

**Alternate Field Investigation** 



Saguaro Cactus

#### **ACTIVITY OVERVIEW**

In this investigation, students venture outside for a teacher–led, plant discovery walk in their own schoolyard. This activity is offered as an alternative field investigation for classes unable to visit the Desert Botanical Garden. The purpose of this activity is to get students outside and involved in real, hands–on field investigations about plants. It is suggested that classes first conduct the *The Magic of Desert Plants*, *Inquiry Stage 1– Introductory Activity* in preparation for this investigation. Although that introductory activity is primarily for classes visiting the Desert Botanical Garden, it provides foundational concepts and vocabulary which are further explored in this investigation.

#### TEACHER PREPARATION

The purpose of the plant discovery walk is for students to see plants in nature that exhibit a variety of roots, stems, and leaves. It is suggested that teachers first scout the school grounds before taking the students outside. Decide on a route which would be good for a plant discovery walk. The route should include a variety of plants including trees, shrubs, and smaller forbs or grasses. It is recommended that at least three specific places or "stops" be identified along the route that would serve as focal points to discuss plant roots, stems, or leaves. The teaching stops should include a focal plant or plants that allow for the conveyance of the *Teaching Points* presented for each of the plant parts. Teachers should feel free to use more than one stop for each plant part if they are unable to find examples for all the teaching points at one stop.



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Roots: Saguaro Cactus

#### GENERAL PROCEDURES

Guide students on an outdoor walk following your pre-planned route. At each stop, conduct an inquiry to convey the *Teaching Points* presented for that stop. Following each discussion, conduct one or more of the suggested activities. Wrap up your walk by discussing students' discoveries and reviewing the *General Teaching Points*. When the class is back inside, review the entire investigation by walking students through the *Concluding Activity*, which replaces *Inquiry in the Garden- Stage 3*.

Note: Be sure to discuss safety issues with students prior to your walk. If there are plants that should not be touched (dues to spines or other safety reasons), be sure students are made aware of those in advance.

#### Plant Discovery Walk - General Teaching Points

- Plants exhibit a variety of sizes, colors, textures, and shapes.
- Three main parts of plants are the roots, stems, and leaves.
- Roots, stems, and leaves come in a variety of forms.
- Some plants have roots, stems, or leaves with special characteristics (magic).

#### **Roots Stop**

#### Description

The roots stop is best located near a large tree. It would be ideal (though not necessary) if there were some large tree roots exposed above ground. It is also preferable for there to be other types of plants (such as smaller shrubs and/or grasses) nearby for comparison.

#### **Teaching Points**

- Roots differ in form but provide the same function for plants.
- Roots provide support and obtain water for plants.
- Roots are like our feet and keep trees from falling down.
- The roots of plants are usually hidden underground.
- In many plants, the roots are at least as deep and wide as the part of the plant above ground.
- Some tree roots, like mesquite and cottonwood grow very, very deep into the ground.



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Roots: Agave

#### GENERAL PROCEDURES

#### Discussion and Activity Suggestions

At the roots stop, conduct an inquiry using the teaching points as your guide. Questions to help students arrive at the key points for this stop could include the following:

Does this tree have roots?

Where are this tree's roots?

What do roots do for this tree?

How are this tree's roots similar to/different from other nearby plants?

Can you point to the part of your body that is similar to this tree's roots?

After students have had a chance to discuss roots, choose and conduct one or more of the following suggested activities.

#### Have students...

- Stand up with feet together and arms spread wide. Tell them to keep their feet together but move their upper bodies as if they were trees swaying in the wind. Then have students spread their feet apart about shoulder width and "sway" around some more. Ask students which feels more stable, feet apart or together? How might a tree's roots be underground to give it more stability, apart or together?
- Pick a plant and draw both what they see above ground and what they think its roots look like underground.
- Find a plant that likely has small roots.
- Find a plant that likely has large roots.

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Stems: Saguaro Cactus

#### GENERAL PROCEDURES

#### **Stems Stop**

#### Description

The stems stop should offer a variety of plants with different kinds of stems. Including a cactus (if your schoolyard has any) in the stem stop would be useful. A tree at or near this stop offers the opportunity to point out its trunk and branches.

#### **Teaching Points**

- Plant stems differ in form but provide the same basic function for plants.
- Plant stems provide support and structure for plants.
- A tree's stem includes its trunk and branches.
- Some stems have special characteristics (magic) such as cactus stems which hold lots of water.

#### Discussion and Activity Suggestions

At the stems stop, conduct an inquiry using the teaching points as your guide. Questions to help students arrive at the key points for this stop, could include the following:

Can you point to this tree's stems?

Are all these stems alike?

How are this plant's stems similar to/different from that plant's stems?

What do these stems do for this plant?

What is different about this cactus's stems?

After students have had a chance to discuss stems, choose and conduct one or more of the following suggested activities.

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Leaves: Saguaro Cactus

#### GENERAL PROCEDURES

Have students...

- Find a stem they can wrap one hand around.
- Find a stem they can wrap their arms around.
- Find the largest stem (tree trunk) in the schoolyard.
- See how many children it takes to hold hands and encircle the school's largest tree.
- Find a least two stems with different textures.
- Find two different colors of stems.
- Pick a plant and draw its stems.

#### **Leaves Stop**

#### Description

Locate an area near which are a variety of plants with different types of leaves. Students will venture from this stop to discover the variety of leaves nearby. Look for plants that have leaves that are small, large, round, pointed, very tiny, different colored, odd shaped, etc. If there are any agave in your schoolyard discuss the point that agave have fiber in their leaves.

#### **Teaching Points**

- Plant leaves differ in form but provide the same basic function for plants.
- Leaves make food for plants.
- Some leaves have very special characteristics (magic) such as being succulent (full of water) or containing fiber.
- Some plants lose their leaves during the winter or during times of little rain.
- Some plants are evergreen and keep their leaves year–around.



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Leaves: Agave

#### GENERAL PROCEDURES

#### Discussion and Activity Suggestions

At the leaves stop, conduct an inquiry using the teaching points as your guide. Questions to help students arrive at the key points for this stop could include the following:

From where we are, how many different kinds of leaves do you see?

Can you name some ways that leaves are different/similar?

Do any of the leaves we see have special characteristics (or magic)?

Do some plants have more leaves than others?

What do leaves do for a plant?

Are there any plants with no leaves at all? Why?

After students have had a chance to discuss leaves, choose and conduct one or more of the following suggested activities.

Have students...

- Find and draw at least three different types of leaves.
- Find, draw and color at least two different colors of leaves.
- Find, feel and describe at least two different leaf textures.
- See how many different types of leaves they can find.
- Find the schoolyard plant that has the largest/smallest leaves.



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#### **CONCLUDING ACTIVITY**

#### **Procedures**

- 1. Review and discuss the students' experiences during their Introductory Activity (Stage 1).
- 2. Review main concepts and terms and how they applied to the *Plant Discovery Walk* (the investigation).
- 3. They should then consider the discoveries they made during the investigation and review their findings. What did students discover during their investigation?
- 4. Explain to students that an important part of science is sharing your findings with others. Discuss the value of sharing scientific information (so that others may learn from the work and to expand everyone's understanding of the subject). Scientists typically publish their work in scientific journals. Students will prepare a final presentation of their investigation to share with others, both in class and by posting online on the *DBG Journal of Student Findings*.
- 5. Give students time to prepare a final presentation display of their investigation. Using the information from their investigation, they may choose to create a poster, draw pictures, and/or include photographs taken during their investigation or acquired from the internet. Write a song, poem, skit or story reflecting their experience. Encourage student creativity in the display of their work. (Note: For more ideas on art projects that tie into Garden themes, go to the *Additional Resources* section of the Digital Learning website.)
- 6. Have students share their displays and compare their findings with the rest of the class.

#### POST YOUR FINDINGS ON THE INTERNET!

Students may share their findings online by visiting the DBG Journal of Student Findings at <a href="http://www.dbg.org/index.php/digital/students/journal">http://www.dbg.org/index.php/digital/students/journal</a>. Here, students can submit investigation findings or original art inspired by their Inquiry in the Garden.



## TEACHER'S GUIDE FOR KINDERGARTEN-NOURY THE GARDEN - STAGE 2 Alternate Field Investigation

#### RELATED ADE STANDARDS:

#### LANGUAGE ARTS STRAND 4: VIEWING AND PRESENTING

CONCEPT	PERFORMANCE OBJECTIVE
Students use a variety of visual media and resources to gather, evaluate and synthesize information and to communicate with others.	VP–R3. Create visual representations of personal experiences through media such as drawing, painting, acting and puppeteering

#### **SCIENCE STRAND 1: INQUIRY PROCESS**

CONCEPT	PERFORMANCE OBJECTIVE
C1: Observations, Questions, and Hypotheses – Observe, ask questions, and make predictions.	PO 1. Observe common objects using multiple senses. PO 2. Ask questions based on experiences with objects, organisms, and events in the environment.
C2: Scientific Testing (Investigating and Modeling)  – Participate in planning and conducting investigations, and recording data.	PO 1. Demonstrate safe behavior and appropriate procedures (e.g., use of instruments, materials, organisms) in all science inquiry.  PO 2. Participate in guided investigations in life, physical, and Earth and space sciences.  PO 3. Perform simple measurements using nonstandard units of measure to collect data.
C3: Analysis and Conclusions – Organize and analyze data; compare to predictions.	PO 1. Organize (e.g., compare, classify, and sequence) objects, organisms, and events according to various characteristics.  PO 2. Compare objects according to their measurable characteristics (e.g., longer/shorter, lighter/heavier).
C4: Communication	PO1. Communicate observations with pictographs, pictures, models, and/or words PO2. Communicate with other groups to describe the results of an investigation.



# TEACHER'S GUIDE FOR KINDERGARTEN-INQUIRY IN THE GARDEN - STAGE 2 Alternate Field Investigation

#### RELATED ADE STANDARDS:

#### SCIENCE STRAND 4: LIFE SCIENCE

CONCEPT	PERFORMANCE OBJECTIVE
C3: Organisms and Environments – Understand the relationships among various organisms and their environment	PO 1. Identify some plants and animals that exist in the local environment.  PO 2. Identify that plants and animals need the following to grow and survive:  • food • water • air • space

#### SCIENCE STRAND 5: PHYSICAL SCIENCE

CONCEPT	PERFORMANCE OBJECTIVE
C1: Properties of Objects and Materials – Classify objects and materials by their observable properties.	PO 1. Identify the following observable properties of objects using the senses:     • shape     • size  PO 2. Compare objects by the following observable properties:     • size

#### EDUCATIONAL TECHNOLOGY STRAND 2: COMMUNICATION AND COLLABORATION

CONCEPT	PERFORMANCE OBJECTIVE
C1: Effective Communications and Digital Interactions	PO1. Communicate with others as a whole class using digital tools.
C2: Digital Solutions	PO1. Participate in a classroom learning project using digital collaborative resources.