Activity Overview

After reviewing key vocabulary as a class, students are divided into five teams to study the ethnobotany of selected Sonoran Desert plants. Each team is assigned a distinct habitat of the Sonoran Desert. Using provided materials, students study photos of their habitats and selected plants from their habitat. Student teams then consider ways that humans might use the different plants – either as food, shelter, tools, fiber or other purposes. Students complete a worksheet stating their predictions for how the plants are used including which plant part is used and what it is used for. Student teams present their predictions to the class for a discussion in preparation of their trip to the Desert Botanical Garden.

To support the Inquiry in the Garden lesson plans, you may also use the tutorials and Virtual Habitat in DBG’s Digital Desert. These interactive activities will prepare students for their investigations by teaching them about the characteristics of deserts and the Sonoran Desert habitat.

Materials

(Note: All of the following materials are provided as downloadable graphics.)

Vocabulary Word Cards:

• Ethnobotany – The study of the relationship between plants and people.
• Biodiversity – The variety of life including different species, habitats, and ecosystems.
• Habitat diversity – The variety of different habitat types within a specific area.

Written description of the following Sonoran Desert habitats:

- Saguaro / Desert Habitat
- Riparian Habitat
- Chaparral Habitat
- Mesquite Bosque Habitat
- Yucca / Grassland Habitat

1.

continued…
Materials

Pictures of the following habitats and plants:

- Saguaro / Desert Habitat
  - saguaro cactus with fruit
  - picture of dead saguaro with ribs
  - cholla cactus with buds
  - prickly pear cactus with cochineal
- Riparian Habitat
  - arrowweed
  - cattail
  - yerba mansa
  - cottonwood tree
  - willow tree
- Chaparral Habitat
  - agave
- Mesquite Bosque Habitat
  - mesquite with bean pods
- Yucca / Grassland Habitat
  - soaptree yucca
  - field of desert grass

*Student Research Guide – Ethnobotany in Sonoran Desert Habitats*

*Student Worksheet – Ethnobotany Predictions Table*

continued…
LEARNING OBJECTIVES

Upon completion of this activity, students will be able to…

– define the words ethnobotany, biodiversity, and habitat diversity.
– name and describe five different habitat types that occur within the Sonoran Desert.
– name at least two plants that occur within the Sonoran Desert.
– predict possible human uses of specific plants and plant parts.

BACKGROUND KNOWLEDGE

These are concepts the educator should understand and can be found in the glossary.

<table>
<thead>
<tr>
<th>Ethnobotany</th>
<th>Biodiversity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat Diversity</td>
<td>Riparian</td>
</tr>
</tbody>
</table>
Activity Procedures

1. Introduction.

Explain to students that they will be visiting the Desert Botanical Garden where they will be studying desert plants and their uses. Through an inquiry discussion, review with students the name of our desert (the Sonoran Desert) and the characteristics of deserts in general (hot, dry, high evaporation, low rainfall, and extreme temperature fluctuations).

2. Review key vocabulary.

Remind students that on their field trip they will be studying desert plants and their uses. Explain that there are some key vocabulary words that will be used during the field trip. To prepare, the class will review those terms. Call on three students and hand out one Vocabulary Card to each student. Have each hold up their card and read the word and the definition to the class. Ask the class to repeat each word aloud together.

3. Use key terms to explain activity.

Explain that during the field trip, the class will be studying the ethnobotany of selected plants in the different habitats of the Sonoran Desert. Because the Sonoran Desert has a diversity of habitats (that is, it exhibits habitat diversity), there are actually five different habitat types that the class will be studying. Each habitat has specific plants associated with it. In this activity, the class will divide into five teams with each team being assigned a habitat to study and then share with the rest of the class.

4. Create habitat teams and hand out materials.

Divide the class into five teams and assign each team a habitat to study. Hand out the Habitat Description and photographs associated with each habitat to the corresponding team. Also, to each student, hand out a Student Research Guide – Ethnobotany in Sonoran Desert Habitats. Review the materials pointing out that each team has photos and descriptions of their habitat, photos of selected plants, and a Student Research Guide. Review the Student Research Guide, answering any questions students may have. Point out that although they are working in teams, students should complete their own Research Guides.

continued…
Activity Procedures

5. Student teams work time.
Allow adequate time for teams to study their habitats and plants and complete their Student Research Guides. Encourage team work and discussion. Remind teams that they will be sharing their photos and information with the rest of the class so they need to prepare their presentations including who will present which parts.

6. Hand out and review Student Worksheet – Ethnobotany Predictions Table.
Hand out (one to each student) and review the Student Worksheet – Ethnobotany Predictions Table. Point out that during the team presentations, all students should fill in their table with the information provided by the presenting teams. If they have predictions about plant uses that differ from the presenting team, there is space for them to include their own predictions.

7. Student habitat and ethnobotany predictions presentations.
Have each team come up and present their habitat, plants, and plant use predictions to the rest of the class. They should use the Presentation Guide Table from their Student Research Guide to be sure they cover all information. As teams are making their presentations, the rest of the class should be filling in their Student Worksheet – Ethnobotany Predictions Tables. Allow time for questions and discussion following each presentation.

8. Activity wrap up.
Wrap up the activity by reminding students that they will visit examples of each of these Sonoran Desert habitats during their field trip to the Desert Botanical Garden. They will see the actual plants they just studied and they will learn how people actually use those plants. They will see if their predictions are correct! They might also impress their guides with the knowledge they already have based on what they just studied!
Agave
Arrowweed
Cattails
Chaparral Habitat
Cholla Cactus Buds
Cottonwood
Field of Desert Grass
Mesquite with Bean Pods
Mesquite Bosque Habitat
Inquiry in the Garden
Plants and People

Riparian/Desert Oasis Habitat
Prickly Pear Cactus with Cochineal
Saguaro Fruit
Saguaro/Desert Habitat
Saguaro Wood Skeleton
Soaptree Yucca
Willow
Yerba Mansa
Yucca Grassland Habitat
SONORAN DESERT HABITAT DESCRIPTIONS

Saguaro / Desert Habitat Description

Elevation: 260 – 3,000 feet

With its many mountains and valleys, the desert is the largest of the habitats in the Sonoran Desert. Tall cacti, small trees and hardy shrubs survive with less than 10 inches of rainfall a year. The desert has a unique kind of beauty. Towering saguaro cacti and green–trunked palo verde trees thrive in the foothills. Creosote bushes fill the valleys. Trees, like mesquite and ironwood, grow in washes where runoff supplements the desert’s limited rainfall. Other important plants that are found in this habitat include the cholla, prickly–pear, and the ocotillo. Many people appreciate the tranquility and beauty of the desert landscape, and they turn to it as a place to explore and enjoy. In earlier times, people valued this habitat and the plants that thrive here. These plants provided shelter, medicine, and food. How would you use desert plants?

Along with this habitat description, you should have the following habitat and plant pictures:

- Saguaro / Desert Habitat
- saguaro cactus with fruit
- picture of dead saguaro with ribs
- cholla cactus with buds
- prickly pear cactus with cochineal

continued…
Sonoran Desert Habitat Descriptions

Riparian / Desert Oasis Habitat Description

Elevation: Sea level – 3,000 feet

Water is scarce in the desert, but it can be found in streams and occasional seeps and springs. Even with limited rainfall (usually less than 10 inches a year), these desert oases support many plants that would not otherwise be found in the desert. Cottonwood, willow, and other trees grow beside these sources of water, and plants like cattail grow in the water. Other plants, such as yerba mansa and arrowweed can also be found in these stream-side habitats. There are many uses for plants found in this habitat including materials for tools and construction, and food and medicinal plants. Poles from cottonwood and mesquite trees make strong supports. Willow saplings can be bent easily for frames, and plants like arrow-weed make excellent thatching materials. In the last century increased water use has meant that many desert oases have disappeared along with the rich variety of plants found in them. How would you use riparian plants?

Along with this habitat description, you should have the following habitat and plant pictures:

- Riparian Habitat
- arrowweed
- cattail
- yerba mansa
- cottonwood tree
- willow tree

continued…
**Sonoran Desert Habitat Descriptions**

**Chaparral Habitat Description**

**Elevation: 3,400 – 6,100 feet**

Chaparral habitats occur mainly along the northern margins of the Sonoran Desert and receive 15 to 25 inches of rain each year. Chaparral habitats are noted for their dense growth of evergreen shrubs and small trees. Plants like agave, desert spoon, juniper, and manzanita thrive here. Chaparral shrubs often have deep roots that help prevent erosion. Most species grow back quickly after burning. Because chaparral occurs at a higher elevation than other desert habitats, temperatures here are often cooler. People from the desert often traveled to the chaparral habitats to take advantage of the rich diversity plants there. Many chaparral plants provided important sources of food, fiber, timber, medicine and dye. Did you know? Cowboys traveling through chaparral wear leggings called “chaps” to protect themselves from the tough vegetation. How would you use chaparral plants?

Along with this habitat description, you should have the following habitat and plant pictures:

- Chaparral Habitat
- agave

*continued*
SONORAN DESERT HABITAT DESCRIPTIONS

Mesquite Bosque

Elevation: Sea level–1,500 feet

Small mesquite forests are found along meandering water channels where ground water is high. Here, the mesquite tree’s roots are able to reach the underground water. Depending on where they are located, mesquite bosques receive around 10 – 12 inches of rain a year. Dense mesquite bosques provide islands of shelter in the desert and offer desirable habitat for wildlife and people. The word “bosque” means forest in Spanish. The mesquite tree is one of the most important plants to desert people. All parts of the mesquite tree can and have been used by people — providing food, shelter, medicine, fiber and dye. Because of this, the mesquite is sometimes referred to as the tree of life. How would you use mesquite?

Along with this habitat description, you should have the following habitat and plant pictures:

– Mesquite Bosque Habitat
– mesquite with bean pods

continued…
Sonoran Desert Habitat Descriptions

Yucca / Grassland Habitat

Elevation: 3,600–5,600 feet

Yucca and Grassland habitat borders the eastern edges of the Sonoran Desert at higher elevations. With an annual rainfall of 10 to 18 inches, grasses, yucca and acacia are abundant. These desert grasslands have more than just grasses. They also support shrubs, succulents and a few trees. Grassland plants such as yucca and grass have many valuable uses for people. They provide materials for fiber, food, tools, and building material. People from the desert often traveled to nearby semi-desert grasslands. They went to these grasslands to gather plants and hunt animals on a seasonal basis. How would you use grassland plants?

Along with this habitat description, you should have the following habitat and plant pictures:

- Yucca / Grassland Habitat
- soaptree yucca
- field of desert grass
PLANTS AND PEOPLE STUDENT RESEARCH GUIDE – ETHNOBOTANY IN SONORAN DESERT HABITATS

Name ___________________________________________  Teacher ______________________________________

Habitat:

Elevation where habitat occurs: ____________________ Rainfall: ____________________

Habitat Description: ____________________________________________

Key Plants in this Habitat: ________________________________________

Carefully study all the plant photos associated with your habitat. Consider how people might use these plants. Choose one of your key plants (if you have more than one), and complete the information and answer the questions below.

Plant Name: ____________________________________________

Relative Height (circle one): tall  short  medium

Succulent (circle one): no  yes

Growth type: tree  bush  forb/grass  cactus  other (describe): ____________________

General plant description (in your own words describe this plant): ____________________________________________

What part(s) of this plant do you think are or can be used by people? (Consider the leaves, stems, roots, fruits, flowers, etc.)

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

For each plant part listed (above), describe how you think the plant is used. (Consider uses as a tool, shelter, food, fiber, or other.)

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

How would the plant part be prepared for use? (Would it be cut, soaked, cooked, etc.?)

________________________________________________________________________

________________________________________________________________________

If you have additional plants, use the space below to describe how you think they might be used:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Prepare for your team presentation. Use the table below as a guide for your team’s presentation. Be sure everything listed to share is presented and be sure each student participates. There is space for you to assign parts of your presentation to different students on your team.

<table>
<thead>
<tr>
<th>What to share with the class</th>
<th>Who on the team will do it</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name and describe your habitat</td>
<td></td>
</tr>
<tr>
<td>Hold up photos of the habitat</td>
<td></td>
</tr>
<tr>
<td>Name all the key plants in your habitat</td>
<td></td>
</tr>
<tr>
<td>Hold up photos of the key plants</td>
<td></td>
</tr>
<tr>
<td>Describe your selected plant</td>
<td></td>
</tr>
<tr>
<td>Hold up photos of your selected plant and plant parts</td>
<td></td>
</tr>
<tr>
<td>Describe what part(s) of the plant your team thinks is (are) used</td>
<td></td>
</tr>
<tr>
<td>Describe how your team thinks the plant parts are used</td>
<td></td>
</tr>
<tr>
<td>Describe how your team thinks the plant is prepared for use</td>
<td></td>
</tr>
</tbody>
</table>
PLANTS AND PEOPLE STUDENT WORKSHEET – ETHNOBOTANY PREDICTIONS TABLE

<table>
<thead>
<tr>
<th>Habitat</th>
<th>Selected Plant</th>
<th>How Used (Team Predictions)</th>
<th>How Prepared (Team Predictions)</th>
<th>Actual Use</th>
</tr>
</thead>
</table>

Use this space below to describe any other predictions you’d like to make (about other plants or if you think differently from another team’s prediction):

__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
Ethnobotany –

The study of the relationship between plants and people.
Biodiversity –

The variety of life including different species, habitats, and ecosystems.
Habitat Diversity –
The variety of different habitat types within a specific area.
### Related ADE Standards:

#### Reading Strand 1: Reading Process

<table>
<thead>
<tr>
<th>Concept 4: Vocabulary</th>
<th>Performance Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquire and use new vocabulary in relevant contexts.</td>
<td>PO 2. Use context to determine the relevant meaning of a word.</td>
</tr>
</tbody>
</table>

#### Reading Strand 1: Reading Process

<table>
<thead>
<tr>
<th>Concept 6: Comprehension Strategies</th>
<th>Performance Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employ strategies to comprehend text.</td>
<td>PO 4. Use graphic organizers in order to clarify the meaning of the text.</td>
</tr>
</tbody>
</table>

#### Reading Strand 3: Comprehending Informational Text

<table>
<thead>
<tr>
<th>Concept 1: Expository Text</th>
<th>Performance Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify, analyze, and apply knowledge of the purpose, structures, and elements of expository text.</td>
<td>PO 8. Draw valid conclusions based on information gathered from expository text.</td>
</tr>
</tbody>
</table>

#### Writing Strand 1: Writing Process

<table>
<thead>
<tr>
<th>Concept 1: Prewriting</th>
<th>Performance Objective</th>
</tr>
</thead>
</table>
| Prewriting includes using strategies to generate, plan, and organize ideas for specific purposes. | PO 1. Generate ideas through a variety of activities (e.g., brainstorming, graphic organizers, drawing, writer’s notebook, group discussion, printed material).  
PO 4. Use organizational strategies (e.g., graphic organizer, KWL chart, log) to plan writing. |
Related ADE Standards:

Writing Strand 2: Writing Elements

<table>
<thead>
<tr>
<th>Concept 1: Ideas and Content</th>
<th>Performance Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Writing is clear and focused, holding the reader’s attention throughout. Main ideas stand out and are developed by strong support and rich details. Purpose is accomplished.</td>
<td>PO 1. Express ideas that are clear and directly related to the topic. PO 2. Provide content and selected details that are well-suited to audience and purpose. PO 3. Use relevant details to provide adequate support for the ideas.</td>
</tr>
</tbody>
</table>

Writing Strand 3: Writing Applications

<table>
<thead>
<tr>
<th>Concept 2: Expository</th>
<th>Performance Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expository writing includes nonfiction writing that describes, explains, informs, or summarizes ideas and content. The writing supports a thesis based on research, observation, and/or experience.</td>
<td>PO 1. Record information (e.g., observations, notes, lists, charts, map labels and legends) related to the topic.</td>
</tr>
</tbody>
</table>

Writing Strand 3: Writing Applications

<table>
<thead>
<tr>
<th>Concept 6: Research</th>
<th>Performance Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research writing is a process in which the writer identifies a topic or question to be answered. The writer locates and evaluates information about the topic or question, and then organizes, summarizes, and synthesizes the information into a finished product.</td>
<td>PO 1. Paraphrase information from a variety of sources (e.g., Internet, reference materials).</td>
</tr>
</tbody>
</table>

Language Arts Strand 3: Listening and Speaking

<table>
<thead>
<tr>
<th>Standard 3: Listening and Speaking</th>
<th>Performance Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students effectively listen and speak in situations that serve different purposes and involve a variety of audiences.</td>
<td>LS–E2. Prepare and deliver an oral report in a content area and effectively convey the information through verbal and nonverbal communications with a specific audience</td>
</tr>
</tbody>
</table>
## Related ADE Standards:

### Science Strand 1: Inquiry Process

#### Concept 1: Observations, Questions, and Hypotheses

- **Performance Objective**
  - PO 2. Formulate a relevant question through observations that can be tested by an investigation.
  - PO 3. Formulate predictions in the realm of science based on observed cause and effect relationships.

### Science Strand 1: Inquiry Process

#### Concept 2: Scientific Testing (Investigating and Modeling)

- **Performance Objective**
  - PO 5. Record data in an organized and appropriate format (e.g., t-chart, table, list, written log).

### Science Strand 4: Life Science

#### Concept 1: Characteristics of Organisms

- **Performance Objective**
  - PO 1. Compare structures in plants (e.g., roots, stems, leaves, flowers) and animals (e.g., muscles, bones, nerves) that serve different functions in growth and survival.

### Science Strand 4: Life Science

#### Concept 3: Organisms and Environments

- **Performance Objective**
  - PO 1. Describe ways various resources (e.g., air, water, plants, animals, soil) are utilized to meet the needs of a population.
### Related ADE Standards:

#### Social Studies Strand 4: Geography

<table>
<thead>
<tr>
<th>Concept 2: Places and Regions</th>
<th>Performance Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Places and regions have distinct physical and cultural characteristics.</td>
<td>PO 1. Describe how the Southwest has distinct physical and cultural characteristics.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Concept 3: Physical Systems</th>
<th>Performance Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical processes shape the Earth and interact with plant and animal life to create, sustain, and modify ecosystems. These processes affect the distribution of resources and economic development.</td>
<td>Science Strand 4 Concept 3 Describe uses, types, and conservation of natural resources.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Concept 5: Environment and Society</th>
<th>Performance Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human and environmental interactions are interdependent upon one another. Humans interact with the environment—they depend upon it, they modify it; and they adapt to it. The health and well-being of all humans depends upon an understanding of the interconnections and interdependence of human and physical systems.</td>
<td>PO 1. Describe human dependence on the physical environment and natural resources to satisfy basic needs.</td>
</tr>
</tbody>
</table>
**RELATED ADE STANDARDS:**

**Workplace Skills Strand 1**

<table>
<thead>
<tr>
<th>Standard 1 - Students use principles of effective oral, written and listening communication skills to make decisions and solve workplace problems.</th>
<th>Performance Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>1WP–E6. Speak in a content area (e.g., science, social studies, literature), using vocabulary of the subject accurately;</td>
<td>PO 1. Deliver a factual presentation using appropriate terminology</td>
</tr>
<tr>
<td>1WP–E7. Identify the relevant details and facts of written materials</td>
<td>PO 2. Identify relevant facts contained in selected written material</td>
</tr>
</tbody>
</table>

**Workplace Skills Strand 1**

<table>
<thead>
<tr>
<th>Standard 4 - Students work individually and collaboratively within team settings to accomplish objectives.</th>
<th>Performance Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>4WP–E3. Exert a high level of effort and perseverance toward goal attainment, as a team member</td>
<td>PO 2. Identify the team member roles and responsibilities</td>
</tr>
</tbody>
</table>