

ARTS ARE CORE! 2010 Science Integration Activity

Grades K-2

Activity Title: Exploring Texture in the Garden

Visual Arts Standards

Kindergarten: Texture: The surface qualities of objects, experienced mainly by touch

- Recognize the difference between smooth and rough textures.
- Play with smooth and rough textures, talk about the differences. Feel the texture of paint while finger painting.
- Find actual textures (sand, cloth, plastic, rocks, metal, water, and food textures)
- Group textures and explain why. Combine actual textures to create new ones, e.g. mixing sand and water to make mud, yeast and water to make foam.
- Participate in making a group collage of different textures.

http://en.wikipedia.org/wiki/Henri_Matisse

First Grade: Texture: The surface traits of objects experienced mainly by touch

- Make texture “rubblings” in pencil, crayon or charcoal of actual texture.
- Press items found in environment and in nature into clay products to make texture impressions.
- Make several texture “rubblings.” Analyze which textures are most visually interesting.
- Collect different textured objects, combining them with texture “rubblings” to create aesthetically pleasing pictures.

Second Grade: Texture: the surface traits of objects experienced mainly by touch

- Make unique texture “rubblings” from environment. Share ideas on how to duplicate textures that can’t be rubbed.
- Find things from nature; stamp impressions into clay.
- Examine how textures are made by wind, water and impressions in natural surfaces.
- Find natural and man-made objects with textures to press into clay or dip into paint for stamping on paper.

Science Standard 1: Processes of Science, Communication of Science, and the Nature of Science. Standard 1 is not to be taught as stand-alone content, but is integrated into the teaching of the Content Standards (2-4). This lesson/activity integrates Objective 1, 2, and 3. The complete K-2 standards can be found on the [USOE/UEN website](#).

Science Standard 2: Students will gain an understanding of Earth and Space Science through the study of earth materials, celestial movement, and weather.

Kindergarten Objective 1: Investigate non-living things.

Indicators: 1) Observe and record that big rocks break down into small rocks, e.g., boulders, rocks, pebbles, sand and record the results of observations. 2) Demonstrate how water and wind

move non-living things. 3) Sort, group, and classify Earth materials, e.g., hard, smooth, rough, shiny, flat.

First Grade Objective 1: Investigate the natural world including rock, soil, and water.

Indicators: 1) Observe, compare, describe, and sort components of soil by size, texture, and color. 2) Identify and describe a variety of natural sources of water, including streams, lakes, and oceans. 3) Gather evidence about the uses of rocks, soil, and water.

Second Grade Objective 1: Describe the characteristics of different rocks.

Indicators: 1) Explain how smaller rocks come from the breakage and weathering of larger rocks. 2) Describe rocks in terms of their parts (e.g. crystals, grains, cement). 3) Sort rocks based upon color, hardness, texture, layering, particle size and type (i.e., igneous, metamorphic, sedimentary).

Science Standard 4: Students will gain an understanding of Life Science through the study of changes in organisms over time and the nature of living things.

Kindergarten Objective 1: I n v e s t i g a t e living things.

Indicators: 1) Construct questions, give reasons, and share findings about all living things. Compare and contrast young plants and animals with their parents. 2) Describe some changes in plants and animals that are so slow or so fast that they are hard to see (e.g., seasonal change, “fast” blooming flower, slow growth, hatching egg).

First Grade Objective 1: Communicate observations about the similarities and differences between offspring and between populations.

Indicators: 1) Communicate observations about plants and animals, including humans, and how they resemble their parents. 2) Analyze the individual similarities and differences within and across larger groups.

Second Grade Objective 1: Tell how external features affect an animal’s ability to survive in its environment.

Indicators: 1) Compare and contrast the characteristics of living things in different habitats. 2) Develop, communicate, and justify an explanation as to why a habitat is or is not suitable for a specific organism. 3) Create possible explanations as to why some organisms no longer exist, but similar organisms are still alive today.

Background Information

This lesson integrates the art concept of texture with the science standards concerning living and non-living concepts in a garden setting. In the visual arts, texture is the perceived surface quality of an artwork. It is an element of two-dimensional and three-dimensional design and is broadly distinguished by its perceived visual and physical properties. Use of *texture*, along with other elements of design, can convey a variety of messages and emotions. In the garden, a variety of textures can be observed and felt in a variety of ways.

Beginning with rocks and then progressing through soil particles, students begin to identify non-living elements and living organisms and discover the relationship between them that creates

what we see in the environment and the end products that provide for us the things we use and see every day—animal, vegetable, mineral.

Research Basis

Blair, D. (2009). The Child in the Garden: An Evaluative Review of the Benefits of School Gardening. *Journal of Environmental Education*, 40(2), 15-38. Retrieved from ERIC database.

Although educators widely use school gardens for experiential education, researchers have not systematically examined the evaluative literature on school-gardening outcomes. The author reviewed the U.S. literature on children's gardening, taking into account potential effects, school-gardening outcomes, teacher evaluations of gardens as learning tools, and methodological issues. Quantitative studies showed positive outcomes of school-gardening initiatives in the areas of science achievement and food behavior, but they did not demonstrate that children's environmental attitude or social behavior consistently improve with gardening.

Ozer, E. (2007). The Effects of School Gardens on Students and Schools: Conceptualization and Considerations for Maximizing Healthy Development. *Health Education & Behavior*, 34(6), 846-863. Retrieved from ERIC database.

There are thousands of school gardens in the United States, and there is anecdotal evidence that school garden programs can enhance students' learning in academic, social, and health-related domains. This review draws on ecological theory to conceptualize school gardens as systemic interventions with the potential for promoting the health and well-being of individual students in multiple interdependent domains and for strengthening the school environment as a setting for positive youth development. This review (a) summarizes the small literature regarding the impact of school garden curricula on student or school functioning, (b) provides a conceptual framework to guide future inquiry, (c) discusses implications of this conceptualization for practice, and (d) suggests further research needed to better inform practice.

Tucciarelli, T. (2004). Art in the Garden. *School Arts: The Art Education Magazine for Teachers*, 103(8), 36.

Meadow Woods Elementary in Orlando, Florida has a garden ceremony at the end of each year. This is a time when the whole school gathers together to celebrate another successful school year. The classrooms are built around the garden, so it is the centerpiece of the school. Students always do an art project for this ceremony. This year the project was to paint a shed, which is in the center of the garden. The project naturally led into discussions of art concepts. For instance, while painting the caterpillar's body, first grade students discovered that there are many shades of green. Fourth grade students learned that the way light hits a subject creates depth. Fifth grade students were challenged by using a vanishing point and perspective when painting the scene of a city street for their character, Maniac Magee. Every painting became a lesson on color mixing. The paintings also created interest in literature. Each time a class entered the art room, discussion began with what grade was working on which character.

Materials Activity 1: Garden Textures and Collaborative Art

- Blanket
- 10-12 produce items
- [*Tops and Bottoms*](#) by Janet Stevens
- [*Looking at Rocks \(My First Field Guides\)*](#) by Jennifer Dussling
- Broken crayons for rubbings
- Watercolors (optional)
- Variety of colored paper
- Large poster board or bulletin board area (3' x 5')
- Glue stick

Materials Activity 2: Mosaics

- Paper or reclosable quart bag (1 for each student)
- [*A Seed is Sleepy*](#), Dianna Hutts Aston (optional book)
- [*A Handful of Dirt*](#), Raymond Bial (optional book)
- Access to an outdoor area with a variety of vegetation (garden, schoolyard, or park)
- Paper Plates (thick plates or triple the number of thin plates)
- A variety of large seeds (from popcorn to beans, all can be found in a grocery store)
- A variety of soil types (texture and color)
- White glue (such as Elmers)
- Plastic spoons
- Clear lacquer or clear varnish spray (optional)

Materials Activity 3: Garden Impressions

- Paper or reclosable quart bag (1 for each student)
- Broken crayons for rubbings
- Paper for rubbings
- Newspaper
- Paper plates
- Scissors
- Modeling or ceramic clay (a ball that will make a 6" x 7" x 1/2" pancake shape)
- Variety of plant materials (leaves, stems, flowers, seeds, seedpods, etc.)
- Vegetable oil spray
- Rolling Pins (one for every 4-5 students)
- Cotton Muslin (12" x 12" inch piece for each student)
- Hammers or crab mallets (order crab mallets online, one for every 4-5 students)
- Cardboard frame (8.5" x 11")

Invitation to Learn

Activity 1: Garden Textures and Collaborative Art

Place five produce items and five other items collected outdoors (living and non-living) under a blanket (be sure the students don't see the items you have placed under the blanket). Invite the students to sit in a circle around the blanket and then ask them to identify what they feel and the texture of the item. Record the student responses on the whiteboard and remove the blanket. Edit the list on the whiteboard (delete incorrect item responses and add item names missed by the students).

Activity 2: Mosaics

Provide each student with a paper or reclosable bag and ask them to go into the garden (a park or schoolyard) and collect at least 5-10 items that feel different from one another (this may also be assigned as a homework or family connection assignment).

Activity 3: Garden Imprinting

Provide each student with a paper or reclosable bag and ask them to go into the garden (a park or schoolyard) and collect at least 5-10 “living” or once living plant items (leaves, flowers, stems, bark, fruit) that feel different from one another (this may also be assigned as a homework or family connection assignment).

Instructional Procedures

Activity 1: Garden Textures and Collaborative Art

1. After the presenting the “Invitation to Learn,” ask students to classify the items into living and non-living things. Read [*Tops and Bottoms*](#), by Janet Stevens, to determine the plant parts that were felt by the students and [*Looking at Rocks \(My First Field Guides\)*](#) by Jennifer Dussling to categorize the non-living items.
2. Demonstrate how to make a “rubbing” of natural items with crayons ([*Making a Leaf Rubbing For a Nature Journal*](#) or [*A Tree-Minute Video - Leaf Relief Activity for Kids*](#)).
3. Provide the students with crayons and paper to make “rubblings” of the items they have collected.
4. Ask students to use scissors to cut out some of their rubbings as squares, circles, triangles, or other random shapes. Provide templates, if necessary.
5. Ask students to apply paste from a glue stick to the back of each cutout shape and then place their “shape” rubbing onto the poster board or bulletin board to create a paper texture collage.



Activity 2: Mosaics

1. Ask students to look at their collections (see “Invitation to Learn”), and categorize items that are living or non-living. Did anyone collect plant parts, seeds, rocks, or soil? Discuss the characteristics of living and non-living things and then ask the students to categorize their items. Read [*A Seed is Sleepy*](#) by Dianna Hutts Aston and [*A Handful of Dirt*](#) by Raymond Bial. (Note that soil mineral particles—sand, silt and clay—are non-living small pieces of rock,



but that soil—as a whole—is teeming with life: bacteria, fungi, insects. A soil sample contains both living organisms and non-living elements.)

2. Explain that the students will be creating seed and soil mosaics to go along with some of the items they have collected to explore a wide variety of textures.
3. Provide each student with a paper plate, glue, a variety of seeds, and soils.
4. Students may trace an outline of a mosaic picture or pattern they would like to create. If a skyline is needed, add it first with paint or colored pencil (glue does not stick well to crayons).
5. Ask the students to select three or five of the items they have collected to be placed on the mosaic; keeping in mind that green vegetation will wilt, encourage students to pick other items they have collected. Glue the large items on the mosaic first, next add the seeds and dry soils. All items should be attached with plenty of white glue. It is best if glue is applied to the lines of the design which have been traced onto the background, doing small areas at a time. Better results will be obtained if an area is left to dry before proceeding. Have the seeds and soils handy in saucers or cups. Large seeds will work best for small hands and the soil can be sprinkled with teaspoons. Keep glue off the surface where no seeds will be applied. Once the glue is dry, avoid flexing the paper plate.
6. Optional: you may spray a clear lacquer or clear varnish over the seed and soil mosaic after the glue has dried. This will hold the seeds and soils better and will also bring more luster and color out of the seeds and soils used.



Activity 3: Garden Impressions

1. Ask students to sort the items they have collected in the “Invitation to Learn” into plant vegetation (stems, leaves and flowers) and seeds or seed structures (pods, cones, winged seeds, etc.)
2. The seed items (and some of the leaves) will be used to learn about textures and impressions.
3. Ask students to select a few leaves and the seeds they have sorted out and do a “rubbing” with crayons on a piece of paper for each item.
4. After the item has been rubbed, ask students to place the item on a piece of newspaper and then spray one side of the leaves and the seeds with vegetable oil; this will make it easier to remove the plant material from the clay. (This movie demonstrates [Making Leaf Clay Impressions](#).)
5. Ask students to roll out their ball of clay and then press the oil side of the leaves and seeds into the clay using a rolling pin. After this is done, ask students to compare the textures of the rubbings and imprints. Are they similar or quite different?
6. The remaining leaves, stems, and flowers will be used to create a plant art imprint. Cover the work area with newspaper. Ask students to randomly or naturally (like you might see the plant in nature) arrange the plant materials (not more than two items on top of one another)



on the newspaper and cover with the 12" x 12" cloth (make sure all the vegetation is under the cloth).

7. Students should crush the materials by rolling a rolling pin over their arrangement. Crushing leaves, stems, or flowers with a rolling pin releases pigments that stain the fabric. A hammer may be used on more fibrous materials and to obtain more color. People throughout history have crushed plants and used the natural pigments as paint and to dye their fabric for clothing.
8. When all of the pigment is released (no more color coming out onto the cloth), help students frame their work.



Assessment Suggestions

1. Gather 30 living and non-living items. Divide the class into two relay race teams. Provide each team with 15 items and then ask students to race a short distance sorting the items into a living or non-living box. Check the boxes after the race to re-teach incorrectly placed items.
2. Provide students with the items they used to make their imprints and see if they can find the matching shape in the clay imprint.
3. Provide students with a variety of “muds” made from sand, silt and clay and ask them to identify the sample as gritty (sand), smooth (silt), or sticky (clay).

Curriculum Extensions/Adaptations/Integrations

Seed Strength Impressions

Materials

- Clear plastic cup (1 for each pair of students)
- Three soybeans (or other small bean) for each pair of students
- Plaster of Paris (5 tablespoons per pair of students)
- Plastic spoons for mixing Plaster of Paris and adding water

Instructional Procedures:

1. Put the plaster of Paris in the plastic cup; add 2 tablespoons of water and mix. Continue to add drops of water until the mixture has the consistency of a very thick milkshake. Push the soybeans into the plaster until they are covered and then smooth the surface.
2. Make regular observations. What do you think will happen to the soybeans? What happens? Why? The next day, add a tablespoon of water to the cup and continue to make observations. What happens? Why?
3. Discussion responses: Seeds require moisture and warmth to germinate. In this case, the seed absorbs moisture from the plaster mixture. As the seed absorbs water, it increases in size and applies pressure to the surrounding plaster. This force, combined with the strength of the germinating sprout, causes the plaster to crack and allows the shoot to grow up through the plaster. This strength and ability to grow in adverse conditions allows plants to survive in a wide range of environments. You may also notice that when water is mixed with plaster, the

cup becomes warm. A chemical reaction which gives off heat like this is known as an exothermic reaction.

Family Connections

1. The rubbings created in these activities could be taken home and made into greeting cards, book covers on handmade books, handmade envelopes, a mobile, gift tags, wrapping paper, bookmarks, or handmade puzzles.
2. Provide each child with a paper or reclosable bag and ask him or her to collect 10 living or non-living items from their neighborhood or yard. Compare and contrast these items with the ones found at school. How many are different; how many are the same? Are the textures different?
3. Ask students to share a book they have on gardening or plants from home or from the library and discuss the illustration style.

Additional Resources

[What is a Fruit? What is a Vegetable?](#) Poster and Activity Cards

Mosaics <http://prekinders.com/art-ideas/>

[Nature Printing](#)

How to create a [Bird Seed Mosaic](#)

[Rasmussen Potter "Leafware"](#)