



WHY IS AN APPLE LIKE A SUITCASE? THE IMPORTANCE OF FRUIT AND SEEDS IN PLANT REPRODUCTION



Grades K–2

I. Introduction

Students will have an opportunity to examine a variety of fruit to discover that each has seeds. Even cotton and some “vegetables” are considered the fruit of the plant because they contain seeds. Through experimentation, students will understand the important role that fruit and seeds play in a plant’s life cycle.

II. Goals/Objectives

- * To develop an understanding that all fruit contain seeds, that a fruit’s function is to distribute seeds, and that these seeds are important to plant reproduction.
- * To develop an understanding of the scientific process of investigation and experimentation appropriate to each grade level.

III. Educational Standards

A. California Content Standards for Science [California Department of Education (2000)]

Kindergarten

Life Sciences

- (2c) Students know how to identify major structures of common plants and animals (e.g., stems, leaves, roots, arms, wings, legs).

Investigation and Experimentation

- (3a) Observe common objects using the five senses.
(3b) Describe the properties of common objects.
(3c) Describe the relative position of objects by using one reference (e.g., above or below).

- (3d) Compare and sort common objects by one physical attribute (e.g., color, shape, texture, size, weight).
- (3e) Communicate observations orally and through drawings.

Listening and SpeakingComprehension 1.1

Understand and follow one- and two-step oral directions.

Comprehension 1.2

Share information and ideas, speaking audibly in complete, coherent sentences.

Grade One**Investigation and Experimentation**

- (3a) Draw pictures that portray some features of the thing being described.
- (3b) Record observations and data with pictures, numbers, or written statements.

Listening and SpeakingComprehension 1.1

Listen attentively.

Comprehension 1.2

Ask questions for clarification and understanding.

Comprehension 1.4

Stay on the topic when speaking.

Writing Applications

Write a brief expository description of a real object, person, place, or event, using sensory details.

Grade Two**Life Sciences**

- (2f) Students know fruit and flowers are associated with reproduction in plants.

Investigation and Experimentation

- (3a) Make predictions based on observed patterns and not random guessing.
- (3d) Write or draw descriptions of a sequence of steps, events, and observations.
- (3e) Use magnifiers or microscopes to observe and draw descriptions of small objects or small features of objects.
- (3g) Follow oral instructions for a scientific investigation.

Writing

- (2.1) Write brief narratives based on their experiences.

B. “Open Court” Connections

- Strategies such as “predicting”, “compare and contrast”, and “summarizing” spiral through all the grade levels in the SRA Open Court 2000 Program.
- The “Machines in the Garden” unit theme in the First Grade Open Court Program is a natural place to include this lesson as a science extension.
- The Venn Diagram (used in the “Extension Activities” section of this lesson) overhead is included in the SRA Open Court 2000 program materials.

IV. Background

During the Discovering Plants program at Huntington Botanical Gardens, your class will be introduced to the book *Weslandia* by Paul Fleischman and explore the herb garden. In the beginning pages of *Weslandia*, we see a young boy named Wesley who lays awake at night. As he tries to sleep, he listens to the night wind blowing. Some magical seeds are carried by the wind and germinate in his backyard. Plants with mysterious red flowers begin to grow and the rest of the story involves Wesley’s clever use of the plant parts to create his own “civilization.”

This lesson will include a discussion of the many ways that seeds travel and will investigate the important role that flowers, fruit, and seeds play in plant growth and reproduction. In the Discovering Plants program, students will have a chance to see a cotton tree in the herb garden and feel the seeds inside the cotton boll. Students will also discuss the uses of the fruit produced by the jojoba and strawberry plants. This will give students a chance to reflect on the similarities that they have discovered regarding these plants and make a connection—they all produce fruit that contain seeds!

Students will use the information generated by a Know-Want to Know-Learned chart to follow the scientific process by using their meaningful questions to form a hypothesis about whether or not all fruit have seeds. After that, students will conduct careful investigations during their experiments by dissecting various types of fruit. Finally, students will come to a conclusion about whether their predictions were correct or incorrect.

V. Materials Needed

- * Disposable cutting boards
- * Plastic knives
- * A variety of fruit that can be sliced open by young children such as: tangerines, pears, kiwifruit, strawberries, seeded grapes, cherries, etc.
- * Copy of “A Fruit is a Suitcase for Seeds” by Jean Richards
- * Chart paper
- * Markers

- * Seed packets
- * Small suitcase
- * Overhead of “KWL Chart,” page 9.
- * Magnifying glasses (optional)
- * Goggles (optional)
- * Lab coats (optional)
- * For each student, one copy each of **Student Handout One**, “Does My Fruit Have Seeds?” and of **Student Handout Two**, “Venn Diagram.”

VI. Lesson Activities

Part I—Pre-reading activity for English Language Learners (ESL Lesson)

This part can be done a day or two ahead so that students may better understand some of the vocabulary used during the rest of the activity. The vocabulary for the activity is listed on page 13.

Bring in items such as small suitcases or doll suitcases and packages of seeds. Try to have a variety of seed sizes. Have students explore seeds by opening seed packages and observing attributes of seeds.

- 1) Where do seeds come from?
- 2) What are seeds for?
- 3) How would they describe the seeds?
- 4) What words can be used to compare seeds that are different and seeds that are the same?
- 5) When would students use a suitcase?
- 6) What goes inside a suitcase?

Part II

1. Read students *A Fruit is A Suitcase for Seeds* by Jean Richards. Ask students to give examples of three ways that seeds travel in the book. Encourage students to give their answers in complete sentences. Elicit responses by showing illustrations from the book. Suggest to students that they may paraphrase information just acquired from the text. (*How would you say that in your own words?*) Write student responses on the board.

Examples:

- a) Some seeds travel by being blown by the wind.
- b) Some seeds travel by floating in the water.
- c) Some seeds travel because animals eat the fruit and then drop the seeds in different places.

2. After reading the book, review the last two pages and discuss the concept of the fruit in the story being compared to a suitcase.
 - a) How is a piece of fruit like a suitcase?
 - b) The little girl is pictured eating a strawberry and the print underneath says, “You’re really eating a suitcase. . . .” What does that mean?
 - c) On the facing page there is an illustration of a suitcase that looks like a strawberry. The bird is holding a tag that says “fruitcase.” Have they ever heard that word before? What does it mean?
 - d) The text reads “. . . a suitcase for seeds!” How is a strawberry like a suitcase?
 - e) What is a suitcase used for? Since a suitcase is used to carry clothes and other items when traveling, what does a strawberry have in common with a suitcase? Does it carry seeds around?
3. On the board, or as an overhead, create a “Know, Want to Know, Learned,” or KWL, chart to track student learning. (A blank KWL chart that may be used to prepare an overhead is provided on page 9; a sample KWL chart is on page 10.) Using student responses, you will fill in the chart during the course of the lesson, recording things that students already KNOW about a subject (K), things that they WANT TO KNOW about a subject (W), and finally the things that they have LEARNED about the subject (L). This last column will be completed at the end of the lesson, as students share and record the information they have learned. There is also a space to write predictions based on what they know.

Part III

1. Begin by asking students what they KNOW about a subject — in this case, fruit and seeds. Record their responses in the first column of the KWL chart. Ask the students how they knew this information. What prior experiences led to this knowledge?
2. Next, ask students what they would like to explore about the subject. Chart these responses in the second column, the “W,” or “Want to Know” section.
3. The student will now form hypotheses about what they might learn based on their previous knowledge. Hold up various fruit and ask students to predict whether or not each fruit will have seeds inside. Use the following questions to guide their inquiry:
 - a) Do you see any seeds on the outside of the fruit?
 - b) What makes you think that there will/will not be seeds inside?
 - c) What experiences have you had before that helped you make your prediction?
 - d) Would it be harder to predict if you had never eaten this fruit before?
 - e) How would you decide if you had never seen this fruit before?

- f) What do we know about fruits and seeds from reading the book in this lesson?

As a class, form a general prediction about the relationship between fruits and seeds. Chart the prediction in the space provided on the KWL chart.

2. After completing this activity, explain to students that they are going to have a chance to be scientists! Scientists first do research on a particular subject. They ask questions and predict answers. Then scientists do experiments to prove or disprove their guess. They gather data and finally make a conclusion based on the information they have discovered from their experiments. The students will explore fruits based on the predictions and "want to know" column in the KWL chart, making additional predictions and observations along the way.

Part IV

1. First, distribute disposable cutting boards to students. Then, distribute fruit such as strawberries, kiwifruit, cherries, and pears to each student or group. Next, ask students to predict (formulate a hypothesis) whether or not their fruit will have seeds. If so, where will the seeds be? What size and color will the seeds be? How many seeds will the students find?
2. Have students dissect fruit and chart whether or not each fruit has seeds. Using the Data Sheet "Does My Fruit Have Seeds?" (**Student Handout One**) students should record whether or not each fruit has seeds. Allow some time for the students to share their information with their neighbors (or other groups). Students should also illustrate their fruit and describe the attributes of any seeds found. Students may use magnifying glasses, if available, to more closely examine small seeds. Students will use the information from the data sheet to prove or disprove their hypothesis. Repeat this process for each fruit being dissected.
3. As the students are dissecting their fruit, tell them to think about whether each fruit makes a good "suitcase" for the seeds.
 - a) Does the skin or rind of the fruit protect the seeds inside?
 - b) Does the pulp or flesh of the fruit keep the seeds from moving around inside the fruit?
 - c) Does the size and shape of the fruit help the seeds travel?
 - d) Does the fact that the fruit tastes good help the seeds travel? If so, how?
4. The following sample questions may also help you in guiding this activity:
 - a) What do you notice about the inside of the fruit?
 - b) Where are the seeds?
 - c) How many seeds are there?
 - d) Are the seeds always in the same spot?
 - e) Compare the kiwifruit and the lemon — which has more seeds?

- f) Does a lemon always have the same number of seeds?
5. Finally, after all the data has been collected, have students share their information with the class. Ask students to examine their conclusions. Did they prove or disprove their guess? Use this information to fill out the “Learned” column of the KWL chart.

Revisit the first two columns of the “KWL Chart.” How did their knowledge (“Know” column) change? Did the students answer their original questions from the “Want to Know” section? What could they continue to explore in the future?

Note:

This activity can be organized in a variety of ways. You may prefer to do a whole class lesson in which each child would have his/her own fruit and then guide the activity with relevant questions as each student works independently with 4-5 different fruit. Each student would follow the teacher’s instructions and dissect each fruit and chart information in the same order. Another possibility is to have 4-5 groups of students each investigate one type of fruit and then share the results with the rest of the class. Yet another version would be to have each group work with the same 4-5 types of fruit, but the students would take turns doing the dissecting and charting. Your preference may be influenced by the grade level of your students and the amount of adult supervision available to you during the lesson.

VII. Discussion Questions

1. Where are the seeds of the strawberry? [*Surprise, they are on the outside!*]
2. Why is the fruit like a suitcase? [*It helps the seeds travel and also protects them from damage.*]
3. Name three different ways seeds can travel. [*Wind, water, animals.*]
4. Why don’t seeds grow in your tummy? [*Seeds need light, air, water, and soil nutrients to grow. They cannot get all of these inside your body.*]
5. Can you grow a plant from a seed? [*Try it and see!*]

VIII. Extension Activities

1. Write down the steps of the lesson on sentence strips. Mix up the steps and have students assist you in properly sequencing the strips in a pocket chart.
2. Have students write down their experiences in their journal. Use words like first, next, then, and finally. Have students illustrate the steps of their experiment.
3. Make strawberry lemonade with the leftover fruit: puree strawberries and add to ready-made lemonade. Garnish with a kiwifruit slice.
4. Compare and contrast a strawberry and a lemon. List their differences and similarities. Have the entire class participate in completing a Venn Diagram

(Student Handout Two) including attributes that are “Alike” and “Different.” Have students use the five senses to describe both fruit.

5. Grow a plant from a seed in your classroom.
6. Plant a strawberry pot with different varieties of strawberries. Count the seeds.
7. Graph the results of the student data sheets.
8. Make a paper bag strawberry. Stuff a brown paper lunch bag with newspaper and tie off the top with a green pipe cleaner. Leave about 2–3 inches at the top. Paint the top part green and paint the bottom red like a strawberry. Use a Q-tip to dot 200 seeds on your strawberry.

KWL Chart

“Know” “Want to Know” “Learned”

K	W	L
PREDICTION(S):		

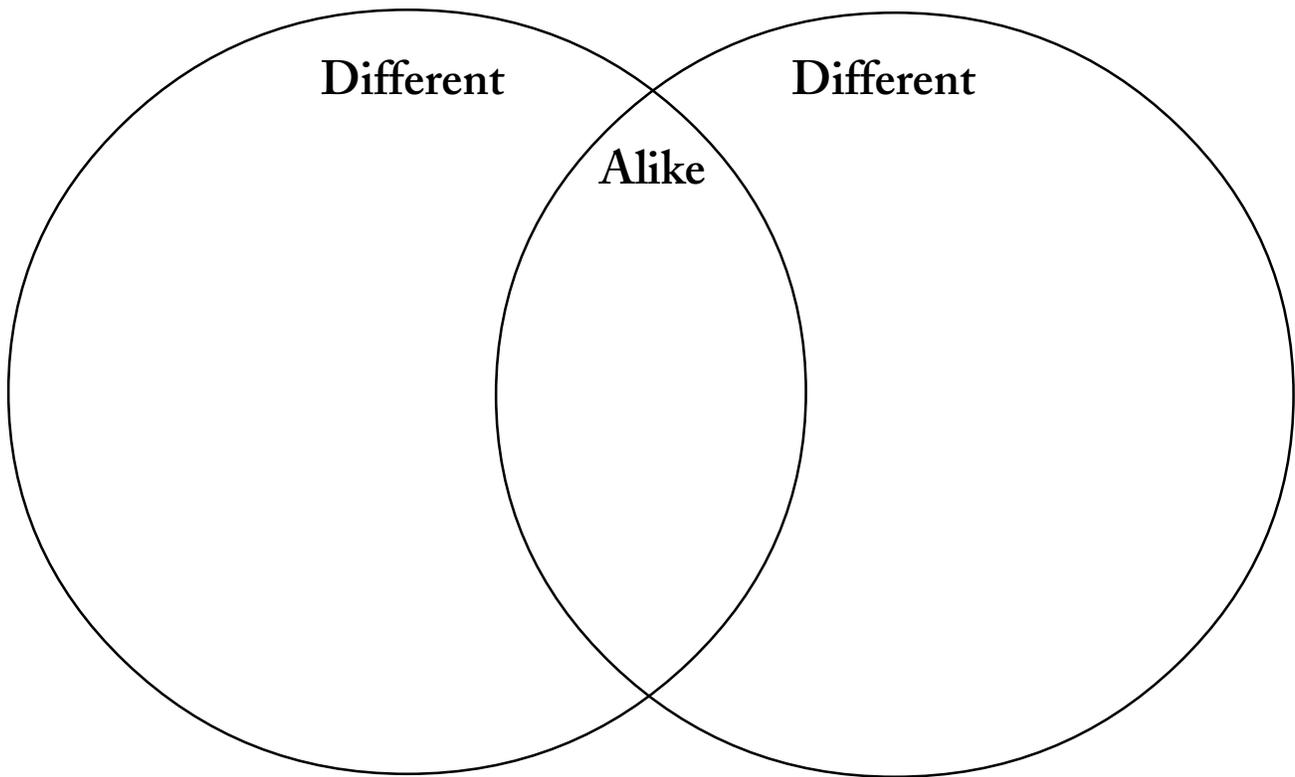
KWL Chart *EXAMPLE*
 “Know” “Want to Know” “Learned”

K	W	L
<p>What we know:</p> <ul style="list-style-type: none"> * Strawberries have seeds on the outside * Oranges have seeds on the inside. 	<p>What we want to know:</p> <ul style="list-style-type: none"> * Do lemons have seeds? * Do cherries have seeds? * What do seeds do? 	<p>What we learned:</p>
<p>PREDICTION(S): All fruit will have seeds.</p>		

DATA SHEET
Does My Fruit Have Seeds?

<u>Name of Fruit</u> Illustrate your fruit	<u>Does This Fruit Have Seeds?</u>		<u>Number of Seeds</u>	<u>Describe the Seeds</u> (Tiny, black, round, etc.)
	Yes	No		

VENN DIAGRAM



VOCABULARY

- Fruit** *the part of the plant that came from a flower and holds seeds*
- Predict** *to guess what will happen*
- Seed** *the part of a (flowering) plant that may grow into a new plant*
- Suitcase** *a case for carrying clothes when traveling*