

## Trees on the Plateau of the Grand Canyon

**CONTENT AREA & GRADE LEVEL:** Science, grades 3-4

**TIME:** 4 class periods, 55 Min. per class.

**LESSON FOCUS:** Students will use the inquiry process to observation, question, and hypothesize about the trees, animals, and environment of the plateau of the Grand Canyon/Colorado plateau. They will formulate relevant questions about the properties of trees, animals and events of the plateau of the Grand Canyon/Colorado plateau environment using their observations and prior knowledge. They will also locate information (e.g., book, article, website) to create a presentation in relation to the investigation of the plateau of the trees, animals and environment of Grand Canyon/Colorado plateau environment.

### **STANDARDS ASSESSED:**

#### **AZ- Arizona Academics Standards**

**Subject :** Science

**Subject/ Grade/ Domain :** GRADE 3

- **Strand :** Strand 1: Inquiry Process
  - **Concept :** Concept 1: Observations, Questions, and Hypotheses  
Observe, ask questions, and make predictions.
    - **Performance Objective PO 1. :** Formulate relevant questions about the properties of objects, organisms, and events of the environment using observations and prior knowledge.
- **Strand :** Strand 4: Life Science
  - **Concept :** Concept 2: Life Cycles  
Understand the life cycles of plants and animals.
    - **Performance Objective PO 1. :** Compare life cycles of various plants (e.g., conifers, flowering plants, ferns).
    - **Performance Objective PO 2. :** Explain how growth, death, and decay are part of the plant life cycle.
  - **Concept :** Concept 4: Diversity, Adaptation, and Behavior  
Identify plant and animal adaptations
    - **Performance Objective PO 1. :** Identify adaptations of plants and animals that allow them to live in specific environments.
    - **Performance Objective PO 2. :** Describe ways that species adapt when introduced into new environments

**Subject/ Grade/ Domain :** GRADE 4

- **Strand :** Strand 1: Inquiry Process
  - **Concept :** Concept 1: Observations, Questions, and Hypotheses
    - **Performance Objective : PO 4.** Locate information (e.g., book, article, website) related to an investigation.
- **Strand :** Strand 4: Life Science
  - **Concept :** Concept 4: Diversity, Adaptation, and Behavior  
Identify plant and animal adaptations.
    - **Performance Objective PO 1. :** Recognize that successful characteristics of populations are inherited traits that are favorable in a particular environment.

**ASSESSMENT:** For formative assessment: the students will be observed during the group process. A group summative assessment will be taken from the presentations. The tools to collect student data: group presentations, butcher sheets, drawings and pictures. Look for inquiry process skills, and meeting the other performance objectives listed above.

### **MATERIALS/BACKGROUND INFORMATION:**

- Video DVD: Producer T. Munchweiler, Havasu "Baaja L.L.C., "Havasu 'Baaja, People of the Blue Green Water", 2004 available from [www.havasubaaja.org](http://www.havasubaaja.org)
- Computers (1 for every 5 students) with the following software: Internet Explorer, Photoshop, PowerPoint, Scanning, WordPerfect/Microsoft Word.
- [Field trip directions/safety](#)
- Blank paper and clipboard for field trip
- Butcher paper

To successfully teach this lesson, teachers should be well versed in the follow subjects:

- The anatomy of a tree
- Animals of the plateau of the Grand Canyon/Colorado plateau
- The growth of a tree
- The anatomy of a tree
- The growth of a tree
- The four seasons of the Colorado plateau
- The trees of the plateau of the Grand Canyon/Colorado plateau
- The animals of the plateau of the Grand Canyon/Colorado plateau
- Deciduous and non-deciduous trees
- The human impact on forest
- The trees of the plateau of the Grand Canyon/Colorado plateau
- Deciduous and non-deciduous trees
- The human impact on forests

Student will cover the diversity, adaptation and behavior identify plant and animal adaptations by identify adaptations of plants and animals that allow them to live in specific environments; describe ways that species adapt when introduced into new environments; recognize that successful characteristics of populations are inherited traits that are favorable in a particular environment.

Example: Adaptations that allow plants and animals to survive.

- camouflage – horned lizards, coyotes
- mimicry – Monarch and Viceroy butterflies
- physical – cactus spines
- mutualism – species of acacia that harbor ants, which repel other harmful insects

### **POSSIBLE PROCEDURES:**

#### **A. Engage (Day 1)**

1. Give the following instructions to the students:

•Pay particular attention to what the narrator says and the back ground scenes in the DVD you are about to watch.

•You will be required to recall some particular information in the DVD and use it in an in an assignment.

2. Show the opening (1:26 minutes) and winter chapters (2:05 minutes) of the DVD titled, “Havasu “Baaja, People of the Blue Green Water”.

1. After the clips divide the class into groups of 2-6 and present them with the following instructions:

a) You have 10 minutes as a group to record answers to the questions on the poster paper with the markers provided

b) Each group must choose one or two members to present the group answers to the class

c) The presenters will present from the front of the classroom and the group’s written answers will be posted on the board behind them with the tape provided

Questions:

a) Name and describe at least two different trees mentioned by the narrator or which you saw growing on the plateau of the Grand Canyon.

•Expected responses:

- 1) Pine
- 2) Ponderosa Pine
- 3) Pinion
- 4) Oak
- 5) Willow
- 6) Juniper
- 7) Cedar
- 8) Aspen
- 9) Blue spruce

b) How are the trees different and /or alike?

•Expected responses:

- 1) Some have leaves
- 2) They all have bark
- 3) They have different kinds of leaves and bark
- 4) The pine trees have needles and cones
- 5) They all have branches and roots
- 6) They all produce oxygen
- 7) They all need water, carbon dioxide, sunlight, and nutrients from the ground to survive
- 8) They have different colored leaves, needles, and bark
- 9) Some loose their leaves in the fall

- 10) Their leaves change color
- 11) Some are dormant in the winter
- 12) They grow at different places
- 13) Some are tall and some are short
- 14) Some are fat and some are skinny
- 15) They smell good
- 16) They have berries
- 17) Some have cones
- 18) They have nuts

c) How do the trees benefit the environment, including animals; other plants; humans such as the Havasu Baaja people in their past history and all people today?

• Expected responses:

- 1) The Havasu people used the trees to build homes and for fire wood
- 2) They made bows, arrows, and other tools from wood in the past
- 3) Both humans and animals ate the nuts and berries from the trees
- 4) Trees produce oxygen it benefits the earth's atmosphere and all other forms of live on earth
- 5) Some forms of live like fungi thrive in the shade from the tree and animals rest and protect themselves from sunlight

d) Name some things at home that are made of wood

• Expected responses:

- 1) We make houses from trees
- 2) We use it for fire wood to heat homes and cook
- 3) We make lumber from trees and use it for:
  - i. Furniture
  - ii. Plywood
  - iii. Roofs
  - iv. Frame houses
  - v. Porches/decks
  - vi. Siding
  - vii. Floors
  - viii. Tools
  - ix. Tooth picks and matches
  - x. Paper
  - xi. Spoons, forks, plates and bowls

e) What animals live in/on trees and eat them?

• Expected responses:

- 1) Birds make nest and sit in the trees for protection
- 2) Squirrels live in the trees
- 3) Termites and beetles live, eat, and kill the trees
- 4) Worms eat tree leaves
- 5) Insects lay eggs on their branches and leaves
- 6) Ants and other insects live in some trees and eat the leaves, nuts, and berries

7) Birds and other animals eat the nuts, berries, bark, leaves, and insects in/on the trees

f) What jobs today depend on forest or use wood products?

• Expected responses:

- 1) Lumberjacks
- 2) Carpenters
- 3) Construction workers
- 4) Forest fire fighters
- 5) Furniture sales person
- 6) People who use wood to make products i.e....  
paper mill workers, and drivers that haul the wood to paper mills

### **B. Explore (Day 2)**

Students will be taken on a field trip to a wooded area chosen for its mixture of trees. They will continue to work in their assigned groups. The students will conduct a guided exploration of the trees at Buffalo Park in Flagstaff AZ, or a similar wooded location within a short bus ride or walk to school. The student groups will have 20 minutes to record their observations on labeled sheets attached to a clip board.

Instructions:

a) The purpose of the field trip today is for your groups to observe and record information about different trees in their environment

Arrival at the trees

- a) The teacher measures the tree trunk and announce the measurement to everyone
- b) Groups will list your observations on the labeled paper
- c) Tell students to feel the tree bark and leaves; observe how and where the tree is growing; What the trees smell like; If the trees make any particular sounds
- d) The types of trees will be labeled on the paper
- e) Do not eat the tree parts just taste a small piece very carefully

Hanouts for Ponderosa pine, juniper, aspen, pinion, blue spruce and willow. Each will have the following prompt/labels:

1. How tall is the tree? Why is the tree as tall as it is?

How can we measure how tall the tree is? (compared to the other trees and vegetation around it).  
The tree is that tall because it is 30 years old.

2. How thick is the trunk of the tree compared to the other trees? Why is the tree that thick?

How do we know how thick tree trunk is? (Teacher will take a 100 foot measuring tape and measure or have a group measure the trunk in inches and centimeters for the groups so they could record the data.)

The tree is that thick because as it grows it gets thicker.

3. What type of leaf does the tree have? Why does it have this kind of leaves?

How do we describe the leaves? Describe the leaf using the five senses of smell, sight, sound, feel, and taste. It has this type of leaf because it loses them in the fall.

4. Describe the bark. Why does its bark have the properties you describe?

How do we describe the bark? Describe the bark using the five senses of smell, sight, sound, feel, and taste. It tastes and smells like pine-sol because of the sap which protects the tree.

5. Describe what the branches look like as they grow out from the trunk of the tree? Why are the branches arranged as they are on the tree?

How do I explain the branches? Draw a sketch of the tree. Describe how high up the trunk do the branches grow from the trunk? They are arranged on the tree so they can grow leaves that are exposed to the sunlight and they are thick branches because to support the snow in the winter.

What type of seeds does the tree have? Where are they? Why do you think they have this type of seed?

The seeds are in the berries, and cones. They are in the berries and cones so that they could drop to the ground they have a chance to grow. There has to be a lot of them in a cone because many animals eat them.

### **C. Explanation (Day 3)**

The students will use their sheets of recorded data and to record comparisons of the trees on the paper. The key element to student data is their reasoning of why their group feels there is a difference? (Example: The different types of large cats have different colored/patterned fur. Why? The large cat's fur are different in color and pattern to help them to blend into their particular environment. It helps them to protect themselves and when hunting by concealing so they can get closer to prey)

Instructions:

a. You have 15 minutes to organize a comparison of the different trees on the sheets of butcher paper provided.

b. As a group you will appoint a different person who has not presented during this class or was not the leader to present your group comparison.

c. Groups will have five minutes to present their comparison of the trees

d. The on butcher paper will be posted behind the presenters on the board with tape that teacher will provide.

#### **D. Elaboration (Day 4)**

In their same group students will have 30 minutes to:

1. Research a tree they choose using library resources; additional books, and magazines provided in class; and the internet. (If possible no two groups will do the same tree)

a. Their research will explain what the tree does, and what it looks like during the four seasons.

b. They must also provide pictures of the tree in the four seasons.

c. The groups will pick a tree that grows in a similar environment that shares some similar characteristics and describe the similarities.

d. Produce a drawing the tree they choose.

e. Describe the environment the tree grows in.

f. Provide pictures that assist in their explanation/description.

g. Describe the effects humans have on the habitat of the tree

2. Student groups will have five minutes each to present their research, drawing and picture.

#### **E. Evaluation**

The students will be observed during the group process for formative assessment. A group summative assessment will be taken from the presentations. The tools to collect student data: group presentations, butcher sheets, drawings and pictures.

*Dale Siquah, student, Northern Arizona University, College of Education*