

TEACHER'S GUIDE FOR SEVENTH GRADE INQUIRY IN THE GARDEN - STAGE 3

Key to Desert Plants



Desert Botanical Garden website

OVERVIEW

The purpose of this activity is to move students through the completion of an investigation using the scientific process. Having previously made observations, asked questions, developed a hypothesis, and made and tested their predictions, students now analyze their results and draw conclusions about how to identify plants in the cactus family. After reviewing their experiences from their field trip to the Desert Botanical Garden, students complete a *Study Guide* in which they describe their investigation and state their conclusions. They also create a Venn Diagram depicting the shared and unique characteristics of cacti and euphorbias. Students next construct a more elaborate Venn Diagram using additional materials and objects to depict the identifying characteristics. To share their work with others, students are encouraged to post their findings and diagrams online at the Desert Botanical Garden website.

MATERIALS

- *Key to Desert Plants - Data Collection Journal* (from the DBG fieldtrip)
 - *Student Study Guide – Key to Desert Plants – Results and Conclusion*
 - Materials to construct creative Venn Diagrams: construction paper, internet photos, colored markers, natural objects, various art materials, etc.
1. Review and discuss the students' experiences during their trip to the Desert Botanical Garden. Have students share the names and descriptions of some of the different plant families they keyed out during their field trip. Use the Organize and Analyze section of the *Data Collection Journal* to review.
 2. Ask for students to list and describe as many distinguishing characteristics as they can remember which they used to identify plants (e.g., hairy leaves, green bark, leaves simple or compound, etc.). List the characteristics on the board as students share them. Review and discuss the characteristics and ask students which characteristics are adaptations to desert conditions. Ask students how those specific characteristics help plants survive in the desert environment. Point out that because water is a limiting factor in the desert, plants with those characteristics may have a better chance of survival.
 3. Discuss the differences between euphorbias and cacti. Review and discuss

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3. Discuss the differences between euphorbias and cacti. Review and discuss the characteristics that were common and unique to both. Discuss the investigation and ask students whether or not their hypothesis was true. Discuss why it is OK for a hypothesis to not be supported by the results.
4. Hand out and review the *Student Study Guide – Key to Desert Plants – Results and Conclusions*. Answer any questions the students may have then give them time to complete their *Study Guides*. Encourage students to make creative Venn Diagrams and direct them to the materials acquired for their projects (you might ask them in advance to bring materials from home). (*Note: For more ideas on art projects that tie into Garden themes, go to the Additional Resources section of the Digital Learning website.*)
5. When they are ready, give students time to share, compare, and discuss their creative Venn Diagrams. If possible, have students take digital photos of their creative Venn Diagrams to post online at the Desert Botanical Garden website.

POST YOUR FINDINGS ON THE INTERNET!

The final step of the Inquiry Process is to share your findings. Students may share their creative Venn Diagrams and/or findings by visiting the DBG Journal of Student Findings at <http://www.dbg.org/index.php/digital/students/journal>. Here, students can submit investigation findings or original art inspired by their Inquiry in the Garden.

STUDENT STUDY GUIDE - KEY TO DESERT PLANTS- RESULTS AND CONCLUSION

Student Name _____ Teacher _____

Instructions: Use the information from your Student Study Guide – Key to Desert Plants and from the Data Collection Journal (from your field trip) to answer the questions below. Following your teacher's instructions, you may also post your work online on the DBG Journal of Student Findings.

1. What was your class hypothesis regarding this question: What are the distinguishing characteristics of plants in the Cactus Family?

2. What additional observations did you make at the Desert Botanical Garden that further led you to that hypothesis?

3. What question does your hypothesis attempt to answer?

4. What was your prediction about how to identify cacti?

5. How did you test your prediction? Describe the investigation you conducted at the Botanical Garden.

6. Analyze your results. What did you find out about the identifying characteristics of cacti and euphorbias as you keyed them out?

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Student Name _____ Teacher _____

7. State your conclusion. Was your hypothesis supported by your results? (Was it true or not true?)

8. Why is it OK to have your hypothesis be false (not supported by your results)?

9. Write a new, refined hypothesis based on the results from your investigation:

10. Based on your findings, what are some other questions that arise that might lead to new investigations?

11. List identifying characteristics of cacti:

12. List identifying characteristics of euphorbias:

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RELATED ADE STANDARDS:

READING STRAND 1: READING PROCESS

CONCEPT	PERFORMANCE OBJECTIVE
C6: Comprehension Strategies	PO 7: Use reading strategies (e.g., drawing conclusions, determining cause and effect, making inferences, sequencing) to interpret text.

READING STRAND 3: COMPREHENDING INFORMATIONAL TEXT

CONCEPT	PERFORMANCE OBJECTIVE
C1: Expository Text	PO 8: Interpret graphic features (e.g., charts, maps, diagrams, illustrations, tables, timelines, graphs) of expository text. PO 9: Apply knowledge of organizational structures (e.g., chronological order, comparison and contrast, cause and effect relationships, logical order) of expository text to aid comprehension. PO 10: Make relevant inferences about expository text, supported by text evidence.

WRITING STRAND 1: WRITING PROCESS

CONCEPT	PERFORMANCE OBJECTIVE
C1: Prewriting	PO 1: Generate ideas through a variety of activities (e.g., prior knowledge, discussion with others, printed material or other sources).
C5: Publishing	PO 1: Prepare writing in a format (e.g., oral presentation, manuscript, multimedia) appropriate to audience and purpose. PO 3: Use graphics (e.g., drawings, charts, graphs), when applicable, to enhance the final product. PO 4: Write legibly.

WRITING STRAND 3: WRITING APPLICATIONS

CONCEPT	PERFORMANCE OBJECTIVE
C2: Expository	PO 1: Record information (e.g., observations, notes, lists, charts, map labels and legends) related to the topic.
C3: Functional	PO 1: Write a variety of functional texts (e.g., directions, recipes, procedures, rubrics, labels, posters, graphs/tables).

LANGUAGE ARTS STANDARD 4: VIEWING AND PRESENTING

STANDARD 4: VIEWING AND PRESENTING	PERFORMANCE OBJECTIVE
Students use a variety of visual media and resources to gather, evaluate and synthesize information and to communicate with others.	VP-E2: Plan, develop and produce a visual presentation, using a variety of media such as videos, films, newspapers, magazines and computer images

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MATH STRAND 2: DATA ANALYSIS, PROBABILITY, AND DISCRETE MATHEMATICS

CONCEPT	PERFORMANCE OBJECTIVE
C3: Systematic Listing and Countings	PO 2: Solve counting problems using Venn diagrams and represent the answer algebraically.

SCIENCE STRAND 1: INQUIRY PROCESS

CONCEPT	PERFORMANCE OBJECTIVE
C1: Observations, Questions, and Hypotheses	PO 3: Explain the role of a hypothesis in a scientific inquiry.
C3: Analysis and Conclusions	PO 1: Analyze data obtained in a scientific investigation to identify trends. PO 3: Analyze results of data collection in order to accept or reject the hypothesis. PO 5: Formulate a conclusion based on data analysis. PO 6: Refine hypotheses based on results from investigations. PO 7: Formulate new questions based on the results of a previous investigation.
C4: Communication Communicate results of investigations.	PO 1: Choose an appropriate graphic representation for collected data: PO 2: Display data collected from a controlled investigation. PO 3: Communicate the results of an investigation with appropriate use of qualitative and quantitative information. PO 5: Communicate the results and conclusion of the investigation.

SCIENCE STRAND 4: LIFE SCIENCE

CONCEPT	PERFORMANCE OBJECTIVE
C3: Populations of Organisms in an Ecosystem	PO 3: Analyze the interactions of living organisms with their ecosystems: limiting factors

EDUCATIONAL TECHNOLOGY STRAND 2: COMMUNICATION AND COLLABORATION

CONCEPT	PERFORMANCE OBJECTIVE
C1: Effective Communications and Digital Interactions	PO 1: Collaborate and communicate with peers, experts, or others employing a variety of digital tools to share findings and/or publish.
C2: Digital Solutions	PO 1: Communicate and collaborate for the purpose of producing original works or solving problems.
C3: Global Connections	PO1: Independently locate and interact with teacher approved global communities.