

Objectives

Students will

- discuss glaciers and how they change the land;
- do an activity that illustrates how glaciers change the land, and
- make a class list of what causes changes to our planet's structure

Materials:

- Paper and pencils
- Newsprint and markers
- Ice cube tray
- Water
- Sand
- Two plastic cups for each group
- Teaspoon
- Paper towels

Procedures:

Note: Before beginning the lesson, prepare the ice trays for the student activity. Make enough ice so that each group has two clear ice cubes and two that have been frozen with sand on the bottom. Then put the other materials in a central place so students are ready to begin immediately following the opening discussion.

1. Begin the lesson by asking students if they know what a glacier is. Write their ideas on the newsprint. As a class, arrive at a definition of a glacier. A sample definition follows: a large body of ice moving down a slope, pushing rocks and sand as it travels. Glaciers are responsible for new landforms; an example is Long Island in New York.

Ask the students if they know where glaciers are (cold areas, northerly areas etc).

Discuss how Glaciers used to be in New York State (20,000 years ago)

Show the students the images of glaciers (Alpine glacier spilling into river, Antarctica, the image of North America showing the maximum extent of glaciation)

2. Tell students that they will participate in an activity that will demonstrate how glaciers can cause dramatic changes. Divide students into small groups; tell them to select one person in each group who's responsible for collecting materials for the group.

3. Have the designated students gather the materials for their groups. At this point, retrieve the ice cube trays from the freezer. Put two clear ice cubes in one cup and two sandy ones in another for each group. Distribute the cups, two for each group.

4. Tell students to use a paper towel to pick up one of the sandy ice cubes. Instruct them to hold this ice cube against the side of the plastic cup and rub the bottom of the cube back and forth several times. Make sure each student in the group has a chance to rub the ice cube.

5. Ask students to carefully examine the surface of the cup where the ice cube was rubbed. Have students record their observations.

6. Then have students follow the same steps with the clear ice cube. Make sure they rub this ice cube with as much pressure and force as they used for the sandy one. Ask students to record these observations.

7. Have the groups clean up their areas as finish the activity. When all the groups have completed the activity, bring the class together for a discussion. Ask what happened after students rubbed the sandy ice cube against the cup. Ask what happened after students

rubbed the clear ice cube against the cup. Students will probably observe that the sandy ice cube made a mark on the cup, while the clear one did not.

8. Discuss with the class what the results show. Help students understand that the sandy particles in the ice cube are what caused the mark on the cup. This rubbing motion is similar to the way glaciers cut deep depressions in Earth's surface.

9. Show them the photo of New York State, point out where Buffalo is, then point out the finger lakes, remind them of the scratches on their cup and tell them that the Finger Lakes were created this same way.

10. Now – ask them what they think will happen when the ice melts. What will we be left with? Use a small pile of sand to demonstrate. Point out Long Island on the New York State Map. Discuss with them how this is just the material that got left behind when the glacier melted.

11. Conclude the lesson by asking students if they can think of other natural forces that cause changes on the Earth's surface. Possible ideas include flowing water, wind, and the movement of tectonic plates or underground water. Record students' ideas on a sheet of newsprint. Keep the list available so students can add additional ideas.

Image 1: Alpine Glacier



Image 2: Antarctica

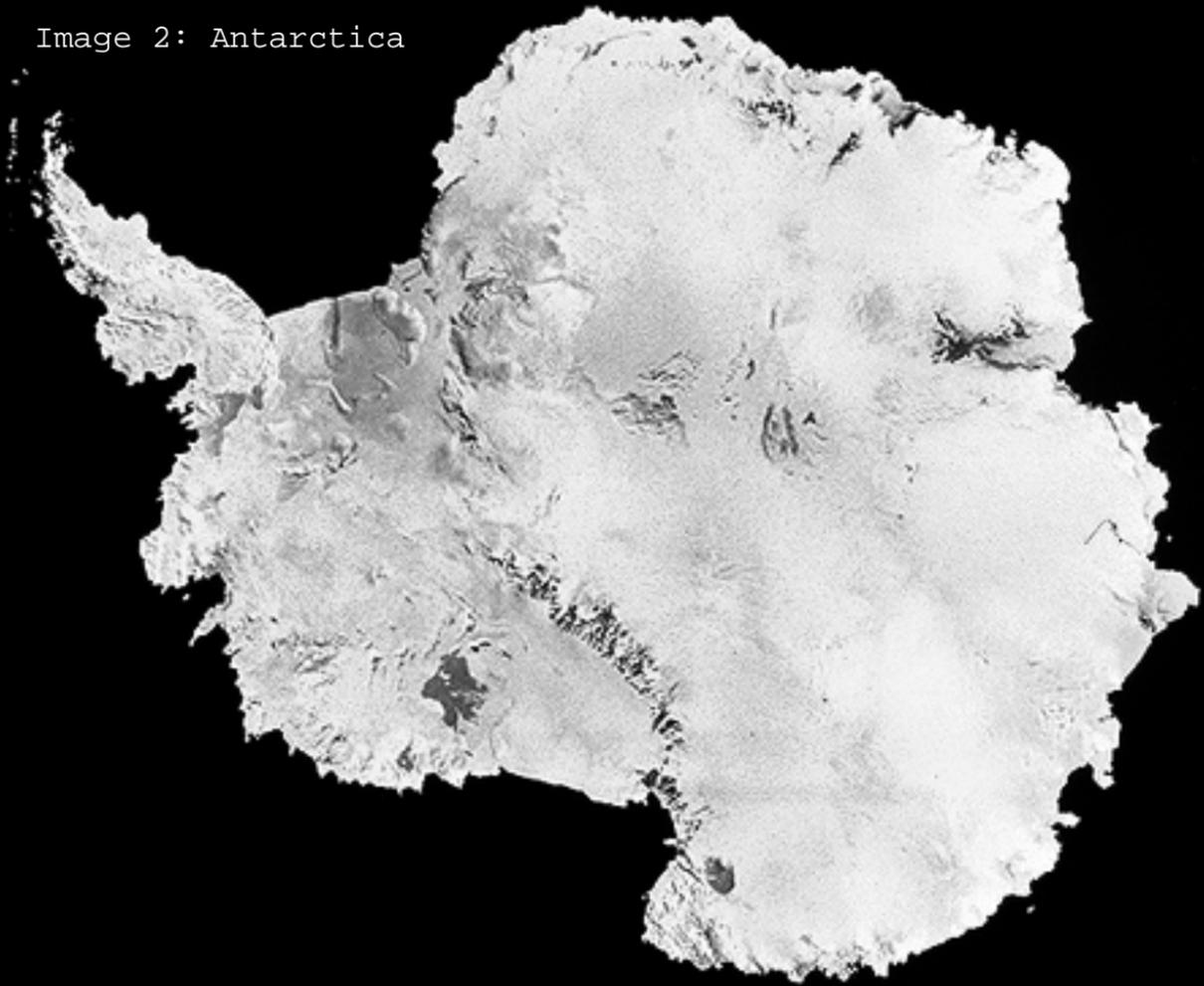




Image 3: North America Under Glaciation
Approx 12,000 years ago

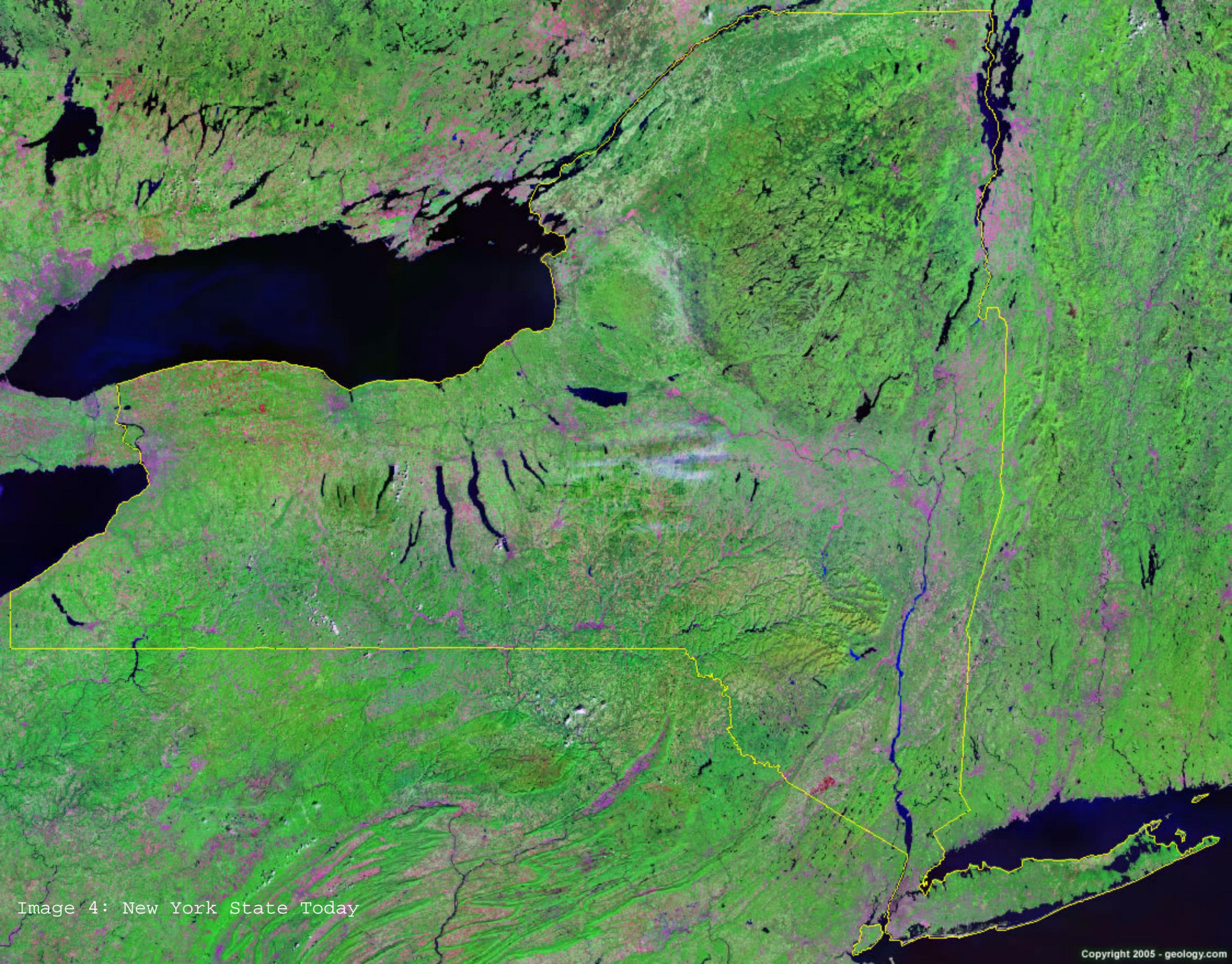


Image 4: New York State Today



Canadaigua Lake

Cayuga Lake

Owasco Lake

Otisco Lake

Conesus Lake

Honeoye Lake

Hemlock Lake

Canadice Lake

Keuka Lake

Skaneateles Lake

Image 5: Finger Lakes

Seneca Lake