

Ecosystem Changes

Grade Level: 4-5

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Inquiry and Discovery

Fall 2007

December 14, 2007

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II. Vital Information:

Rationale: This unit on ecosystem changes will allow the students to learn how ecosystems change and how these changes affect everything the ecosystem encompasses. The students themselves are part of an ecosystem and therefore need to know the basics of the changes that occur within. The students will also learn of what to do when certain, dangerous, rapid changes occur such as earthquakes and tornadoes. The students will be prepared if, in fact there is a natural disaster in the community itself.

Summary: Ecosystems go through constant changes. These changes are labeled slow changes and rapid changes. The slow changes are erosion, succession and climate changes. The rapid changes are thunderstorms, tornadoes, hurricanes, volcanoes, and forest fires. The rapid changes often affect the people in the community and survival is key when this does occur.

Grade/Level: Grades 4 and 5

Time Required: This unit will take about three weeks to complete. The students will be working with this unit for a half an hour a day, three days a week.

Subjects: This unit will cover Science, Social Studies, Health and the Arts

Learner Considerations- Developmental Readiness: According to Piaget, the students at this level are in the concrete operational stage. The concrete operational child begins to

think logically in this stage. Operations are associated with personal experience. Concrete operations allow children to classify different classes into a bigger group or to combine a number of classes in any order. In addition, concrete operations allow children to order objects in terms of more than one dimension. Children at the concrete operational stage can solve conservation tasks (Piaget, 2002). The students at this level will be able to follow along while someone is reading. They will also be able to read silently without being disrupted or side-tracked. Children at the fourth and fifth grade like to voice their ideas and opinions. Therefore, I will allow the students at several points during the unit to actively voice their thoughts. The students will also be cognitively able to answer comprehension questions after reading. The students will be able to sort and define terms after reading as well. The students will not have a problem working together to achieve a common goal. The students can work on their own and be silent at the same time. I will help the students to remain quiet by passing around pictures for them to look at while they are given tasks such as reading silently. This information was gathered from observations in the fourth grade classroom.

Learners' Abilities, Disabilities, and Other Needs: To ensure that the students in the class are all getting the same opportunities to learn at their best ability I will try to differentiate this unit in several ways. The first way I will differentiate this unit is by using a graphic organizer for the students to follow along with as we read. This will help the students stay structured. The second way I will differentiate the unit is to vary the ways of reading the science chapter. I will read to the class, call on students to read, and have them read silently to themselves. The third way I will differentiate this unit will be by asking

comprehension questions after reading each section of the text. This will help me to be sure that the students understand. I will also have the students do several hands-on activities for the kinesthetic learners in the classroom. The students will also be given a chance to use the internet and navigate on websites. The last way that I will differentiate this unit will be providing pictures not located in the book for the students to look at. This will help the basic skills learner by looking at different resources. I will also use differentiation in the assessment. Two assessments will be done, the first being verbal and the second written.

Cultural Connections: This unit on ecosystem changes can touch upon several cultures. There are countless ecosystems in the world and they are all different. The students will be learning about changes such as earthquakes and volcanoes that only occur in certain parts of the world. This will enlighten them on some of the hardships other cultures have to face, other than their own. The students will be able to compare these cultures to their own by identifying the different ecosystems that occur in each area. I will also be providing the students with pictures of different natural disasters that have only occurred in different parts of the world. We will discuss why they happen here and not in our country. Some ecosystem changes bring disease. The text will touch upon where these diseases are found and the causes. The students will also be able to identify safety precautions in the certain regions affected by the natural disasters being discussed.

Cross-Curriculum Connections: This unit will connect Science, Social Studies, the Arts and Health by relating each curricular field to the changes in ecosystems. The unit

connects to Science with reading in the Science textbook and the creation of a graphic organizer to help the students learn the basic information for the unit. The content of the different types of ecosystem changes is Science related. The unit will connect to Social Studies in relating the ecosystem changes to a specific event. This event will be Mount St. Helens. The students will learn about the events of the volcano and search for articles based on those events. The unit will connect to the Arts by the students developing brochure explaining the safety precautions to take during natural disasters. Lastly, the unit will connect to Health by creating a survival kit to ensure the students and their family's safety if a natural disaster happens to occur in the community.

Management Considerations: When the first lesson of this unit begins the students will have their books open on their desks ready to begin. They will be following the classroom rules that are applied every day. These rules include being respectful, raising your hand if you want to talk, and listen to those who are talking. Instead of having the students volunteer to read, I will be picking their names from a basket of Popsicle sticks. This will avoid any disagreements over who will read. The students will be asked at one point to read silently when I will also give them pictures to look at. At another point in this unit, the students will be told to use the internet. The rules for the internet will be gone over and they include staying on the website given, asking for help if needed, no food or drinks at the computer tables, and one person at a computer at a time. The students will be using arts and crafts for two of the lessons in this unit. They should know from previous lessons to clean up after themselves and to work at their desks.

III. Content and Standards

Guiding Questions:

What are the two types of changes that ecosystems go through?

What allows more and more organisms to live in an ecosystem?

How are hurricanes and tornadoes alike?

What Is A Volcano?

Why Do Volcanoes Occur?

What should you put in a survival kit?

What is an example of a family escape route?

What kinds of food are non perishables?

What damage can a flood do? Earthquake? Forest Fire?

How do you think you can survive in a flood? Earthquake? Forest Fire?

What are the events that occurred before, during, and after the volcano, Mt. Saint Helens?

Unit Web:



Content Generalizations, Facts, and Concepts:

Science-

- Succession is an orderly change in the species in a community. The term refers to a sequence or process by which organisms take over an area. A lichen is a type of fungus that often grows with algae. A cattail is a tall plant found in marshes. Added nutrients allow ecosystems to support more living things. The wind blows seeds and spores into ponds. Severe storms, such as hurricanes, thunderstorms and tornadoes, fires, and volcanoes are what make up the rapid changes in ecosystems. Hurricanes and tornadoes are alike in that they both have powerful winds. People can be warned that they need to evacuate by TV, radio, loudspeakers, alarms, police, volunteers, and neighbors (Jones, 2000).

Social Studies-

- The Earth's crust is made up of huge slabs called plates, which fit together like a jigsaw puzzle. These plates sometimes move. The friction causes earthquakes and volcanic eruptions near the edges of the plates. A volcano is a geological landform (usually a mountain) where magma (rock of the earth's interior made molten or liquid by high pressure and temperature) erupts through the surface of the planet. In simple terms a volcano is a mountain that opens downward to a pool of molten rock below the surface of the earth. It is a hole in the Earth from which molten rock (magma) and gas erupt (Newspapers in Education, 2003).

Arts-

- Avalanche: Jump upslope, move to the side of the avalanche, stay on your feet as long as possible, hold on to something, swim to stay near to top of snow, give

yourself breathing room if you are to be buried, create air pocket near mouth and nose, take a deep breath.

- Flood: Have flood kit on hand (batteries, non perishable food, map, phonebook, sleeping bag, blankets, sanitary needs, flare, flashlight) stay indoors and don't travel (unless instructed otherwise)
- Earthquake: Have survival kit on hand, all family members should know how to turn off gas and electricity, anchor heavy objects to wall, stay in doorway or under desk or table, if outdoors stay away from buildings, trees and telephone poles, drive away from underpasses.
- Tornado: Seek basement or cellar, stay away from windows and doors, go directly in center of room, and use sofa cushions to protect arms, legs and head.
- Lost in Woods: Stay where you are, call 911 if you have a phone, put on any additional clothing to stay warm, try lighting fire, conserve water supply, relax.
- To make a brochure you have to fold the paper in three. The students need to make sure the cover is appealing and gets the point across of what the brochure is about. The inside should cover the basics of how to survive in one of the natural disasters (Watts, 2006).

Health-

- You will need a three-day supply of non-perishable food. Non-perishable means food that can stay good for a long time without needing to be in the refrigerator. It is also good if the food doesn't need to be cooked. Here are some suggestions: ready-to-eat canned meats, fruits and vegetables, Canned juice, milk and soup, sugar, salt and pepper

- Storing water is one of the most important things you can do. In an emergency, pipes may be broken or the water contaminated. (Contaminated means it is not safe to drink.) Store water in plastic containers. Plastic soft drink bottles are good! Don't use milk cartons or glass bottles. You should have a three-day supply of water.
- Ask your Mom or Dad or another adult for help in locating or creating your first aid kit. These are the things your first aid kit should have: Sterile adhesive bandages of different sizes, sterile gauze pads, hypoallergenic adhesive tape, bandages, and scissors (Get Ready, Get Set, 2007).

Content-Related Skills:

Reading Skills

Sorting Skills

Vocabulary Skills

Note-taking Skills

Computer Skills

Following Directions

Sequencing

Group Work Skills

Creative Thinking Skills

Comprehension Skills

Oral Decoding Skills

National and State Content Standards:

Reading and Graphic Organizer Activity-

NJ- New Jersey Core Curriculum Content Standards

- **Subject** : Science (Adopted July 2, 2002)
- **Standard 5.10:** (ENVIRONMENTAL STUDIES) ALL STUDENTS WILL DEVELOP AN UNDERSTANDING OF THE ENVIRONMENT AS A SYSTEM OF INTERDEPENDENT COMPONENTS AFFECTED BY HUMAN ACTIVITY AND NATURAL PHENOMENA.
 - **Range/Grade Level 0:** By the end of Grade 6
 - **Strand A:** Natural Systems and Interactions
 - **Cumulative Progress Indicator A:** Explain how organisms interact with other components of an ecosystem.
 - **Cumulative Progress Indicator B:** Describe the natural processes that occur over time in places where direct human impact is minimal.

USA- National Science Education Standards

- **Chapter Chapter 6:** Science Content Standards
- **Grade Level** : K-4
 - **Content Standard F:** Science in Personal and Social Perspectives: As a result of activities in grades K-4, all students should develop understanding of
 - **Ability/ Concept** : Changes in environments
 - **Detail** : Changes in environments can be natural or influenced by humans. Some changes are good, some are bad, and some are neither good nor bad. Pollution is a change in the environment that can influence the health, survival, or activities of organisms, including humans.
 - **Detail** : Some environmental changes occur slowly, and others occur rapidly. Students should understand the different consequences of changing environments in small increments over long periods as compared with changing environments in large increments over short periods

Current Events Activity-

USA- Nat. Council for Social Studies: Nat. Standards for Social Studies Teachers

- **Standard A3:** Thematic Standard: People, Places, and Environments
Social studies teachers should possess the knowledge, capabilities, and dispositions to organize and provide instruction at the appropriate school level for the study of People, Places, and Environments.
 - **Type of Expectation** : Learner Expectations
 - **Expectation** : The study of people, places, and human-environment interactions leads learners to create their spatial views and geographic perspectives of the world. Today's social, cultural, economic, and civic demands on individuals requires that learners understand the world in spatial terms and possess knowledge of places and regions, physical systems, and the interactions of environment and society. In addition, learners need the ability to map information in a spatial context and to interpret such maps. The study of people, places, and environments will also help to promote learners' capabilities to make informed and critical decisions about the relationships between human beings and their environment. The study of people, places, and environments will also help to promote learners' capabilities to make informed and critical decisions about the relationships between human beings and their environment.

NJ- New Jersey Core Curriculum Content Standards

- **Subject** : Social Studies (2004)
- **Standard 6.1:** ALL STUDENTS WILL UTILIZE HISTORICAL THINKING, PROBLEM SOLVING, AND RESEARCH SKILLS TO MAXIMIZE THEIR UNDERSTANDING OF CIVICS, HISTORY, GEOGRAPHY, AND ECONOMICS.
 - **Range/Grade Level** : Building upon the knowledge and skills gained in the previous grades, by the end of Grade 4 students will:
 - **Strand A** : Social Studies Skills

- **Cumulative Progress Indicator 1:** Explain how present events are connected to the past.
- **Cumulative Progress Indicator 2:** Apply terms related to time including years, decades, centuries, and generations.
- **Cumulative Progress Indicator 3:** Locate sources for the same information (e.g., weather forecast on TV, the Internet or in a newspaper).
- **Cumulative Progress Indicator 4:** Organize events in a time line.

Making a Brochure Activity-

■ ■ ■ USA- Nat. Committee for Standards in the Arts: Standards for Arts Education

- **Grade Range :** Grades K-4
- **Art :** Visual Arts
 - **Content Standard 6:** Making connections between visual arts and other disciplines
 - **Achievement Standard :** Students identify connections between the visual arts and other disciplines in the curriculum

■ ■ ■ NJ- New Jersey Core Curriculum Content Standards

- **Subject :** Visual and Performing Arts (2004)
- **Standard 1.2 :**
(CREATION AND PERFORMANCE) ALL STUDENTS WILL UTILIZE THOSE SKILLS, MEDIA, METHODS, AND TECHNOLOGIES APPROPRIATE TO EACH ART FORM IN THE CREATION, PERFORMANCE, AND PRESENTATION OF DANCE, MUSIC, THEATER, AND VISUAL ART.
 - **Range/Grade Level 0:**
Building upon knowledge and skills gained in preceding grades, by the end of Grade 4, students will:
 - **Strand D:** Visual Art
 - **Cumulative Progress Indicator 3:** Generate works of art based on selected themes.

Survival Kit Activity-

■ ■ ■ NJ- New Jersey Core Curriculum Content Standards

- **Subject :** Comprehensive Health and Physical Education (2004)
- **Standard 2.2 :** (INTEGRATED SKILLS) ALL STUDENTS WILL USE HEALTH-ENHANCING PERSONAL, INTERPERSONAL, AND LIFE SKILLS TO SUPPORT A HEALTHY, ACTIVE LIFESTYLE.
 - **Range/Grade Level 0:** Building upon knowledge and skills gained in preceding grades, by the end of Grade 4, students will:
 - **Strand A:** Communication
 - **Cumulative Progress Indicator 1:** Explain how to determine the validity and reliability of a health resource.
 - **Cumulative Progress Indicator 2:** Present health information, orally and in writing, to peers.
 - **Cumulative Progress Indicator 5 :** Explain how to identify a health problem or issue for possible research.

USA- National Health Education Standards

- **Standard** : HEALTH EDUCATION STANDARD 7 – Students will demonstrate the ability to practice health-enhancing behaviors and avoid or reduce health risks.
- **Grade** : 3-5
 - **Performance Indicator** : 7.5.3. demonstrate a variety of behaviors to avoid or reduce health risks.

IV. Performance, Objectives, Outcomes and Assessments

Performance Objectives:

- The students will be able to identify three types of rapid changes that occur naturally in ecosystems.
- The students will be able to describe one rapid change that people cause in ecosystems.
- The students will be able to list ways that people protect themselves during rapid changes in ecosystems.
- The students will be able to find one current event article on Mt. Saint Helens.
- The students will be able to find one article on past events relating to Mt. Saint Helens.
- The students will be able to use internet for information.
- The students will be able to present the information to the class.
- The students will be able to identify four safety acts to perform during a natural disaster.
- The students will be able to develop a brochure from the information above.
- The students will be able to share their research with the teacher and classmates.
- The students will be able to use interactive website to gather information.
- The students will be able to design a survival kit for a natural disaster.
- The students will be able to present their survival kit to the class and teacher.

Skills Checklist:

	Reading Skills	Sorting Skills	Vocabulary Skills	Note-taking Skills	Computer Skills	Following Directions	Sequencing	Group work skills	Creative thinking skills	Comprehension Skills	Oral Decoding Skills
1	✓✓					✓					✓
2						✓					✓✓
3						✓					
4	✓	✓				✓					✓
5						✓					✓
6	✓					✓					✓
7			✓			✓					
8						✓					
9		✓				✓					✓
10		✓				✓					
11	✓					✓					✓
12		✓				✓					
13						✓					✓
14	✓					✓					✓
15						✓					
16		✓				✓					✓✓
17	✓	✓				✓					
18											✓
19						✓					✓
20						✓					
21	✓✓					✓					
22						✓					
23		✓				✓					✓
24	✓					✓					

Multiple Choice and Open- Ended Task Challenge:

1. How does a pond change over time to a forest?
2. What is one cause of rapid ecosystem changes in ecosystems?
3. How do people try to stay safe during rapid changes in ecosystems?
4. Why might an ecosystem that is damaged by fire able to recover fairly quickly?
5. Which of these are most likely to be the first plants in a new ecosystem that has few nutrients?
 - a. Trees
 - b. Mosses
 - c. Flowers
 - d. Shrubs

6. What is the name of molten rock that erupts from volcanoes?
 - a. Magma
 - b. Lava**
 - c. Vent
7. What is the name of molten rock within the Earth's crust?
 - a. Magma**
 - b. Lava
 - c. Vent
8. Composite volcanoes are made up of layers of lava and _____.
 - a. Conduit**
 - b. Ash
 - c. Magma
9. Which of the following would you NOT want to include in a survival kit?
 - a. Flashlight
 - b. Flare
 - c. Milk**
10. What should you include for first aid in a survival kit?

Other Unit Assessments:

The other unit assessments done in this unit would be short worksheets done after each lesson. Also, the students performed several oral presentations that were graded by rubrics. Simply observing how the students were working with others, on the computers, researching, and doing crafts would be another part of the assessment.

V. Implementation

Introductory/Motivating Activity: The motivating activity for this unit would be a short film on Ecosystem changes. The video (see references) is about the different ecosystems in the world and how they are affected by slow and rapid changes. The students will be interested in this video and hopefully understand how important it is to learn about this topic.

Culminating Activity: To close the instruction of this unit I will address the importance of learning the survival in any ecosystem, even those we do not live in. I will have the students assist me in hanging up the work they have done throughout the unit on the Ecosystem Changes bulletin board in the classroom and also out in the hallway for the school to see.

Home Connection Activities: To engage the student's family with the unit, I will have them bring home their survival kits and present the same information they had done in class. The students will know the importance of survival in for their own families and have the feeling that they helped out in the safety routine their family will take on.

VI. Performance Assessment

Lesson 1: Science

The students will be able to:

Identify three types of rapid changes that occur naturally in ecosystems.

*Domain of Bloom's Taxonomy- Knowledge

Describe one rapid change that people cause in ecosystems.

*Domain of Bloom's Taxonomy- Comprehension

List five ways that people protect themselves during rapid changes in ecosystems.

*Domain of Bloom's Taxonomy- Knowledge

Oral Directions for Performance Assessment:

After reading about slow and rapid changes we will be able to fill out this graphic organizer and then answer the questions for the assessment. First, we will complete the graphic organizer that I have drawn here on the board, and that you have on the second page of your assessment. The words in the bank need to be placed in the correct circle, either the rapid changes circle, or the slow changes circle. I call on some of you to come to the board and place the correct words in the circles. After completing the graphic organizer, we will read over the questions together and then you will complete them on your own.

Explanation of Assessment: The assessment given for the Ecosystem Changes lesson was part worksheet and part graphic organizer. The worksheet was worth twenty points and the graphic organizer worth sixteen points. The graphic organizer has a rubric for grading. While doing the graphic organizer the class went to the board and filled in the answers as well. Part of the rubric includes the oral part of the assessment.

Assessment Accommodations: The assessment accommodations that were done for this performance assessment was having an oral part, written part, and graphic organizer. Doing this can make the assessment doable for all types of learners. The students in ELL would be out of the classroom for the assessment.

Scoring Rubric:

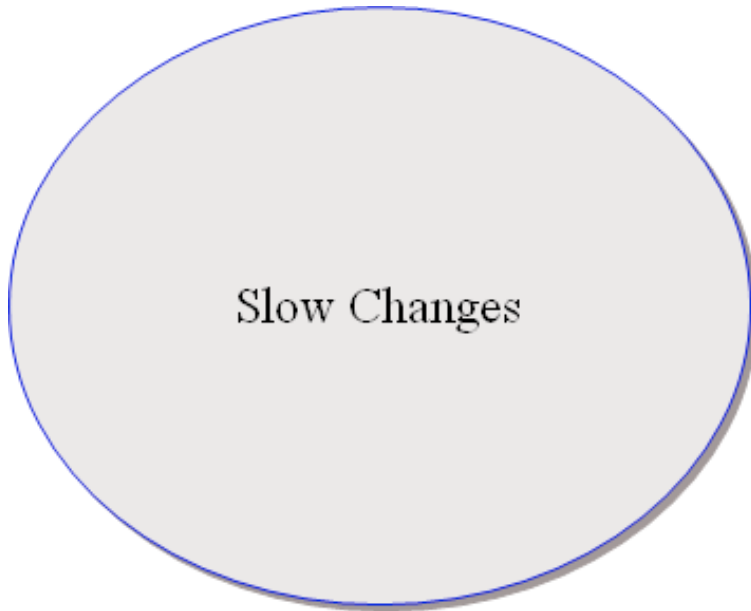
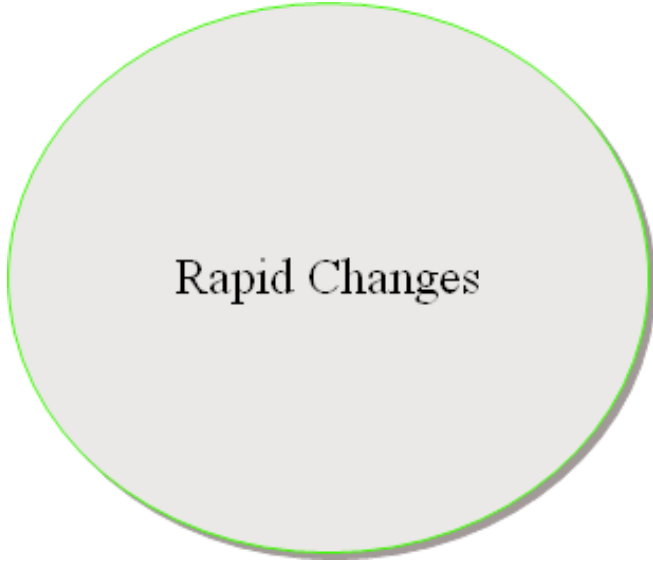
Ecosystem Changes

Levels:					
Criteria:	1	2	3	4	Score
On Task	Constantly talking to others in room, rarely works on task	Sometimes talks about unrelated subjects	Usually follows the task and talks only to partner	Always follows the steps of the task and sometimes goes beyond the concepts	
Reflective Habits	Student does not carry knowledge over from one problem to the next. Does not look back over work when finished with a problem.	Student occasionally transfers knowledge from one problem to the next. Sometimes looks back over work.	Student often transfers knowledge from one problem to the next. Usually looks back over work.	Builds on prior knowledge and experience. Goes over work thoughtfully to make sure solution makes sense.	
Strategies and Representations	Student does not make use of problem solving strategies, models, or scientific representations.	Student makes use of a single problem solving strategy, model, or scientific representation.	Student uses a clear strategy to solve the problem and an appropriate model or representation to explain or enhance the solution.	Student uses multiple strategies and representations that clearly explain and enhance the solution.	
Explanation	Explanation is unclear, confusing, and/or incomplete.	Explanation is incomplete. Alludes to underlying science, but does not evidence full understanding.	Explanation is clear and complete. Alludes to underlying science, but does not evidence full understanding.	Explanation is clear and complete. Student evidences understanding of science behind problem.	

Name: _____

Date: _____

Word Bank:
Forest Fire
Thunderstorm
Succession
Erosion
Climate Changes
Hurricane
Tornado
Volcano



Student Outcome/Scores: **Top Five Scores** **Lowest Five Scores**

Student	Score
1	96 %
2	84%
3	60%
4	94%
5	100%
6	100%
7	100%
8	83%
9	100%
10	96%
11	91%
12	100%
13	100%
14	88%
15	77%
16	100%
17	98%

18	100%
19	82%
20	85%
21	100%
22	100%
23	78%
24	100%

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