

# Infusing Arts into Sciences

At Expressions Learning Arts Academy, we believe that science can be enhanced with the use of the Arts as well. While keeping in-line with state standards both disciplines can be combined to create an effective method of teaching without compromising either subject. I believe that by combining subject areas, children have the opportunity to take a more in-depth look at the subject material presented. When science is infused with the Arts, children are not just visualizing what they are learning, they are living it, they become it, and most importantly, they remember it. My classroom environment transforms into the Science units we are studying throughout the year. For example, when we study a bioregion, we not only learn the physical characteristics of it, we also learn about the plants, the animals, the people, and the resources available. The classroom becomes that environment. The children investigate these different areas with many hands-on explorations. As we learn about a region we build it, paint it, create music that is inspired by it, and perform skits to bring what we are learning to life. I feel that when children experience Science that is enhanced by their own artistic creations, they have a better understanding and ability to remember what they have learned. The children don't just learn material for a test, they learn it for life. Science becomes more interesting and enjoyable for the students. Their creativity is sparked as is their curiosity about the world around them.

I feel that by using the Arts in Science, I am reaching all of my students, regardless of their learning styles. I believe that integrating the Arts into all subjects whenever possible helps me create an effective classroom environment where optimal student learning can occur.

Listed in this section are several fun lesson plans that you can do with your students to bring the Arts into Science. Lessons can be adapted to the needs of your children.

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## **Lesson 1:**

This lesson plan has children making an artistic booklet with the findings from these simple experiments on a rock that the students bring in from home.

### **Abstract**

This lesson plan shows how to test a rock for hardness, streak, and the presence of calcium carbonate. This particular lesson was written for a class of sixteen third grade science students; one student was mildly hearing impaired. The lesson begins with a class discussion on several properties of rocks. Students are given instructions and explanations of the 4 stations. The class is then divided into the stations to investigate and test a rock in order to identify hardness, streak, and the presence of calcium carbonate. The lesson ends with each student creating an artist booklet with his or her findings. Student assessments are included.

**LESSON:** Demonstrating the hardness, streak, and presence of calcium carbonate  
in a rock.

**UNIT:** Forces That Shape the Earth

**OBJECTIVE:** Third grade science students will know how to test rocks for hardness, streak, and presence of carbonates, and be able to identify the hardness, streak, and presence of calcium carbonate in a rock on a performance assessment test and describe the procedure on a written short answer unit exam.

**RATIONALE:** It is important for children to distinguish characteristics of objects in the natural world.

**CONTENT:**

- Rocks and Minerals
- Streak of a Rock
- Hardness of a Rock
- Mohs' Hardness Scale
- Carbonates

**PREREQUISTE KNOWLEDGE:** General knowledge of rocks and minerals

(formations, types: sedimentary, igneous, metamorphic, characteristics of rocks:

hardness including an explanation of Mohs' Hardness Scale, streak, luster, cleavage, and texture).

## **PROCEDURE:**

- Class discussion reviewing characteristics of rocks and minerals (luster, streak, texture, hardness, cleavage).
- Show PowerPoint presentation reviewing concepts of hardness and color.  
Presentation will explain how to test a rock for hardness, true color, and the presence of calcium carbonate. The instructions for each station will be described in the presentation.
- **LESSON TASK:** Children will make a booklet with their findings from each station.
- Child retrieves rock brought from home. Child will take rock to every station.
- Divide children into four groups with four students in each group. Each group goes to a different station. Children will stay at each station for 3 – 5 minutes. Station instruction and explanations are laminated and placed at each station (instructions and explanations are the exact same as in the PowerPoint presentation).

## **STATION ONE: TITLE PAGE**

### **Child receives:**

- Piece of paper
- Colored pencils

### **TASK:** Child creates title page.

- Child writes ROCKS AND MINERALS on the top of paper.
- Child traces and colors rock.
- Child labels rock as: My Rock.

## **STATION TWO: STREAK TEST**

### **Child receives:**

- Streak plate
- Piece of paper
- Colored pencils

### **Laminated Instructions and Explanations:**

The **streak** of a mineral is the powder left behind when the mineral is rubbed against a rough surface that is harder than the mineral. The mineral's true color is shown in the streak that is left behind.

The **streak plate** has a hardness of **7** on Mohs' Hardness Scale. If a mineral is softer than 7, it will leave a streak.

**How to determine a mineral's true color:** Take rock and rub it on a streak plate.

The color that is left on the plate is the mineral's true color. The true color may be different than the color of the mineral itself. If the mineral is harder than the streak plate, no color will be left behind.

### **INSTRUCTIONS FOR THE TASK AT STATION TWO:**

1. Take your rock and rub it back and forth gently a few times on the streak plate to reveal the true color of the rock.
2. Write on the top of your piece of paper: Streak Test
3. Complete this sentence on your paper for this station:
  - When tested on a streak plate, the true color of my rock is

\_\_\_\_\_.

❖ **If no color appears on the streak plate, then complete this sentence on your paper for this station:**

- My rock did not leave a color on the streak plate because my rock is harder than the streak plate.

4. If you have time, draw a picture of this activity.

### **STATION THREE: SCRATCH TEST**

**Child receives:**

- Piece of paper
- Copper penny
- Colored pencils

#### **Laminated Instructions and Explanations:**

The hardness of a mineral is its resistance to be scratched.

According to Mohs' Hardness Scale, here are a few common items with their hardness numbers:

- Fingernail - 2 ½
- Copper Coin - 3 ½
- Paper Clip- 4 ½
- Sand Paper - 7
- Steel File - 7 ½

**How to determine if a mineral is harder or softer than 3 ½ on Mohs'**

**Hardness Scale:** Take a copper penny and try to scratch your rock with it. If it makes a scratch, your rock is softer than 3 ½ on Mohs' Hardness Scale. If the

penny doesn't make a scratch, your rock is harder than 3 ½ on Mohs' Hardness Scale.

**INSTRUCTIONS FOR THE TASK AT STATION THREE:**

1. Take a copper penny and try to scratch your rock. Does it leave a scratch mark?
2. Write on the top of your piece of paper: Scratch Test
3. Complete these sentences on your paper for this station:
  - My rock is **harder / softer** than 3 ½ on Mohs' Hardness Scale.
  - I **could / could not** scratch my rock with a copper penny.
4. If you have time, draw a picture of this activity.

**STATION FOUR: TESTING FOR CARBONATES**

**Child receives:**

- Piece of paper
- Safety goggles
- Eye dropper
- Plastic plate
- Small cup of vinegar placed on table

**Laminated Instructions and Explanations:**

A carbonate is a mineral that contains carbon and oxygen plus some other element such as calcium.

**How to identify a carbonate:** If you place a few drops of vinegar on the rock and it bubbles, the rock is a carbonate.



### **INSTRUCTIONS FOR THE TASK AT STATION FOUR:**

1. Take your rock and place it on the plastic plate.
2. Put on safety goggles.
3. Take an eyedropper and fill with a few drops of vinegar.
4. Place three drops of vinegar on your rock.
5. Observe for ten seconds. What happens? Did it bubble? Does it contain calcium carbonate?
6. Write on the top of your piece of paper: Testing for Carbonates
7. Complete these sentences on your paper for this station:
  - My rock **contains / does not contain** calcium carbonate.
  - My rock **bubbled / did not bubble** when vinegar was added.

❖ **While students are working, teacher goes to each station and makes observational and verbal assessments by asking questions about the tests being performed.**

- After all stations are completed, the children return to their regular seats.
- Teacher asks children about their findings (What do the findings tell you about your rock?).
- Children use their completed findings to create a personal rock booklet.
- Children:
  1. Put the four completed station sheets together with the title page on top.
  2. Tie raffia, ribbon, or yarn through each hole to create a booklet with their investigations on their rock.

## **MATERIALS:**

- PowerPoint presentation / laptop computer/ projector
- Laminated instructions for each station
- Rock that child brings from home (extra on hand is recommended)
- 4 pieces of unlined paper (that has been three hole punched) for each child
- 8 unglazed porcelain streak plates, can use backs of plates [can find at most teacher supply stores (can use sand paper instead- has a hardness of 7 on Mohs' Hardness Scale)]
- Colored pencils for each station
- 4 copper pennies
- 4 eye droppers
- 4 pairs of safety goggles
- 16 small plastic plates (can be washed and saved for future use)
- Vinegar
- Raffia, ribbon, or yarn

## **ASSESSMENTS:**

1. Have students test a rock for hardness, streak, and presence of carbonates on a performance test.
2. On a short answer unit test, have students write the procedure for testing a rock for hardness, streak, and presence of carbonates.

## **DIFFERENT LEARNING STYLES:**

- Discussions- Auditory learners
- PowerPoint presentation- Visual and Auditory learners
- Learning through manipulations- All learners especially visual and kinesthetic

## **FOLLOW-UP ACTIVITIES AND EXTENSIONS:**

- Examine rocks for luster, texture, and cleavage
- Test a raw egg to see if carbonates are present
- Test several brands of chalk to see if carbonates are present
- Perform a streak test on several known minerals to see if the true color is the same as the mineral itself

## **INSTRUCTIONAL STRATEGIES:**

The types of instructional strategies used in this lesson were direct instruction, self-directed learning and cooperative learning. The direct instruction included the class discussions and the PowerPoint presentation. Self-directed learning was used at each station. Each station included explanations and instructions that must be followed in order to complete each task. The use of stations and group rotations included the use of cooperative learning. The students are interacting with each other as they perform the required tasks.

## **ADAPTION FOR EXCEPTIONAL STUDENT:**

For the hearing impaired student in this class, these strategies can be used to ensure that the student can participate and be presented with the material in a manner most beneficial for learning:

- Provide student with written copy of PowerPoint presentation dialog.
- Put children in pairs within the rotational group, so that the child can have a buddy to read with and ensure that the instructions are comprehended.

## **NATIONAL TECHNOLOGY STANDARDS:**

(National Technology Standards retrieved on January 10, 2003 from:

[http://cnets.iste.org/teachers/t\\_stands.html](http://cnets.iste.org/teachers/t_stands.html))

- **ASSESSMENT AND EVALUATION:**
  - **Standard 4:** Teachers apply technology to facilitate a variety of effective assessment and evaluation strategies.
- **TEACHING, LEARNING, AND THE CURRICULUM.**
  - **Standard 3:** Teachers implement curriculum plans that include methods and strategies for applying technology to maximize student learning.

## **Sunshine State Standards Correlations (Grades 3-5):**

(Sunshine State Standards as recorded by the Florida Department of Education (2003)

June 14, 2003 from <http://www.firn.edu/doe/curric/prek12/frame2.htm>.)

### **THE NATURE OF MATTER:**

- **STANDARD 1:** The student understands that all matter has observable, measurable properties. (SC.A.1.2)

### **PROCESSES THAT SHAPE THE EARTH:**

- **STANDARD 1:** The student recognizes that processes in the lithosphere, atmosphere, and biosphere interact to shape the earth. (SC.D.1.2)

### **THE NATURE OF SCIENCE:**

- **STANDARD 1:** The student uses the scientific processes and habits of mind to solve problems. (SC.H.1.2)
- **STANDARD 3: (SC.H.3.2)**
  - **Benchmark 2:** The student knows that data are collected and interpreted in order to explain an event or concept.

### **Reference**

Florida Department of Education, 2003. *Sunshine State Standards*. Retrieved on June 14, 2003

from: <http://www.firn.edu/doe/curric/prek12/frame2.htm>.

National Technology Standards retrieved on January 10, 2003 from:

[http://cnets.iste.org/teachers/t\\_stands.html](http://cnets.iste.org/teachers/t_stands.html)

## **Lesson 2: Demonstrate the way magma moves within the earth's mantle**

This lesson is followed by two Art sessions where the students are to paint with watercolors the results of this experiment. **Art Session 1:** The children take their watercolor paper and wet it completely with a sponge. Once the paper is wet, students can do a “wash”, which is the first layer of this picture. To create a “wash”, students take a small amount of paint of their brushes and “move” it around on the paper. The paint will move around because the paper is wet. I would suggest using lighter colors for the wash (orange, yellow, small amount of red). Now the paper must dry completely before the next Art session. **Art Session 2:** Children are to paint what the results from the experiment. They may want to paint a volcano with magma/lava, the magma moving inside the jar, or whatever they felt from watching the experiment.

### **Here's the Experiment:**

**Lesson:** Demonstrate the way magma moves within the earth's mantle.

- UNIT: Forces That Shape the Earth
- OBJECTIVE: Third grade science students will know how magma moves within the mantle, and be able to explain three characteristics of magma movement orally and on a written short answer unit exam.
- RATIONALE: Understanding the way magma moves in the mantle is important for understanding how a volcano can erupt (Forces that shape earth).
- CONTENT:
  - Pressure
  - Magma (heating and cooling)

Mantle

Crust

Lava

Volcano (pressurized magma finding weak spot in crust)

PROCEDURE:

1. Write on chalkboard the scientific process for the Moving Magma Experiment.
2. Class discussion on what they have previously learned about the layers of the earth.
3. Ask students what they think happens in the mantle.
4. Read over experiment with students.
5. Have students write the experiment in science journal including their hypothesis.
6. Conduct experiment in front of class.
  - Fill large clear pitcher with cold water.
  - Fill small glass bottle with hot water and add 4 drops of red food coloring.
  - Put on safety goggles.
  - Gently drop small glass bottle inside the large pitcher.
  - Observe and record results.
7. Discuss results.
8. Have students fill in their results and conclusion in journals.

## MATERIALS:

- Large clear pitcher filled with cold water
- Small glass bottle filled with hot water
- Red food coloring
- Safety goggles

Assessment: 1. Have student verbally describe what is happening to magma within the mantle.

2. On a written unit test, have students list and explain three characteristics of magma movement in short answer form.

Experiment shows how heated magma rises to the surface of the earth's crust. As the magma rises, it cools and returns to the lower mantle area, where it heats back up and rises to the crust again. This process continues and causes tremendous pressure in the mantle. The magma is trying to find a way through the earth's crust. If there is a weakened spot in the crust, the pressurized magma will shoot through it causing a volcano to erupt.

## Different Learning Styles

- Discussions- Auditory learners
- Learning through observations- All learners especially visual and kinesthetic learners
- Copying down information- Visual learners



## **Sunshine State Standards Correlations (Grades 3-5):**

(Sunshine State Standards as recorded by the Florida Department of Education (2003)

June 14, 2003 from <http://www.firn.edu/doe/curric/prek12/frame2.htm>.

### **Third Grade Science Standards**

#### **A. Process that Shape the Earth**

##### **1. Standard 1 (SC.D.1.2)**

**a. Benchmark 4:** knows that the surface of the Earth is in a continuous state of change as waves, weather, and shifts of the land constantly change and produce many new features.

**b. Benchmark 5:** knows that some changes in the earth's surface are due to slow process and some are due to rapid process.

#### **B. The Nature of Science**

**1. Standard 1 (SC.H.1.2):** The student uses the scientific process to solve problems.

**a. Uses all benchmarks under this standard (1, 2, 3, 4, and 5).**

### **Reference**

Florida Department of Education, 2003. *Sunshine State Standards*. Retrieved on June 14, 2003

From: <http://www.firn.edu/doe/curric/prek12/frame2.htm>.

## Lesson 3: Showing Seasonal Changes in Plants

In this lesson first graders are creating a book with their explorations of the four seasons.

### Lesson: Showing Seasonal Changes in Plants

- **UNIT**: Forces that Shape the Earth (Weather)
- **OBJECTIVE**: First grade science students will recognize seasonal changes in plants, and be able to verbally state one change of a plant throughout each season.  
When shown a picture of a plant in different seasons, students will be able to visually identify these changes.
- **RATIONALE**: Understanding how a plant changes through the seasons is important for understanding the effects of seasonal changes in living things.
- **CONTENT**:
  1. Seasons
  2. Spring
  3. Summer
  4. Fall
  5. Winter
  6. Parts of a flower (leaves, petals, stem)
  7. Leaves
  8. Trees

- **PROCEDURE:**

- ◆ With entire class: Teacher displays a transparency that has four sections with a season title labeled in each. A tree is shown as it appears in each season.

1. Short class discussion reviewing previous lesson on names and of seasons.

- Explain weather changes in each season using the overhead transparency as a visual reference.
  - Explain student tasks by showing an example of each station project.
  - Review methods of creating a leaf rubbing picture
- ◆ Divide children into four groups of three children and send each group to a station.

### **STATION 1: SPRING**

#### **CHILD RECEIVES:**

- Piece of white construction paper with SPRING written at the top, along with a bare tree drawn.
- Numerous amounts of flat, green, medium sized DecACake party sprinkles.
- Glue stick

**TASK:** Child will glue flat, green party sprinkles on branches of Tree to represent a tree with budding leaves.

## **STATION 2: SUMMER**

### **CHILD RECEIVES:**

- Piece of white construction paper with Summer written on top.

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- Pre-cut brightly colored parts of a flower
- Glue stick

**TASK:** Child must glue parts together to make a flower. Child may color different parts of plant if time permits.

## **STATION 3: FALL**

### **CHILD RECEIVES:**

- Piece of light brown construction paper with Fall written on top along with the base of a tree with branches drawn on paper.
- Three small leaves.

**TASK:** Child will draw the leaves on the tree by doing a leaf rubbing with real leaves and crayons (red, orange, yellow, and brown). Leaves may be drawn on the tree, on the ground, or falling in the air.

## **STATION 4: WINTER**

### **CHILD RECEIVES:**

- Piece of gray construction paper with Winter written on top

- One Q-Tip
- Small cup with a small amount of black tempera paint
- Ten small cotton balls

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**TASK:** Child will draw the base of the tree and branches with a q-tip and black paint on the construction paper. Child will glue cotton balls on tree or the ground to represent snow that may occur in winter.

- ◆ Students stay at each station for four to five minutes.
- ◆ While students are working, teacher makes observational and verbal assessments by asking questions about the pictures being made.
- ◆ After students have completed each picture, they will remain at the last station. Teacher engages students in a class discussion and asks what changes in the plants were noticed from one station to the other.
- ◆ Teacher puts the overhead transparency of the tree in the four seasons on the board again and asks students to explain the seasonal changes in each picture.
- **MATERIALS:**
  - ◆ Overhead projector
  - ◆ Transparency with four sections labeled with the four seasons showing how a tree looks in each of these seasons (pre-made by the teacher).

- ◆ One sheet of white construction paper per child (extra sheets on hand is recommended).
- ◆ One sheet of gray construction paper per child (extra sheets on hand is recommended).
- ◆ One sheet of light brown construction paper per child (extra sheets on hand is recommended).
- ◆ Pre-cut, in brightly colored construction paper, parts of a flower (stem, leaves, petals).
- ◆ At least 12 glue sticks.
- ◆ 12 Q-tips (extra on hand)
- ◆ Three small cups (for paint)
- ◆ Black tempera paint
- ◆ 120 small cotton balls (extra on hand)
- ◆ Pre-made completed pictures from each station (visual reference)
- ◆ Three containers of flat, green (medium size) DecACake party sprinkles
- ◆ 80 small leaves (extra on hand)
- ◆ Several red, orange, yellow, and brown crayons (enough for both Spring and Fall station)
- **Assessment:**
  - ◆ Have students verbally state one seasonal change of a plant from each season.

- ◆ When shown a picture of a plant from different seasons, students will visually identify seasonal changes of the plant.
- **Different Learning Styles:**
  - ◆ Discussions- Auditory learners
  - ◆ Learning through manipulations- All learners especially visual and kinesthetic
- **Follow-up Activities and Extensions:**
  1. Science: Use the pictures made from this lesson and have child identify and place the seasons in the correct order.
  2. Science and Music: Use the pictures made from this lesson and put them together to make a book with a title page (the four seasons) and place the seasons in the correct order. Play the Vivaldi's concerto *The Four Seasons* while doing this activity.
  3. Science: Provide child with a picture of a tree in each season and on separate index cards the title of each season. Have child match the correct season with the picture of the tree in that season. Student will glue season title to correct picture.
  4. Language Arts and Dance: Read poetry about the different seasons and have children make up partner-poetry dances to the poems. Can perform the dances in front of other classes.
  5. A follow-up activity to the lesson that will be presented allows students the chance to complete the following sentence..."In the \_\_\_\_\_ (insert

any season), I like to \_\_\_\_\_.” Students are expected to write out the entire sentence and then draw a picture below it that relates to the sentence.

### **National Technology Standards:**

(National Technology Standards retrieved on January 10, 2003 from:

[http://cnets.iste.org/teachers/t\\_stands.html](http://cnets.iste.org/teachers/t_stands.html))

#### **A. ASSESSMENT AND EVALUATION:**

- a. **Standard 4:** Teachers apply technology to facilitate a variety of effective assessment and evaluation strategies.

#### **B. TEACHING, LEARNING, AND THE CURRICULUM.**

- a. **Standard 3:** Teachers implement curriculum plans that include methods and strategies for applying technology to maximize student learning.

### **Sunshine State Standards Correlations (Grades K-2):**

(Sunshine State Standards as recorded by the Florida Department of Education (2003)

Retrieved from: <http://www.firn.edu/doe/curric/prek12/frame2.htm>

### **Science Standards**

- **Processes that Shape the Earth**
  - **Standard 1 (SC.D.1.1)**



- **Benchmark 3:** Student recognizes patterns in weather.
- **Processes of Life**
  - **Standard 1 (SC.F.1.1):** Student describes patterns of structure and function in living things.
    - **Benchmark 3:** Student describes how living things change.

### Visual Arts

- **Skills and Techniques**
  - **Standard 1 (VA.A.1.1):** Student understands and applies media, techniques, and processes.
    - **Benchmark 3:** Student uses materials and tools to develop basic processes and motor skills, in a safe and responsible manner.

### **References**

- . Florida Department of Education, 2003. *Sunshine State Standards*. Retrieved on June 14, 2003 from: <http://www.firn.edu/doe/curric/prek12/frame2.htm>.
- National Technology Standards retrieved on January 10, 2003 from: [http://cnets.iste.org/teachers/t\\_stands.html](http://cnets.iste.org/teachers/t_stands.html).

## Lesson 4: Creating Water cycle bracelets.

**Lesson: Making a bracelet to remember the components of the water cycle.**

- **UNIT:** Forces that Shape the Earth
- **OBJECTIVE:** Third grade science students will recognize the components of the water cycle, and be able to verbally state the changes water goes through during each part of the cycle. When shown a picture of the water cycle, students will be able to visually identify these changes.
- **RATIONALE:** Understanding how water moves through the water cycle is important for understanding the some of the changes that water undergoes in the environment.
- **CONTENT:**
  - ◆ Precipitation
  - ◆ Percolation
  - ◆ Transpiration
  - ◆ Evaporation
  - ◆ Condensation
- **PROCEDURE:**
  - ◆ Teacher reviews the water cycle by going over each part of the cycle and what happens to the water in each part.
  - ◆ Teacher gives each student five different color beads and three pieces of string, yarn, or waxed cord.
  - ◆ dark blue: precipitation
  - ◆ brown: percolation

- ◆ green: transpiration
- ◆ white: evaporation
- ◆ light blue: condensation
- ◆ Have students braid their string, yarn, or cord and tie a knot at one end.
- ◆ Teacher takes the **white** bead and talks about **evaporation**. After the teacher discussion, ask students questions about evaporation. Then have the children put a white bead onto the string, yarn, or wax cord. As they put it on have them repeat the definition of evaporation.

**Evaporation:** Evaporation is when the sun heats up water in rivers, lakes, or the ocean and turns it into vapor or steam. The water vapor or steam leaves the river, lake, or ocean and goes in the air (Kidzone, 2003).

- ◆ Teacher takes the **green** bead and talks about **transpiration**. After the teacher discussion, ask students questions about transpiration. Then have the children put a green bead onto the string, yarn, or wax cord next to the white bead. As they put it on have them repeat the definition of transpiration.

**Transpiration:** Transpiration is the process by which plants lose water out of their leaves. Transpiration gives evaporation a bit of a hand in getting the water vapor back up into the air.

- ◆ Teacher takes the **light blue** bead and talks about **condensation**. After the teacher discussion, ask students questions about condensation. Then have the children put a light blue bead onto the string, yarn, or wax cord next to

the green bead. As they put it on have them repeat the definition of condensation.

**Condensation:** Water vapor in the air gets cold and changes back into liquid, forming clouds. This is called condensation.

You can see the same sort of thing with a glass of cold water on a hot day. Water forms on the outside of the glass. The water on the outside of the glass came from the air. Water vapor in the warm air turns back into liquid when it touches the cold glass.

- ◆ Teacher takes the **dark blue** bead and talks about **precipitation**. After the teacher discussion, ask students questions about precipitation. Then have the children put a dark blue bead onto the string, yarn, or wax cord next to the light blue bead. As they put it on have them repeat the definition of precipitation.

**Precipitation:** precipitation occurs when so much water has condensed that the air can't hold it anymore. The clouds get heavy and water falls back to the earth in the form of rain, hail, sleet or snow (Kidzone, 2003).

- ◆ Teacher takes a **brown** bead and talks about **percolation**. After teacher discussion, ask students questions about percolation. Then have the children put a brown bead next to the dark blue bead on the string, yarn, or wax cord. As they put it on have them repeat the definition of percolation.

**Percolation:** When water falls back to the earth as precipitation, it may fall back in the oceans, lakes, or rivers or it may end up on land. When it ends up on land, it will both soak into the earth and become part of the

"ground water" that plants and animals use to drink or it may run over the soil and collect in the oceans, lakes or river where the water cycle starts

**ALL OVER AGAIN** (Kidzone, 2003).

- ◆ After students have completed their water cycle bracelets, ask them again what each color represents. Then assist them in tying their bracelets loosely onto their wrists.

- **MATERIALS:**

1. Three, ten inch pieces of yarn, string, or wax cord for each student
2. Five different color beads for each student ( I chose: white: evaporation, green: transpiration, light blue: condensation, dark blue: precipitation, and brown: percolation)
3. Chart or picture of the water cycle to use as a reference during the lesson

- **Assessment:**

- ◆ Informal assessment: check students' understanding of the components of the water cycle by asking them to verbally tell you what each color bead represents on their bracelet.
- ◆ Have children fill in the parts of the water cycle on a picture.
- ◆ Have children draw their own versions of the water cycle on paper.

- **Different Learning Styles:**

- ◆ Discussions- Auditory learners
- ◆ Learning through manipulations- All learners especially visual and kinesthetic

## **Sunshine State Standards Correlations (Grades 3-5)**

(Sunshine State Standards as recorded by the Florida Department of Education (2003)

Retrieved of June 14, 2003 from: <http://www.firn.edu/doe/curric/prek12/frame2.htm>

### **Science Standards**

- **Processes that Shape the Earth**
  - **Standard 1 (SC.D.1.1)**
    - **Benchmark 3:** knows that the water cycle is influenced by temperature, pressure, and the topography of the land.

### **Visual Arts**

- **Skills and Techniques**
  - **Standard 1 (VA.A.1.1):** Student understands and applies media, techniques, and processes.
  - **Benchmark 3:** Student uses materials and tools to develop basic processes and motor skills, in a safe and responsible manner.

### **References**

Florida Department of Education, 2003. *Sunshine State Standards*. Retrieved on June 14, 2003 from: <http://www.firn.edu/doe/curric/prek12/frame2.htm>.

Kidzone. The Water Cycle. Retrieved on June 3, 2003 from:

<http://www.kidzone.ws/water>.

## Lesson 5: Making a model of the layers of the earth

### Lesson: Showing the layers of the Earth

- **UNIT**: Forces that Shape the Earth
- **OBJECTIVE**: Third grade science students will recognize the layers of the earth, and be able to verbally state each of the layers in the correct order. When shown a picture of the Earth divided into four layers, students will be able to identify these layers in the correct places.
- **RATIONALE**: Understanding the different layers of the Earth is important for understanding the physical make up of the Earth and to understand how this effects changes on the earth's surface.
- **CONTENT**:
  - ◆ Crust
  - ◆ Mantle
    - Magma/Lava
  - ◆ Outer core
  - ◆ Inner core
- **PROCEDURE**:
  - ◆ Review the layers of the Earth (crust, mantle, outer core, inner core) including their sizes and location on the Earth.
  - ◆ Give each child a small pinch of orange clay to make a small ball. This will represent the inner core. Talk about the inner core as students are forming their red circles.

- ◆ Next, give each child a piece of yellow clay that is twice as big as the orange piece. The yellow clay (outer core) will need to be flattened and placed around the orange ball (inner core). Talk about characteristics of the outer core while children are flattening and putting the yellow clay around the red ball.
- ◆ Then each student receives an even bigger piece of red clay. This red clay (the mantle) will need to be flattened and placed around the yellow clay (the outer core). Talk about characteristics of the mantle while children are flattening and putting the red clay around the yellow ball.
- ◆ Next, each child will receive an even bigger piece of brown clay. This brown clay (the crust) will need to be flattened and placed around the red clay (the mantle). Talk about characteristics of the crust while children are flattening and putting the brown clay around the red ball.
- ◆ After the model of the Earth is complete (from the inside: orange (inner core, yellow (outer core), red (mantle), and brown (crust), take a knife and cut each student's "Earth" in half. They will be able to see the layers of the earth in the correct places from their model. Have them verbally explain what each color represents in their model of the Earth that shows the four layers.
- ◆ Give each student a plastic bag to take home his or her models.
- **MATERIALS:**
  - ◆ Playdough or self hardening clay in four colors (I chose orange: inner core, yellow: outer core, red: mantle, and brown: crust)



- ◆ Knife for teacher to cut students' models in half when finished
- ◆ Plastic bag for each child to take the two pieces of the model of the Earth home
- ◆ Picture of the earth cut in half showing the different layers to use as a visual reference during lesson
- **Assessment:**
  - ◆ Informal assessment: check students' understanding of the layers of the Earth by asking them to verbally tell you what each color represents on their model.
  - ◆ Have children name and label the layers of the Earth on a picture.
  - ◆ Have children draw their own versions of the Earth with its layers on paper.
- **Different Learning Styles:**
  - ◆ Discussions- Auditory learners
  - ◆ Learning through manipulations- All learners especially visual and kinesthetic

### **Sunshine State Standards Correlations (Grades 3-5)**

(Sunshine State Standards as recorded by the Florida Department of Education (2003)

Retrieved of June 14, 2003 from: <http://www.firn.edu/doe/curric/prek12/frame2.htm>

### **Science Standards**

- **Processes that Shape the Earth**
  - **Standard 1 (SC.D.1.1)**

## Visual Arts

- **Skills and Techniques**
  - **Standard 1 (VA.A.1.1):** Student understands and applies media, techniques, and processes.
  - **Benchmark 3:** Student uses materials and tools to develop basic processes and motor skills, in a safe and responsible manner.

### Reference

Florida Department of Education, 2003. *Sunshine State Standards*. Retrieved on June 14,

**2003 from:**

<http://www.firn.edu/doe/curric/prek12/frame2.htm>.

## **Lesson 6: Making a model of a volcano and “erupting” it.**

### **Lesson: Paper Mache Volcanoes**

- **UNIT:** Forces that Shape the Earth
- **OBJECTIVE:** Third grade science students will describe what a volcano is and why it erupts, and be able to verbally state these concepts. When shown a picture of a volcano, students will be able to visually identify what is happening inside the Earth.
- **RATIONALE:** Understanding how a volcano erupts is important for understanding the effects of the process that can shape the Earth.
- **CONTENT:**
  - ◆ Volcano
  - ◆ Magma and Lava
  - ◆ Crust, mantle, outer core, inner core
  - ◆ Pressure
  - ◆ Effects of eruptions
- **PROCEDURE:**

**To make the Volcano:** I usually have a group of four children working on one volcano together.

While students are working on building their volcanoes, the teacher can lead a discussion and ask questions regarding what causes a volcano to erupt, what happens in the mantle, what are plates, what is magma, what is lava, what can happen when a volcano erupts.

- ◆ Cover your working area with newspaper (I suggest using an outside area if possible)
- ◆ Take the cardboard pizza bottom (or other cardboard of same size) to use as the base
- ◆ Tape the small plastic bottle with a wide top (with top cut off) to the center of the cardboard base, so that the bottle is secure
- ◆ Crumple up a few sheets of newspaper around the bottle and tape it into place (this will be the basic shape of the volcano)
- ◆ Rip newspaper and recycled paper up into pieces about two to three inches wide and five inches long (not too small or it will take forever to Paper Mache it)
- ◆ Put the mixed Paper Mache (or glue/water) mix into a bowl that is both deep enough to not make too much of a mess and wide enough for little hands to work in.
- ◆ Dip each piece of torn paper into the glue mixture. Then take your fingers and run them over the front and back of the piece of paper to get the excess glue off.
- ◆ Place the paper pieces with the glue mixture around the basic volcano shape. Smooth the edges of the paper pieces.
- ◆ Keep building up the volcano with the paper pieces (with the glue mixture) until the students are satisfied with the shape of the volcano.
- ◆ Let dry completely (this usually takes a day or two)

- ◆ When the volcano is completely dry, let the students paint their volcano with tempera paint. They can paint the volcano (before it has erupted) and also the base. My students used their creativity and painted towns, added stick people out of tooth picks, made mini trees, playgrounds, cars, and roads with materials that they brought in from home or found outside in the playground.
- ◆ When the painted volcano has dried completely, you are ready for the erupting phase of this experiment.

#### **How to erupt the volcano:**

Before this phase of the experiment, ask students to make a hypothesis. I have my students write this experiment in their science journals using the scientific process. Then, they can then take their journals home to reproduce the experiment anytime.

- ◆ Take the volcano outside and place on a flat surface
- ◆ Put on safety goggles
- ◆ Wrap the baking soda in a tissue and place it inside the plastic bottle inside the volcano
- ◆ Place one drop of yellow and two or three drops of red food coloring onto the tissue filled with baking soda once it is in the bottle (I let the students pick which colors they want: more red, more orange, more yellow)
- ◆ Students can add dirt or a small stick to see what happens to them.
- ◆ Add vinegar
- ◆ Step back and enjoy the eruption!

- ◆ For a second eruption adjust the amounts of vinegar and baking soda used to create different degrees of flow.

- **MATERIALS:**

- To make volcano:

- ◆ Pizza boxes (or other cardboard of same size for base)
    - ◆ Newspaper (for building volcano) (I would suggest using recycled white paper on the last outer layers so that the newsprint will not be on the outside of the model) You are going to need plenty!
    - ◆ Paper Mache mix (or use very watered down glue)
    - ◆ Big bowl for mixing paper Mache with water
    - ◆ Plastic jug to mix paper Mache mix or glue
    - ◆ 12 oz plastic bottle preferably with a wider top (one for each volcano) with the top cut off to use as the support for building the volcano
    - ◆ Masking tape to tape bottle to cardboard base
    - ◆ Tempera paint and paint brushes to paint model when dry

- To Erupt volcano

- ◆ Vinegar (one cup per eruption, after the first eruption you can experiment with different amounts of vinegar and baking soda to observe differences in the flow of the eruptions)
    - ◆ Baking soda (eight to ten tablespoons)
    - ◆ Tissue (to wrap baking soda up)
    - ◆ Red and yellow food coloring
    - ◆ Safety goggles

- **Assessment:**
  - ◆ Informal assessments: Where the students able to follow their written instructions (procedure) to erupt the volcano?
  - ◆ Show students a picture of an erupting volcano; can they verbally describe what a volcano is and why it erupts?
  - ◆ Teacher observations
- **Different Learning Styles:**
  - ◆ Discussions- Auditory learners
  - ◆ Learning through manipulations- All learners especially visual and kinesthetic

### **Sunshine State Standards Correlations (Grades 3-5)**

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### **Science Standards**

- **Processes that Shape the Earth**
  - **Standard 1 (SC.D.1.1)**
    - **Benchmark 4:** Student knows that the surface of the Earth is in a continuous state of change as waves, weather, and shifts of land constantly change and produce many new features.
    - **Benchmark 5:** Student knows that some changes in the Earth's surface are due to slow processes and some changes are due to rapid processes.

## Visual Arts

- **Skills and Techniques**

- **Standard 1 (VA.A.1.1):** Student understands and applies media, techniques, and processes.
- **Benchmark 3:** Student uses materials and tools to develop basic processes and motor skills, in a safe and responsible manner.

### **Reference**

Florida Department of Education, 2003. *Sunshine State Standards*. Retrieved on June 14,

2003 from: <http://www.firn.edu/doe/curric/prek12/frame2.htm>.



## Other suggestions to easily bring the Arts into

### Sciences:

- ◆ Draw or paint scenes from what you are learning.
- ◆ Have students create skits and act out scenes about the animals, places, or concepts being taught.
- ◆ Make simple recipes that the children can eat to reinforce concepts (ex. Layers of the earth, ecosystems, animals, rock formations, etc.)
- ◆ Make home-made paper from recycled paper materials.
- ◆ If class plays a musical instrument (ex. Recorder) or sings, have students create songs or musical pieces that are inspired by the ideas being taught.
- ◆ Make musical instruments (drums, rain-sticks,)
- ◆ Investigate color blending using the scientific process.
- ◆ Students can make their versions of models about the subject material being taught.
- ◆ Make Paper Mache representations of science theories and concepts.
- ◆ Dressing up to represent a concept.
- ◆ Make flipbooks to show motion.
- ◆ Make collages to represent a bioregion.
- ◆ Making animal information cards: Drawing a picture of an animal on one side, on the other side writing characteristics and facts about the animal. Students can then play games with these when they are finished (ex. What animal am I? I have a long tail; I live in the dessert; I am very small; I can jump very high. Who am I?

- ◆ Teacher can put up large art paper around the room and students can draw/paint the desired scene (ex. A bioregion, ecosystem, animal or plant environment, etc).
- ◆ Create a Subject Newspaper, where students have to write and illustrate articles about a concept or place being studied.
- ◆ Make artistic creations from the natural materials found in the places being studied.

However you decide to use Arts in the Sciences, have fun

and enjoy creating lessons that your students will

*remember forever.*