

**ITQ ARTS AND SCIENCE INTEGRATION
GRADE 4
DANCE AND EARTH SCIENCE**

**Move it Around - Erosion
Lesson #2**

Teach Grade 4, FOSS, Investigation 5, Part 2, *Erosion*.

CONTENT STANDARDS

Dance Grade 4

- 1.4 Explain the principles of variety, contrast, and unity and apply to a dance sequence.
- 2.1 Create, develop, and memorize set movement patterns and phrases.

Earth Science Grade 4

- ES5a** Students know some that changes in the earth are due to slow processes, such as erosion, and some changes are due to rapid processes, such as landslides, volcanic eruptions, and earthquakes.
- ES5c** Students know moving water erodes landforms, reshaping the land by taking it away from some places and depositing it as pebbles, sand, silt, and mud in other places (e.g., weathering, transport, and deposition).

ESSENTIAL QUESTIONS (*Questions students might ask about the topic*)

- What is erosion?
- How can I show erosion through dance?

OBJECTIVES & STUDENT OUTCOMES (*Students will be able to.....*)

- distinguish between weathering and erosion
- create and perform a two-part dance showing erosion

ASSESSMENT (*Various strategies to evaluate effectiveness of instruction and student learning*)

- **Feedback for Teacher**
 - Student response to inquiry
 - Student performance
 - Student revision of work
- **Feedback for Student**
 - Feedback from teacher
 - Feedback from peers
 - Viewing Videotape

WORDS TO KNOW

Dance

- **AB Form:** A two-part compositional form in which the second section contrasts with the first section.
- **Contrast:** To set side-by-side to emphasize differences.

Science

- **Erosion:** The carrying away of weathered earth materials by water, wind, or ice.
- **Glacier:** A large mass of slow moving ice.

MATERIALS

- 7 pieces each of 4' square fabric: 1 piece dark blue (water), 1 piece light blue (frozen water), 2 pieces

<p>green (roots), 1 piece red (acid rain), and 1 piece yellow (wind), 1 piece white (glacier)</p> <ul style="list-style-type: none"> • Create labels for “I am Wind”, “I am Ice – Glacier”, and “I am Water” • “Erosion Instruction Sheet” (included) • CD Player and music • Video Camera • Science notebooks (1/student)
<p>RESOURCES</p> <ul style="list-style-type: none"> • Internet <ul style="list-style-type: none"> ○ http://www.kidsgeo.com/geology-for-kids/0074-erosion-rivers-lakes-streams.php ○ http://www.geography4kids.com/files/land_erosion.html ○ Visible Thinking Routines, “What Makes You Say That”, found at: http://www.pz.harvard.edu/vt/visibleThinking_html_files/03_ThinkingRoutines/03a_ThinkingRoutines.html
<p>PREPARATION</p> <ul style="list-style-type: none"> • Rehearse the three dances from lesson one. • Teach Grade 4, FOSS, Investigation 5, Part 2, <i>Erosion</i>. • Make one copy of each “Erosion Instruction Sheet”. • Have science notebooks ready. • Have pieces of fabric ready. • Have music and player ready. • Plenty of space to move freely and safely.
<p>WARM UP (<i>Engage students, access prior learning, review, hook or activity to focus the student for learning</i>) (5 minutes)</p> <ul style="list-style-type: none"> • Review each of the three dances from lesson #1. • Ask: <ul style="list-style-type: none"> ○ <i>What do you know about erosion?</i> [Accept student answers.] ○ <i>Which three natural forces contribute to erosion?</i> [Accept student answers. Moving wind, water, and ice contribute to erosion.] • Say: <i>The most influential force in erosion is water. Water’s ability to move materials from one place to another place, along with the fact that it is found everywhere along the surface of the Earth, make it a superb tool for erosion. Wind and glaciers can also move earth materials from one place to another.</i>
<p>MODELING (<i>Presentation of new material, demonstration of the process, direct instruction</i>) (10 minutes)</p> <ul style="list-style-type: none"> • Say: <i>Erosion is an easy idea to understand. If you see a rock, pull it out of a mountain, and throw it down on the ground. You are now a part of the erosion of that mountain. You have taken a big object (a mountain) and started to take little objects out of it (a rock). When that rock hit the ground, it could have cracked and made some tiny pieces of rock (sand). Erosion is just that easy. When it rains, the same process happens. Rocks are washed down a mountain or down a stream. Soils are washed away. Weathering and erosion always happen in a downhill direction.</i> • Say: <i>The ocean waves beat against a cliff and break it apart. If you go to Sunset Cliffs or La Jolla Cove, you can see this process happening everyday.</i> • We are going to create a demonstration of ocean waves eroding rocks along the shoreline. <ul style="list-style-type: none"> ○ Say: <i>Think about how you will show the wave cycle: waves moving on shore, crashing upon the rock, and receding again.</i> ○ Ask: <i>How will you show the rock cliffs, the waves and pieces of the rock breaking and being tumbled in and out with the tide?</i> <ul style="list-style-type: none"> ➤ Have six or ten students create a shape to represent the cliff.

- Have four to six students create movement for the waves.
- Have the rock shape decide which two students will break off (one at a time) and move with the waves.
- The remainder of the class will watch how the group solves the problem.
- Encourage safety! Even though waves crash against the rocks students must find ways to show and demonstrate this safely.
- Play music provided with lessons and perform the dance for about 30 seconds.
- *Ask: What did you observe in the dance?* [Students should report that when the water hit to rock, pieces broke off. the broken pieces traveled away from the cliff when the tide went out and traveled toward the rock when the wave. Students should also comment on how the cliff lost pieces of rock.]
- *Say: When the force of the water broke off pieces of the cliff and moved them away, this is called **erosion**.]*
- *Ask:*
 - *How will different sized rocks move in rushing water?* [Accept student responses. Guide students to understand that heavier rocks will move slower with less distance than pebbles or sand.]
 - *If we were going to do this dance again, what would the movement look like for heavy rocks, lighter pebbles and very light sand?* [Heavy rocks do not travel far, whereas pebbles move farther than heavy rocks and sand moves farthest of all because the grains are light.]

GUIDED PRACTICE (*Application of knowledge, problem solving, corrective feedback*)

(25 minutes)

- Students will add on to the dance they started in lesson #1 by creating movement for the **erosion** process.
- Note: Recap the stream table experiment done in Investigation 5, Part 2. Quickly discuss the observations (e.g., the pebbles did not move as far as the sand, sand was taken out of the tray and deposited into a container, the moving water carved a canyon in the tray, etc.).
- Distribute a colored piece of fabric to each of the three groups. One group will perform erosion by wind (yellow fabric), water (dark blue fabric), and frozen water/ice (as in **glaciers**, the white fabric.)
- The dance will be a two-part dance to represent an AB pattern.
- Explain to students the concept of **contrast**.
 - *Ask: What does contrast mean?* [Accept student answers].
 - *Say: Contrast in dance means that parts of a dance appear different from one another. Last week we created part A of our weathering dance. Today we will be creating part B of the weathering dance. This is called a two-part or AB dance. A dance done in an AB pattern has two sections that are **contrasting**.*
 - *Ask: If we saw a dance with three sections that were contrasting, what would we call that pattern?* [ABC].
 - Part A: weathering (from lesson #1)
 - Part B: **erosion** by either wind, water or frozen water/ice (glacier)
- Each of the three group's task (from lesson #1) will be to create movement for part B of the dance: **erosion**. Pieces of the shape (rock) that were broken off of the rock shape will be taken to another place (**erosion**) in the performance space.
- Distribute an "Erosion by Frozen Water/Ice (Glacier) Instruction Sheet" to group 1, "Erosion by Wind Instruction Sheet" to group 2, and "Erosion by Water Instruction Sheet" to group 3.
- Have students to read the description and create the two-part dance.
- *Ask:*
 - *Where will the weathered pieces of rock be taken? Look around the room and find the open space.*
 - *In which will direction will you travel?*
 - *How far or how fast will you move?*
 - *What is a glacier?* [Large body of frozen water that travels slowly down a mountain slope].
 - *What is the difference between a breeze and a wind?* [A breeze is the slow movement of air and a wind is fast moving air].
- *Say: Let's consider a river. Rivers move swiftly. There are large heavy rocks, small pebbles and sand*

in the river. Which of these will move the fastest with the river current and why? [The heavy ones will move slowly or not at all while the pebbles will move quickly, the sand will move the quickest and furthest downstream because they are lighter].

- Allow 15 minutes for the students to read and discuss the introduction, and to create part B of the dance. Move among the groups and coach.
- Use music provided with lessons.
- Perform one group at a time and videotape demonstrations.

DEBRIEF & REFLECT (*Identify problems encountered, ask and answer questions, discuss solutions and learning that took place. Did students meet outcomes?*)

(10 minutes)

- Ask (about the dance):
 - *What do you see? What is going on in the dance?*
 - *How many parts does our dance have and what is the pattern?* [Our dance has two parts and it is an AB pattern.]
 - *What about part B of the dance showed **contrast** to part A of the dance?* [There was more locomotor movement of the weathered pieces of rock. they traveled to another space in the room].
- Ask (about the science):
 - *What is erosion?* [The carrying away weathered earth materials by water, wind or frozen water {ice}].
 - *Through what medium (wind, water, frozen water {glacier}) did **erosion** happen in our dances?*
 - *How will rocks, pebbles, and sand move in a river?* [Rocks will travel less distance because they are heavy. Pebbles will move farther than rocks and sand will move farther than pebbles and will eventually settle on the bottom of a riverbed.]
 - *How does **erosion** happen in rivers, deserts, and **glaciers**?* (Have each group report back what they read on their instruction sheet.)
 - *If water continues to flow across land what do you think will happen?* [It will form a canyon just like in our stream tray experiment.]
- Have students respond to the following prompt in their science notebooks.
 - *How is the water **erosion** dance similar to our stream table experiment?* [They both showed **erosion** by water. In our stream tables, the sand moves further than the pebbles before being deposited into the water basin.]

EXTENSION (*Expectations created by the teacher that encourage students to participate in further research, make connections, and apply understanding and skills previously learned to personal experiences.*)

- Rehearse dances until all three parts are memorized. Give students time to review videotape, accept feedback and revise their work.
- Continue to document **erosion** in journals.

Erosion Instruction Sheet
EROSION BY WIND

READ: Wind, when it carries bits of sand and grit, can blast away layers of rocks that are in the wind's way. □ Sometimes only the soft layers of the rock are eroded, leaving interesting shapes. □ This kind of erosion usually only happens in very dry, desert like areas.

Part A. Rehearse the first part of your dance (WEATHERING).

Part B.

1. Choose one person to hold the yellow scarf and wear the label "I am wind".
2. As a group, decide how you will show EROSION by wind.
 - How strong is the wind? Is it a breeze or a strong wind?
 - Will the wind change speed?
 - In what direction will the wind blow and the rocks travel?
 - Will large pieces travel as far as smaller pieces?
 - At what speed will the large and small pieces travel in wind?
3. Perform for 16 beats and all freeze in frozen shapes.

Erosion Instruction Sheet
EROSION BY WATER

READ: Water causes much erosion. When the rain falls heavily, as in monsoons, flooding can happen.

Rivers with a lot of rushing water can cause mudslides and erode riverbanks. □ Rushing waters that move quickly roll rocks around. This causes the sharp edges of the rocks to get knocked off and that is why river rocks are so smooth and look polished. In fast moving water, rocks get picked up and carried swiftly away where they bounce along in a river, smashing into other rocks on their journey downstream.

Part A. Rehearse the first part of your dance (WEATHERING).

Part B.

1. Choose a person who will hold the dark blue scarf and wear the label "I am wind".
2. As a group, decide how you will show EROSION by water.
 - How fast will the water flow?
 - Where will the pieces of rock be taken to and how will they travel?
 - Will large pieces travel as far as smaller pieces?
 - At what speed will the large and small pieces travel in wind?
3. Perform for 16 beats and all freeze in frozen shapes.

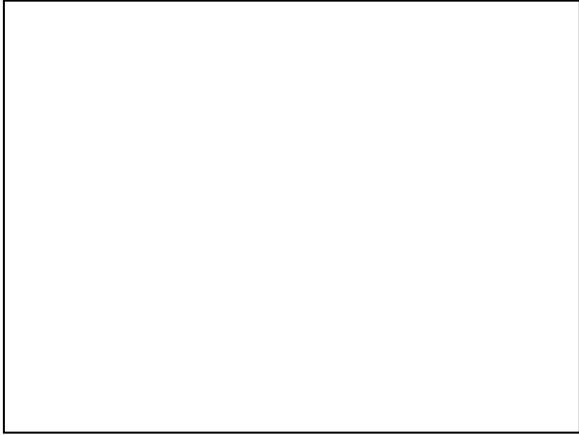
Erosion Instruction Sheet
EROSION BY FROZEN WATER/ICE (GLACIER)

READ: High up on the mountains, snow and ice build up into **glaciers**. **Glaciers** weigh heavily on the rocks beneath and slowly push them downhill under the force of gravity. As the **glacier** slowly moves down the mountainside, the rocks tumble and carve out a path in the bedrock as they are pushed along. **Glaciers** pick up and push other large rocks, sand and pebbles down the mountain slope as it moves. Glaciers melt and recede very slowly and when they do, they leave a scattered deposit of rocks, sand and silt.

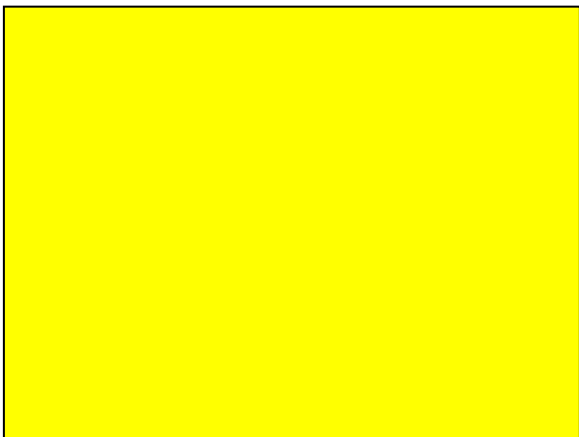
Part A. Rehearse the first part of your dance (WEATHERING).

Part B.

1. Choose a person who will hold the white scarf and wear the label "I am frozen water - glacier".
2. As a group, decide how you will show EROSION by frozen water/ice (glacier)
 - At what speed does a glacier travel?
 - Where will the pieces of rock be taken and how will they travel?
 - Will large pieces travel as far as smaller pieces?
 - At what speed and force will the large and small pieces travel by glacier?
3. Perform for 16 beats and all freeze in frozen shapes.



GLACIER



WIND



**WATER
RIVER**