



National Park Service  
U.S. Department of the Interior  
Pictured Rocks National Lakeshore  
[www.nps.gov/piro/forteachers.htm](http://www.nps.gov/piro/forteachers.htm)

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## “Shape Shifting” Winter Sixth Grade In-Class Activity

**Michigan Science Objectives:** At the end of this lesson, students will become familiar with the following knowledge (and hopefully attain at the end of the field trip):

1. Explain how surface features changed in the U.P. (lakes were formed by glaciers) (Geosphere 10).
2. Describe two types of climates that have existed in the U.P. (temperate and tropical) (Atmosphere 11).
3. Describe the process of succession of an ecosystem (lake) over time (Ecosystem 9).
4. Describe (water) erosion (Changes in Matter 6).

**Thinking Skills:** Observe, make analogies.

**Overview of Activity:** Through activities at three hands-on stations, students will begin to understand how change has occurred in the landforms, life forms and climate of the Upper Peninsula over time and how changes are still occurring to the environment.

**National Park Connection:** National parks preserve areas that tell the history of change in our natural and cultural resources and protect representations of different time periods we can learn from and enjoy.

### **Procedure:**

"Today you will work in groups at three investigation stations to learn about four instruments of change in the Upper Peninsula. Before we begin, I would like to explain a little about the concept of time first."

"Geologists believe our earth to be 3-4 billion years old. That is three thousand million years. Let's write that on the board. It would look like this. 3,000,000,000. If you compared that amount of time to 60 minutes, humans have been on the earth about two seconds compared to 10 minutes for other life forms. It is believe that the first life, some algae, appeared on earth about 500 million years ago (500,000,000). We usually measure time in seconds, minutes, hours, days, weeks and years. We are around for 80 years if we are lucky. The oldest living thing on earth is the bristlecone pine tree in the mountains of California. Some are believed to be 3,000 years old!"

"Everyday you change. Cells in your body grow and die. Look under your bed to see dead skin cells. So it is with all living and non-living things on earth; they are in the process of becoming something else. For the next 20 minutes, I would like you to investigate four different forces of change. You will work in groups, and then we will review your findings afterwards."

**Directions:** "Work in groups of seven to nine students. Please begin as soon as you have all the directions. You will have 10 minutes to conduct each investigation. There are three investigations."

"Each group must first elect a person to do each of the following jobs, if you do not have a job at the first station, switch with someone for the next. Everyone needs to do at least one job."

Reader: Read directions to your group.  
Materials Manager: Gathers materials, returns materials, and cleans up after use for next group to use.  
Investigator: Actually conducts experiment as called for.  
Recorder: Writes information down on data sheet.  
Presenter: Reads or explains findings to rest of class after all investigations are completed.  
Timekeeper: Keeps track of time allotted to conduct each activity.

**Materials Needed:**

\_\_\_\_\_ Investigation 1

- \_\_\_ picture of bristlecone pine
- \_\_\_ plastic trays with sand in bottom (2)
- \_\_\_ pictures of beach/dunes (2)
- \_\_\_ metal moonshine cups (2)
- \_\_\_ sand blobs per class (3)

\_\_\_\_\_ Investigation 2

- \_\_\_ plastic trays with sand in bottom, 3-inches deep (2)
- \_\_\_ ice blocks per class (2)
- \_\_\_ ice cubes per class (2)
- \_\_\_ pieces of Petoskey stone (2)
- \_\_\_ animal pictures (6): \_\_\_ condor \_\_\_ monkey \_\_\_ bear
- \_\_\_ ecosystem pictures (6): \_\_\_ reef \_\_\_ rain forest \_\_\_ forest

\_\_\_\_\_ Investigation 3

- \_\_\_ teaspoons (2)
- \_\_\_ baggies sand per class (2)
- \_\_\_ clear cups with water (2)
- \_\_\_ drawings of same lake - 2 sets (4)



## **Investigation 1: Directions and Data Sheet**

Materials needed: pan with sand in bottom, cup of water, picture of beach, sand blob in a pan, 2 cups of water, picture of Pictured Rocks cliffs

### **Part A**

**Step 1:** Tilt the pan with the sand in it about 45 degrees. Slowly pour one cup of water into pan from the top of the pan. Observe.

**Step 2:** Write your observations here.

**Step 3:** Look at the picture of the beach. How is the formation of the beach in the picture related to what happened to the sand in your pan?

### **Part B**

**Step 1:** Very slowly pour one cup of water on to the sand blob in the pan. Observe.

**Step 2:** Write your observations here.

**Step 3:** Look at the picture of part of the Pictured Rocks Cliffs. How is the shape of these cliffs related to what happened to the blob in your pan?

Based on these activities, what force of change is involved.

## **Investigation 2: Directions and Data Sheet**

Materials needed: ice block, ice cube, tray with gravel in it, sample with magnifying lens, 3 animal pictures

### **Part A:**

**Step 1:** Put ice block in one end of tray with gravel bottom. Push down slightly on block and slide it to middle of tray. Lift up block and put cube under. Push down with the block then slide the block back to starting position. Observe what happened.

Explain how this is an example of something that has occurred in this area in the past.

### **Part B**

**Step 1:** Carefully examine the white object with your eyes and a hand lens. Look for clues to determine what it is.

**Step 2:** Compare the object to the three pictures of animals.

**Step 3:** State which of the pictures you think your object used to be and explain why you think so.

**Step 4:** Look at the pictures of areas that have three different climates. Which climate do you think your object lived in?

**Step 5:** Is this type of climate still in Michigan?

### **Investigation 3: Directions and Data Sheet**

Materials needed: teaspoon, baggie of sand, cup of water, four drawings of the same lake over time,

#### **Part A:**

**Step 1:** Slowly add teaspoons of sand into cup of water. Each teaspoon represents the passage of ten years. Observe.

**Step 2:** Write down your observations.

#### **Part B**

**Step 1:** Look at four drawings of the same lake. These represent four changes in the lake that will occur in 200 years. Write down the succession (or order of changes) that will happen to the lake from the first stage to the last stage. Write down the letters from first to last on the drawings labeled "E" "M" "T" and "I".

**Step 2:** How is the experiment with the sand and water related to changes that can occur in a lake?

#### **Part C**

**Step 1:** Just like people, lakes are born and eventually die. Based on the above two activities explain the following statement, "*All lakes are dying.*"

Review each investigation. What process of change does each represent? (change by water erosion, change due to climate, change due to aging)

Do you know when the glaciers covered this area or when warm shallow salty oceans covered the Upper Peninsula? You will find out during the field trip to Pictured Rocks this winter. You will also learn about other important periods of time and change our world has gone through.