

# Outdoor Beauty

**Grade Level:** Grade 4 – 5

**Content area(s):**

Science, Visual Art

**Classroom Time:** Class prep time: 1 hr, Experiment occurs over several days.

**Purpose:** Students will explore the effects of erosion and the importance of soil preservation while planning, planting and caring for an aesthetic looking garden.

**Skills Addressed:**

Science skill: Inquiry, environments and earth materials

Visual Arts Skill: Differences in materials and media, connect visual arts to other disciplines

**Supplies:**

Paper/journal, pencil/pen, crayons/markers, rocks with cracks, water, chalk, lemon juice/vinegar, containers, soil, shallow boxes, scissors, jars, access to a freezer, cups or sprinkling cans, local plants and or seeds, optional – top soil, mulch, things needed to create a garden space, trowels, shovel, colored pencils/markers,


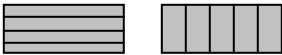
**Lesson Process:**

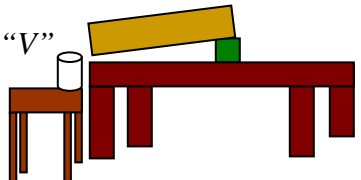
Warm-up –

1. Ask students if they have gardens at home. – *Yes or no*
2. If they do, what types of gardens do they have? – *Ex. Vegetable, flower, specific type of flower gardens, etc...*
3. Ask the students why we have gardens? – *Ex. To grow food, to look nice, to stop erosion, etc...*

Lesson procedure –

1. Share with the students that gardens are used to stop erosion.
2. Define *erosion*. – *The moving of materials, soil, rocks, etc. by rain, wind, fire, ice, and humans* - <http://www.sciencenetlinks.com/lessons.cfm?BenchmarkID=4&DocID=454>, [http://www.geography4kids.com/files/land\\_erosion.html](http://www.geography4kids.com/files/land_erosion.html), <http://geography.about.com/od/physicalgeography/a/erosion.htm>
3. Explain to the students there are different types of erosion – *Geologic or natural (wind, water, ice, sea, gravity) and accelerated (human activity – destroy vegetation, alter contour of the ground, farming, construction, logging and mining)*
4. Ask students the following questions.
  - Where have they seen or heard about erosion happening? – *Ex. Flooding, hills, etc.*
  - What famous areas have been created by erosion? – *Ex. Grand Canyon, coasts, natural landscapes, etc.*
  - What are some possible things we could do to stop erosion? - *Ex. Not cut down trees, landscape, plant trees, build dykes and dams, etc.*
5. Explain the experiment the students are going to do. - [http://qldscienceteachers.tripod.com/junior/expt/geology\\_erosion.html](http://qldscienceteachers.tripod.com/junior/expt/geology_erosion.html)
  - *Student will be given a rock with a crack in it.*
  - *Fill the crack with water.*
  - *Put the rock in the container.*
  - *The rock will then be put in a freezer.*

- The rocks will be taken out of the freezer the next day to be observed
  - Each time the rock is taken out of the freezer water will be poured into the cracks.
  - The rocks will be put back into the freezer
  - Continue the experiment observing the rocks over a period of time to see if there is a change- the rocks will eventually break into smaller pieces
6. Ask the students what they think will happen under each circumstance. *Ex. Nothing, the rocks will crack, etc.*
  7. Have the students write down their hypothesis in their journals.
  8. The students do the experiment.
  9. *Daily check the rocks until break down occurs.* Students record their findings under their hypothesis in their journals daily.
  10. *After the experiment has concluded* - Students write down their conclusion in their journals. – *The rock broke into smaller pieces.*
  11. *After experiment has concluded* - Ask the students to write in their journals how they think this relates to nature. - *It shows us how erosion occurs, especially where the climate gets cold and warm; it shows us how roads crack with the change of seasons, etc.*
  12. *After experiment has concluded* - Ask the students if there is anything that could be done to either stop or slow down erosion in general. – *Rotate fields, build dams, plant trees and plants on hillsides, etc.*
  13. *After the previous experiment has been started* - Explain the next experiment. - <http://www2.kenyon.edu/projects/farmschool/nature/eropro.htm>
    - Students will be divided into groups of three
    - Each group will be given two boxes and some soil
    - At the shorter end of both boxes in the middle cut a wide “V or U with the lowest part 1” from the bottom. *Ex:* 
    - Put ¾” of soil in each box
    - Using their finger they are going to make “furrows” horizontally in one box and vertically in the second box *Ex:* 
    - Using blocks of the same size, prop the boxes up on a table with the cut out edge at the edge of the table and lower than the uncut edge.



“V”

    - Put a jar below the box
    - Put the same amount of water in two cups or two sprinkling cans
    - Sprinkle water over the two boxes at the same time and rate
  14. Ask the students what do they think will happen under each circumstance. – *Ex: all the soil will go into the jar, the soil in one box will go into the soil (which box? – horizontal furrows), etc.*
  15. The students write down their hypothesis in their journals
  16. The students do the experiment.
  17. Students record their findings underneath their hypothesis in their journals. - *When water is sprinkled in each box the soil from the horizontal furrows flows into the jar quicker.*
  18. Have the students answer the following questions in their journals:

- What did they see happening? - *Soil from the horizontal furrow box flowed into the jar while most of the soil from the vertical furrows stayed in the box.*
  - Explain the difference in the jars. – *One jar has more soil than the other.*
  - How does this relate to nature, gardening and farming? - *When it rains soil will flow downhill if something isn't done to prevent it. When farming farms need to know the direction of the water when it rains to know which way to create the furrows, etc.*
19. Review the experiments with the students discussing their observations and conclusions.
  20. Take the students for a walk around the school having them notice places where erosion occurs or could occur.
  21. After securing permission, show the students where they will create a garden.
    - If permission isn't obtained create a garden in the classroom discussing everything with respect to the classroom garden.
  22. Students observe the area noting times of sun, shade and how the rain falls.
  23. Students research gardens around the world noting the aesthetics of them and plant color, heights and spacing. . – *Websites to review:* <http://www.artgardens.net/gardens/index.htm>, <http://landscaping.about.com/>, <http://www.landscapingideasonline.com/picture.php>, <http://www.myidealgarden.com/w/planting.html> , <http://www.myidealgarden.com/w/backyard-picture.html>, [http://images.google.com/images?sourceid=navclient&rlz=1T4GGIH\\_enUS279US284&q=Gardens&um=1&ie=UTF-8&ei=zeeuSZOTFIGEsQO9yrC0Dg&sa=X&oi=image\\_result\\_group&resnum=1&ct=title](http://images.google.com/images?sourceid=navclient&rlz=1T4GGIH_enUS279US284&q=Gardens&um=1&ie=UTF-8&ei=zeeuSZOTFIGEsQO9yrC0Dg&sa=X&oi=image_result_group&resnum=1&ct=title), <http://landscaping.about.com/cs/designexamples1/a/landscapeDesign.htm>, <http://www.mfah.org/bayoubend/garden.asp?par1=1&par2=1&par3=1&par4=1&par5=1&par6=1&par7=&currentPage=>, <http://www.sculpture.org/documents/parksdir/asia/asia.shtml>, <http://gardening.about.com/od/smallspacegardening/ig/Small-Garden-Design-Photos/Small-Flower-Island.htm>
  24. Show students the zone where they live. <http://www.usna.usda.gov/Hardzone/ushzmap.html> - *How to use it* - <http://www.usna.usda.gov/Hardzone/#plants>
  25. Students research the different types of plants that are hardy in their area – *TX* - <http://www.plantsfortexas.com/plantlist.html>, <http://www.highcountrygardens.com/library/view/article/40/>, [http://www.enature.com/native\\_invasive/](http://www.enature.com/native_invasive/), <http://www.oodlesofinformation.com/planting-to-stop-erosion/> - Or plant magazines or adds from local nurseries
  26. Ask the students to design a garden on a piece of paper that would be appropriate for the specified area noting the heights, color and needs of each plant to ensure the garden is aesthetic.
  27. Students as a group decide which garden they would like to plant and adjust as needed.
  28. Students research how to prepare the soil for the garden. - [http://www.ehow.com/how\\_2080198\\_prepare-garden-spring.html](http://www.ehow.com/how_2080198_prepare-garden-spring.html), <http://www.wikihow.com/Prepare-Soil-for-a-Garden>
  29. Students prepare the soil for the garden.
  30. They plant the plants and continue to care for the garden journaling the progress of the garden.

Student assessment or final product to be developed:

Journals, hypothesis, conclusions, questions asked, teacher observation, garden sketch, and garden

### Extension activities

1. Students write hypotheses in their journal about what they anticipate will happen with the garden and each particular species of plants in addition to journaling their experience with creating and maintaining their garden.
2. Students leave detailed instructions for the care of the garden for classes that will follow them.
3. Students create a picture or painting of what they think their garden would look like or of an imaginary garden.
4. Students plant a vegetable garden. They journal their hypotheses and the progress of the garden. After the vegetables are harvested, students research recipes they could use for their harvest. Create a meal using the foods they grew in the garden and the recipes they found. Students will learn the life cycle of plants, proper food preparation, how a healthy meal can be provided through what they have harvested and how pioneers had to provide food for their families.

## **NATIONAL STANDARDS**

### **Science**

### **NS.K-4.1 SCIENCE AS INQUIRY**

As a result of activities in grades K-4, all students should develop

- Abilities necessary to do scientific inquiry
- Understanding about scientific inquiry

### **NS.K-4.3 LIFE SCIENCE**

As a result of activities in grades K-4, all students should develop understanding of

- The characteristics of organisms
- Life cycles of organisms
- Organisms and environments

### **NS.K-4.3 LIFE SCIENCE**

As a result of their activities in grades K-4, all students should develop an understanding of

- Properties of earth materials

## **Art**

### **NA-VA.K-4.1 UNDERSTANDING AND APPLYING MEDIA, TECHNIQUES, AND PROCESSES**

Achievement Standard:

- Students know the differences between materials, techniques, and processes
- Students describe how different materials, techniques, and processes cause different responses
- Students use different media, techniques, and processes to communicate ideas, experiences, and stories

### **NA-VA.K-4.6 MAKING CONNECTIONS BETWEEN VISUAL ARTS AND OTHER DISCIPLINES**

Achievement Standard:

- Students understand and use similarities and differences between characteristics of the visual arts and other arts disciplines
- Students identify connections between the visual arts and other disciplines in the curriculum

## **TAKS Objectives**

### **Science**

## Knowledge and skills

Scientific processes. The student conducts field and laboratory investigations following home and school safety procedures and environmentally appropriate and ethical practices. The student is expected to: (A) demonstrate safe practices during field and laboratory investigations; and (B) make wise choices in the use and conservation of resources and the disposal or recycling of materials.

Scientific processes. The student uses scientific inquiry methods during field and laboratory investigations. The student is expected to: (A) plan and implement descriptive investigations including asking well-defined questions, formulating testable hypotheses, and selecting and using equipment and technology; (B) collect information by observing and measuring; (C) analyze and interpret information to construct reasonable explanations from direct and indirect evidence; (D) communicate valid conclusions

Science concepts: The student knows that complex systems may not work if some parts are removed. The student is expected to: (A) identify and describe the roles of some organisms in living systems such as plants in a schoolyard, and parts in nonliving systems such as a light bulb in a circuit; and (B) predict and draw conclusions about what happens when part of a system is removed.

Science concepts: The student knows that certain past events affect present and future events. The student is expected to: (A) identifies and observes effects of events that require time for changes to be noticeable including growth, erosion, dissolving, weathering, and flow

Science concepts: The student knows that the natural world includes earth materials and objects in the sky. The student is expected to: (A) test properties of soils including texture, capacity to retain water, and ability to support life; (B) summarize the effects of the oceans on land; and (C) identify the Sun as the major source of energy for the Earth and understand its role in the growth of plants, in the creation of winds, and in the water cycle.

Science concepts: The student knows that the natural world includes earth materials and objects in the sky. The student is expected to: (A) interpret how land forms are the result of a combination of constructive and destructive forces such as deposition of sediment and weathering;

## Art

Perception: The student develops and organizes ideas from the environment. The student is expected to: (A) communicate ideas about feelings, self, family, school, and community, using sensory knowledge and life experiences:

Creative expression/performance: The student expresses ideas through original artworks, using a variety of media with appropriate skill. The student is expected to: design original artworks: design original artworks;

Historical/cultural heritage: The student demonstrates an understanding of art history and culture as records of human achievement. The student is expected to: (C) identify the use of art skills in a variety of jobs.