out of school.

-Interpret reading using different modes of presentation.

-Apply a variety of strategies to construct meaning.

-Relate reading experiences to life situations.

-Analyze appropriate print materials for a variety of purposes.

Demonstrators for Academic Expectation 1.3

-Analyze, organize, and interpret information gathered from observations.

-Analyze observations using prior knowledge/experiences.

Demonstrators for Academic Expectation 1.5-1.9

- Select, apply, justify appropriate math procedures to solve real-life problems using rational numbers.
- Model problem solving situations using oral, written, concrete, pictorial, graphic, simple algebraic methods.
- Communicate the meanings of number, space, change, data, and measurement verbally, pictorially, symbolically, and concretely.
- Use deductive/inductive reasoning to synthesize information related to problems, making conjectures, exploring, validating, and convincing others.

Demonstrators for Academic Expectation 1.10

- Apply a classification system based upon multiple criteria to organize objects, information, and/or ideas.

Demonstrators for Academic Expectation 1.12

- Refine formal presentations for a variety of audiences and purposes (e.g., entertainment, imagination, information, persuasion).

Demonstrators for Academic Expectation 1.16

- Analyze relationships/patterns to draw inferences using technology.
- Expand knowledge by identifying and using technology for a specific purpose.

Academic Expectation 2--Science:

- 2.1 Students understand scientific ways of thinking and working and use those methods to solve real-life problems.
- 2.2 Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and predict possible future events.
- 2.3 Students identify and analyze systems and the ways their components work together or affect each other.
- 2.4 Students use the concept of scale and scientific models to explain the organization and functioning of living and nonliving things and predict other characteristics that might be observed.

Demonstrators for Academic Expectation 2.1

- Communicate measurements made with common and advanced technological tools.

Demonstrators for Academic Expectation 2.2

- Identify causes of observed patterns.
- Analyze collected data to discover patterns and predict outcomes.
- Investigate the existence of small- scale variations within a large-scale pattern.
- Investigate the relationships and interactions of two or more patterns.

Demonstrators for Academic Expectation 2.4

- Investigate properties that change or remain constant with changes in scale.

Academic Expectation 3--Self-Sufficiency:

- 3.1 Students demonstrate positive growth in self-concept through appropriate tasks or projects
- 3.3 Students demonstrate the ability to be adaptable and flexible through appropriate tasks or projects.
- 3.6 Students demonstrate the ability to make decisions based on ethical values.
- 3.7 Students demonstrate the ability to learn on one's own.

Demonstrators for Academic Expectation 3.3

- Differentiate between things an individual can and cannot change.

Demonstrators for Academic Expectation 3.6

- Analyze the similarities in ethical values of school, community, cultures, and society.
- Make decisions based on ethical values and evaluate the consequences.
- Clarify personal values.
- Demonstrate ethical behaviors.

Academic Expectation 4--Responsible Group Membership:

- 4.1 Students effectively use interpersonal skills.
- 4.2 Students use productive team membership skills.
- 4.3 Students individually demonstrate consistent, responsive, and caring behavior.
- 4.4 Students demonstrate the ability to accept the rights and responsibilities for self and others.
- 4.6 Students demonstrate an open mind to alternative perspectives.

Demonstrators for Academic Expectation 4.1

- Listen to others express their views.
- Express ideas in a non-confrontational manner.

Demonstrators for Academic Expectation 4.2

- Use effective team skills to complete a task.

Demonstrators for Academic Expectation 4.3

- Find a real-life problem; determine possible solutions and implications; implement a plan.

Demonstrators for Academic Expectation 4.4

- Analyze relationships between rights and responsibilities.

Demonstrators for Academic Expectation 4.6

- Demonstrate behaviors which show respect for divergent opinions.

Academic Expectation 5--Thinking and Problem Solving:

-5.1 Students use critical thinking skills such as analyzing, prioritizing, categorizing, evaluating, and comparing to solve a variety of problems in real-life situations.

-5.3 Students organize information to develop or change their understanding of a concept.

-5.5 Students use problem-solving processes to develop solutions to relatively complex problems.

Demonstrators for Academic Expectation 5.1

-Examine ideas/objects/situations for patterns; discern discrepancies.

-Analyze cause-and-effect relationships.

-Generate possible solutions to problems; predict effects of actions.

Demonstrators for Academic Expectation 5.3

-Gather information from multiple sources to derive meaning.

-Analyze the connections between new information and prior knowledge.

Demonstrators for Academic Expectation 5.5

-Define a problem; gather and organize information about the problem.

Academic Expectation 6--Integration of Knowledge:

-6.2 Students use what they already know to acquire new knowledge, develop new skills, or interpret new experiences.

-6.3 Students expand their understanding of existing knowledge by making connections with new knowledge, skills, and experiences.

Demonstrators for Academic Expectation 6.2

-Select an appropriate strategy to acquire specific new information.

Demonstrators for Academic Expectation 6.3

-Discover relationships among existing knowledge and new ideas, objects, and actions.

-Analyze the connections between new and existing knowledge in specific situations.

Middle School Core Content--Science:

-SC-M-1.1.1 A substance has characteristic physical properties (e.g., density, boiling point, solubility) that are independent of the amount of the sample. A mixture of substances often can be separated into the original substances by using one or more of these characteristic physical properties.

-SC-M-1.1.2 The chemical properties of a substance cause it to react in predictable ways with other substances to form compounds with different characteristic properties. In chemical reactions, the total mass is conserved. Substances are often classified into groups if they react in similar ways.

- SC-M-1.1.3 Chemical elements do not break down during normal laboratory reactions such as heating, exposure to electric currents, or reaction with acids. Elements combine in many ways to produce compounds.
- SC-M-2.1.5 Water, which covers the majority of the Earth's surface, circulates through the crust, oceans, and atmosphere in what is known as the water cycle. Water dissolves minerals and gases and may carry them to the oceans.
- SC-M-3.2.1 All organisms must be able to obtain and use resources, grow, reproduce, and maintain stable internal conditions while living in a constantly changing external environment.
- SC-M-3.2.2 Regulation of an organism's internal environment involves sensing the internal environment and changing physiological activities to keep conditions within the range required to survive. Maintaining a stable internal environment is essential for an organism's survival.
- SC-M-3.2.3 Behavior is one kind of response an organism may make to an internal or environmental stimulus. A behavioral response requires coordination and communication at many levels including cells, organ systems, and organisms. Behavioral response is a set of actions determined in part by heredity and in part from experience.
- SC-M-3.5.1 A population consists of all individuals of a species that occur together at a given place and time. All populations living together and the physical factors with which they interact compose an ecosystem.
- SC-M-3.5.2 Populations of organisms can be categorized by the function they serve in an ecosystem. Plants and some microorganisms are producers because they make their own food. All animals, including humans, are consumers, and obtain their food by eating other organisms. Decomposers, primarily bacteria and fungi, are consumers that use waste materials and dead organisms for food. Food webs identify the relationships among producers, consumers, and decomposers in an ecosystem.
- SC-M-3.5.3 For most ecosystems, the major source of energy is sunlight. Energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis. That energy then passes from organism to organism in food webs.
- SC-M-3.5.4 The number of organisms an ecosystem can support depends on the resources available and abiotic factors (e.g., quantity of light and water, range of temperatures, soil composition). Given adequate biotic and abiotic resources and no diseases or predators, populations (including humans) increase at rapid rates. Lack of resources and other factors, such as predation and climate, limit the growth of populations in specific niches in the ecosystem.

Organizers:

What pollutants in our water should concern citizens of Mason County?
How clean is our water in Mason County and what effect does water purity have on living organisms?

Essential Questions:

Where do water pollutants originate?
Which pollutants are the most dangerous?
How can water pollutants be dealt with to purify water?
How do these water pollutants affect populations of living organisms?

Culminating Performance:

Solutions and Pollutions Test-Multi Choice, Essay
Fruitvale Test-Multi Choice, Essay
Save Our Water Performance Event

Attached.

Knowledge:

Differentiate between mixtures and solutions.
Where do certain pollutants originate?
How can an aquatic food chain be affected by water pollution?

Skills/Abilities:

Observation/Inference
Problem Solving through analysis of w

Critical Resources:

Lab Aids
Solutions and Pollutions Kit
Fruitvale Story Kit
Water Chemical Testing Kit
Glencoe The Water Planet Text
Glencoe CD ROM Virtual Labs
A Water Odyssey-Courier Journal

Instructional/Assessment Activities:

Water Chemistry Basics: 1. Solutions and Pollution
Chemical Survey

Labs:

Defining a Solution
Forming a Solution
Parts per Million
Combining Different Liquids
Liquids and Indicators
Clean Water Video
Video: Ponds and Streams
Successive Dilution of Acid & Base
Neutralization
Relative Concentration

Molecular Concentration
Relative Concentration of Household Vinegar
Used Water

2. A Groundwater Study: The Fruitvale Story

Labs:

Solids and Liquids

Well Testing Plan

CD ROM- How Does Water Flow through Groundwater

The Fruitvale Story

The Cleanup of Fruitvale-Class Presentation

3. Testing the Waters - Chemical Testing of Mason County's Water

Kentucky's Water Supply-A Water Odyssey

Important Water Quality Factors-Web Page

What's Up with Our Nation's Water-Web Page

CDROM- How do Pollutants Get in Our Water?

Video: Bill Nye, "Ecosystems"

The Big ID- Identifying Invertebrates of Fresh Waters, Identifying Vertebrates of
Fresh Water

Building a Fresh Water Food Chain

Chemical and Biological Survey of Mason County Middle School Creek.

Chemical Survey of Local Mason County Streams/Mapping

Presentation to Class

Class Report to Mason County Health Department

Field Trip to Maysville Water Treatment Plant

Scoring Guide

Unit Title: Save Our Water

Culminating Performance:

Solutions and Pollutions Test-Mult Choice, Essay

Fruitvale Test-Mult Choice, Essay

Save Our Water Performance Event

Attached.

Level 4:

Level 3:

Level 2:

Level 1: