



Chapter 1 – From Mammoths to Motor Vehicles - *Seaway Trail Wildguide*

Lesson #1 - Ice Age

Grade 4 – 6

Subject: Science, Social Studies

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Anticipatory Set:

What do you think of when you hear the words “Ice Age”? What is an Ice Age? When was the last Ice Age? Describe what the land looked like during the Ice Age.

NYS Learning Standards:

Mathematics, Science, and Technology Standard 4: Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science

Objectives:

Students will understand how our area we live in now was affected by the Ice Age. The students will conduct an experiment to see how ice can affect landscape. Students will color in two maps showing the changes in the landscape over the years.

Purpose:

To have students understand how the earth surface was affected by glaciers.

Summary: Ice Age

An Ice Age is a period of time when large glaciers, ice sheets, covered much of the earth's surface. Several ice ages have occurred throughout Earth's history. Giant ice sheets advanced and retreated several times in North America and Europe. The latest ice age began 2.5 million years ago. Each cycle, about every 100,000 years, consists of a long cold period where ice sheets slowly extend followed by a relatively short warm period where the ice retreats rapidly. This process has formed the New York and Pennsylvania landscape, as we know it today.

The last ice advance was about 18,000 years ago where Lake Ontario was covered by ice. Ice covered New England, New York and parts of Pennsylvania. The Appalachian Mountains slowed the progress of the ice in the east. The Seaway Trail between Watertown and Massena was covered by salt water at one time. The climate was much like today's Canadian tundra. The weight of the ice depressed earth's crust forming lakes and valleys we know today. The ice carried gravel and rocks with it as it advanced and then dropped the rocks in the area the ice started to melt. As the ice moved southward, the glaciers created depressions that formed the basins in the Finger Lakes and the Great Lakes. The gouging left columns of harder rock in the upper part of St. Lawrence Valley that we know as the Thousand Islands today.

Lake Erie and Lake Ontario are the smallest of the Great Lakes. The Great Lake system contains 95% of the surface fresh water of the United States and 20% of the surface fresh water in the world. Lake Erie, the second smallest lake, is the shallowest of the Great Lakes. Lake Ontario, the smallest lake, is considered the 3rd deepest of the Great Lakes. Lake Ontario receives drainage from all of the other lakes through the



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Niagara River, which is 80% of all its inflowing water. The lake drains into the north through the St. Lawrence River into the Atlantic Ocean. The amount of water that flows out of Lake Ontario in 10 minutes is enough to supply water needs in New York City for a day.

We are now in a warm period that has lasted longer than 10,000 years, which is longer than many of the previous warm periods. If the cycles hold true we are due for a cold period. Some scientists believe we are having above average global temperatures due to the releases of green house gases from burning fossil fuels. Some believe that with continued human-caused global warming could disrupt or override the natural climate cycle of the ice age.

Materials:

1. Sand or dirt (dampen the sand or dirt)
1. Aluminum Pan
2. Water
3. Dixie cups with frozen water in them to create a large ice cube. Keep in mind the size of the cube and the length of time you have for the lesson for the ice cube to melt.
4. Pebbles (Take the pebbles and some sand and freeze them in another set of Dixie cups. You will have created a large ice cube with rocks and sand frozen in them.
5. Overhead maps of North and South America during Ice Age and today.
6. Overhead maps of New York Seaway Trail during Ice Age and today.
7. Copies of a map of New York Seaway Trail where each student will have two copies.
8. Colored markers to fill in the maps

Teach: The idea for this lesson came from a web site :

<http://school.discovery.com/lessonplans/programs/iceage/index.html>

1. Create a timeline showing the students the cycles of the Ice Age as you explain them.
2. Have the students break up into groups of two.
3. Have the students take the sand and place it in the aluminum pan. Have the students create a landscape with the sand.
4. Have the students take the Dixie cup with the large ice cube and have the students push the ice cube across the landscape.
5. Have the groups record their findings. How does the moving ice affect the landscape? What happens when the ice melts?
6. Take the Dixie cups with the pebbles, sand frozen in the ice and repeat the steps of taking the ice cube across the landscape. What happens when the ice melts? What does the ice cube create on the landscape?
7. Once the groups have recorded their findings have the students discuss what they have learned through the experiment.
8. The teacher will show an overhead picture of North and South America during the Ice Age and one picture on how it looks today. Discuss with the students the changes in the landscape.



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9. Handout the maps of New York and the Seaway Trail. Each student should receive two maps.
10. Show the students the map of New York and the Seaway Trail during Ice Age and what it looks like today on the overhead.
11. Have the class work together as you place one map on the overhead. Color in the areas where water, ice and land are in New York today.
12. Take the second map and have the class work together to color the map showing where the ice, water and land were 18,000 years ago.
13. Discuss the difference between the maps.

Guided Practice:

As the students work on the ice cube activity the teacher will go around to the groups and check on the progress of each group. The teacher will guide the students in coloring the maps using the overhead.

Closure:

Ask the students to define Ice Age. Ask the students what affects does the ice have on the Earth's surface. Ask the students what do they think may happen in the future if we stay in a warm period and if we go into a cold period.

Extended Activities:

1. Have the students research the different animals that lived during the Ice Age. Give the students a fact sheet of information they need to find out about the animal. The sheet should include several items of information about the animal they are assigned or they picked. They should included the scientific name, common name, physical description, height, closest relative, diet, extinction status (did it become extinct, change into a smaller variety, or migrate?)
2. Take information from research and create a guidebook. Choose four to six animals and color a picture of them. There is a web site that has large drawings of the ice age animals the students could use. Write a short paragraph about the animal using the information from the fact sheets.
3. Have the students create a diorama of a scene from the ice age. They can include animals and Paleo-Indians in the scene. The scene could include type of vegetation that was around during the Ice Age. Students could write a brief report explaining their diorama scene and present it to the class.
4. Have students imagine they are Paleo-Indians living during the Ice Age. How would you survive? How would you hunt a mammoth? Have students incorporate the five senses: touch, smell, sight, sound, and taste when they describe a mammoth and the hunt. What kinds of sounds would a mammoth make? What would they feel like if you were to touch one? Would the mammoth have a certain odor? What would the meat taste like?



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5. Create crossword puzzles and word searches for students to work on. Create math problems with the movement of a glacier. Set up a problem with how much a glacier moved per year and have students figure out how many feet or inches the glacier could move in a month.
6. This lesson can be connected with Earth Science and the study of rocks. Students could try to identify the different rocks found in New York along the Seaway Trail. The discussion in class is to determine how these rocks were formed.

Web sites:

1. http://www.dmns.org/iceage/ia_giants
The Denver Museum of Nature and Science – Ice Age Giants- This site gives information on the animals during the ice age. There are pages to print out for the students to color.
2. <http://www.co2science.org/subject/c/summaries/glacialcycles.htm>
This site gives you a lot of information on the glacial and interglacial climate cycles. Also go to the link on site to: *Earth's Climate History: The Last 2,000,000 years.*
http://www.co2science.org/subject/other/clim_hist_2million.htm
This section gives you a great summary of the Earth's climate and the different glacial cycles for the past 2 million years.
3. <http://www.eurypterid.net/IceAgeLandscape.html>
This site talks about an area in Central New York, Mendon Ponds Park. It is an area where people can go and see samples of land formed from the glaciers.
4. <http://regentsprep.org/Regents/earthsci/units/weathering/landforms.cfm>
On the end of this site there is some information on glaciers a glacial depositions in New York State. The site also has maps and photos to view.
5. <http://silverwaters.com/ice%20age%20excerpt.htm>
This is a great site that gives you a summary of a book called "Edgewalker's Guide to 20 Great Beaches on Lake Ontario". The site covers information on the development of the beaches that surround Lake Ontario. According to the site the book was to be published in 2002.
6. <http://www.enchantedlearning.com/subjects/mammals/iceagemammals.shtml>
This is a great site for students on finding information on the ice age mammals.
7. <http://school.discovery.com/lessonplans/programs/iceage/index.html>
This is a lesson plan with great amount of information and ideas of activities to use for this subject. The idea for the activity for this lesson came from this site.
8. <http://www.pbs.org/wgbh/nova/ice/textindex.html>
Nova On Line – Tracks the ice age and what affects it had and also goes into the greenhouse affect.



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9. <http://library.thinkquest.org/J001457/?tqskip1=1>
This is a great site for teachers and students. The site covers the geography of the Ice Age. The site covers the Asians coming to America and how they traveled. It also goes into their art of cave painting. The site has a quiz the students can take after visiting the site.
10. <http://www.epa.gov/globalwarming/kids>
This is a great site for students to visit and learn what global warming is and what greenhouse effect is. The site has games for the students to play.

Books for research:

1. "Roadside Geology of New York" – Bradford B. VanDiver, Mountain Press Pub. Co., Missoula, MT, 1985.
2. "After the Ice Age: The Return of Life to Glaciated North America", E.C. Pielou, University of Chicago Press, Chicago, 1992, ISBN 0226668126
3. "Seaway Trail Wildguide to Natural History" - Donald D. Cox, Seaway Trail Foundation, Sackets Harbor, NY, 1997

Books for children to read:

1. "Woolly Mammoth" Life, Death and Rediscovery - Windsor Charlton, Scholastic Reference, April 2001 ISBN 0439241340 (Ages 8-12)
2. "When Mammoths Walked the Earth" – Caroline Arnold, Clarion Books, Sept. 2002, ISBN 0618096337 (Ages 9-12)
3. "Who Are You Calling a Woolly Mammoth?" Prehistoric America, Elizabeth Levy, J.R. Havlan, Dan McFeeley, Scholastic, Sept. 2001, ASIN 0590129384
4. "Frozen Earth" Explaining the Ice Ages, Ronald V. Fodor, John Imbrie, Enslow Publishers, Inc., March 1981, ASIN 0894900366 (Ages 12 and up)
5. "Icebergs and Glaciers: Life at the Frozen Edge", Barbara Wilson, Art Wolfe, Silver Burdett Pr., May 1995, ASIN 0382248597
6. "Ice Age", Darlene Stille, New Tree Books, 1990, ISBN 0516411071