

Bay Area Scientists in Schools Presentation Plan

Lesson Name: Plant Life Cycle

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Grade Level: 2nd GRADE **Standards Connection(s):** LS: Plants and animals have predictable life cycles. Flowers and fruits are associated with plant reproduction.

Next Generation Science Standards:

K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.

K-ESS3-1. Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.

<i>Science & Engineering Practices</i>	<i>Disciplinary Core Ideas</i>	<i>Crosscutting Concepts</i>
<p>Developing and Using Models Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.</p> <ul style="list-style-type: none"> Use a model to represent relationships in the natural world. (K-ESS3-1) <p>Connections to Nature of Science Scientific Knowledge is Based on Empirical Evidence</p> <ul style="list-style-type: none"> Scientists look for patterns and order when making observations about the world. (K-LS1-1) 	<p>LS1.C: Organization for Matter and Energy Flow in Organisms</p> <ul style="list-style-type: none"> All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow. (K-LS1-1) <p>ESS3.A: Natural Resources</p> <ul style="list-style-type: none"> Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do. (K-ESS3-1) 	<p>Patterns</p> <ul style="list-style-type: none"> Patterns in the natural and human designed world can be observed and used as evidence. (K-LS1-1) <p>Systems and System Models</p> <ul style="list-style-type: none"> Systems in the natural and designed world have parts that work together. (K-ESS2-2),(K-ESS3-1)

Common Core Standards:

ELA/Literacy:

W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). **(K-LS1-1)**

SL.K.5 Add drawings or other visual displays to descriptions as desired to provide additional detail. **(K-ESS3-1)**

SL.K.3 Ask and answer questions in order to seek help, get information, or clarify something that is not understood. **(K-ESS3-2)**

Mathematics:

MP.2 Reason abstractly and quantitatively.

MP.5 Use appropriate tools strategically.
K.CC Counting and Cardinality (K-ESS3-1)

FOSS Connections:

Grade 1/2 Module: *Plants and Animals*

Teaser:

We will teach the students about the life cycle of plants, the presence of plants in their lives, and give them an idea of what it means to be a scientist

Objective:

Station 1: Seeds. Students will identify parts of the plant seed in different species.

They will be able to plant seeds in soil and understand the germination process

Station 2: Vegetation. Students will learn the major plant organs (roots, shoots, and leaves) and their role in plant life

Station 3: Flowers. Students will identify the different parts of a flower and the role that they play in pollination

Station 4: Fruits. Students will understand what a fruit is and what role it plays in the plant life cycle. Students will be able to distinguish between what is and what is not a fruit. They will make predictions and record their observations.

Vocabulary/Definitions: 3 – 6 important (new) word

Station 1: Seeds

- embryo
- seed coat
- germination
- Petal
- Stamen
- Carpel
- Pollen

Station 2: Seedling/Vegetative

- Root/Shoot/Leaf/Flower
- Development
- Diversity

Station 4: Fruit

Fruit (scientific definition)

Station 3: Flowering

Materials:

Worksheets for all stations

Station 1: Seeds

Premoistened soil, small pots, sharpie for labeling, paper towels for wiping hands, overnight soaked lima beans (several pre-dissected), Pictures of coconut (a large seed)

Station 2: Seedling/Vegetative

Plants at various stages of growth Samples/cuttings from a variety of plants Magnifying glasses and paper towels

Station 3: Flowering

Easily dissectible flowers (tulips, or smaller flowers for handing out)

Poster Paper and Markers (I will diagram flower)

Magnifying glass (1 per pair)

Our plant (will pollinate and leave in the classroom for follow up)

Station 4: Fruit

Different fruits (apples, a stone fruit, a citrus fruit, pomegranate) including items that students may be surprised to find are fruits (tomatoes, cucumber, pumpkin, peanuts) and a few grocery items to use as examples of what a fruit is NOT (carrots, potato)

Classroom Set-up:

Students will be split up into four groups (preferably beforehand, if the teacher already has a grouping system) and will rotate around 4 stations: Seed, Vegetative/Seedlings, Flowering, Fruit. 4 areas (groups of desks, tables, etc.) should be cleared for the stations

Classroom Visit

1. Personal Introduction:

5 Minutes

We are scientists in training and we study plants. Plants are everywhere in your lives, in what you eat, what you wear, the medicine you take, the houses you live in, etc. Can you name some plants? What would the world look like without any plants?

Topic Introduction:

5 Minutes

How do you use plants every day? Have any of you planted a seed before? Watched a plant grow? Describe how a plant starts as a seed ("contains a baby plant"), and invite them to organize pictures of a seed, seedling, flower, fruit. Emphasize the cyclical nature of the process.

2. Learning Experience(s):

40 Minutes

The teacher will split kids into four groups beforehand. They will rotate around four stations.

Station 1: Seeds

At this station the students will understand what makes up seeds and how they begin to grow. They will learn vocabulary, which is highlighted in bold. The first three segments have worksheet sections for the students to fill out.

(0 min) We will first ask general questions about seeds, asking for student definitions and examples of seeds they have eaten. We may enjoy eating seeds, but why would a plant want to produce them?

What is a definition of a seed? What are different seed shapes and sizes?

(2 min) We will then show examples of seed anatomy using dissected beans, asking students to guess the parts inside. In soaked lima beans, for example, the embryo is easily visible. This can be explained as a "baby plant". The surrounding endosperm ("food supply" for the 2nd graders) gives food for the baby plant as it grows. Finally, the seed coat provides protection until the seed can grow.

(4 min) We will ask students what conditions are needed for a seed to germinate. This often corrects misconceptions – for example, that light is needed to germinate, rather than just warmth.

(6 min) The students will get to plant their own lima beans in small pots. We will have demonstration plants of different ages after germination, and ask students to guess how long the plants have been growing. Students will fill their own pots with pre-moistened soil, take a few seeds, and cover them to prepare for germination.

(9-10 min) If time permits, we will ask students to compare baby plants and baby animals, with guiding questions if necessary. Can an animal embryo grow outside of its parent? Can it

wait to start growing until conditions are right? Does it have a food supply outside of its mother? This short discussion will reinforce seed vocabulary.

Station 2: Seedling/Vegetative Phase

At this station, students will observe plants in various stages of development (i.e. seedling, vegetative growth, flowering) and cuttings of various plant structures from a variety of plants. Students will understand that plants have specialized structures with different functions, and that plants change over time.

Plant Diversity: various samples will be collected so that students can observe the diversity of plant structures. Various types of leaves will be the focus, and flowers will be left for the next stage, but some types of roots may be available, as well as atypical plants like mosses and ferns. Students will be asked to develop guesses as to why some structures may be different than others (i.e. big leaves for lots of light, needles for toughness).

Station 3: Flowering

This lesson was modified from and inspired by part of a lesson entitled "Flower Power," by Rosemarie Young. Students will arrive at the station, and after a brief introduction of who I am, I will pass each pair of students a flower and a magnifying glass. I will then read aloud descriptions of the flower part and have the students find what part I am describing on their flower:

Petal - I am the prettiest part of the flower. I come in a variety of colors, and people like to pluck me off while chanting, "She/he loves me, she/he loves me not..."

Stamen: I am shaped like a lolly pop and there are a bunch of me. I have two parts a skinny body and a round head.

Pollen: I will instruct the students to use their magnifying glass to see the pollen on the anthers, touch it and rub it in their fingers.

Carpel: My base is large and oval shaped and I have a tube-like structure that is sticky on top. When they identify the carpel I will instruct them to open up the ovary and see the ovules. I will ask them if they know what nectar is and will explain what it is and this is where it is located. As each part is identified I will write the name of the structure on the board/poster diagram of the flower. I will then bring out our plant and show them how insects take pollen from one flower and pollinate another.

Station 4: Fruit

At this station, students will learn to identify fruits in the way that scientists do: as the parts of the plant that contain seeds. Students will make predictions (hypotheses) about whether a common grocery item is or is not a fruit, and then either accept or reject their prediction based on whether or not the item has seeds.

We will start off by asking them what they think a fruit is. We will lead them to the scientific definition of a fruit (the part of the plant containing seeds). We will show the kids an apple as an example of a fruit. We will dissect it and observe the seeds, flesh, and skin.

Next, I will present the students with common grocery items and ask them to predict whether the item is a fruit or not. If they predict that it is a fruit, we will then predict how many seeds it has. On worksheets they will write down the name of the item, their prediction as to whether or not it is a fruit, and the number of seeds they predict it to have if it is indeed a fruit. Then we will dissect it and they will write down their observations and whether or not they accept or reject their prediction. I will encourage the kids to observe how deep the seed is within the

fruit, whether it has a hard or soft seed coat, whether the flesh is juicy or dry. It will be a hand-on experience, kids can touch and taste the fruits.

The students will learn that fruits can come in all shapes, sizes, colors, and flavors. They will learn that some fruits have many seeds, and some have only one.

3. Wrap-up: Sharing Experiences

5 Minutes

We will come together again as a large group at the end, and ask for volunteers to say what they learned at the different stations. We will return back to the life cycle diagram, and add some key vocabulary to each stage on the board.

4. Connections & Close:

5 Minutes

We will ask students to observe plants in their houses or on the street – keep their eyes peeled for plant parts (e.g. vegetables or flowers at the supermarket). We will suggest they grow their own plants from seeds they can easily get their hands on e.g. apple, orange, grapefruit. Tell them that this is what scientists do - observe how things grow and ask how they work.

Total 50 – 60 Minutes

Differentiated Instruction:

English Learners: Repeat directions, if necessary, and physically model how to perform activities at each station. Write vocabulary, e.g. seed, fruit, on the board and read words aloud. Vocabulary words can also be visually demonstrated, e.g. using an illustration, and/or redefined in very simplistic terms. Give familiar examples of vocabulary words.

Advanced Learners: Have students think of and write additional examples (fruit, seed, etc.) at each station.

Follow-up Possibilities

ELA Activity:

-Suggest students write a letter explaining “Today we learned about plant life cycles...”

Reading Connections:

- Plant Life Cycle Series by Linda Tagliaferro
http://www.lindatagliaferro.com/plant_life_cycles_51462.htm
- Flowers by Vijaya Khisty Bodach (Capstone Plant Parts Series)
<http://www.capstonepub.com/product/9780736896191>
- Fruits by Vijaya Khisty Bodach (Capstone Plant Parts Series)
<http://www.capstonepub.com/product/9780736896207>
- Leaves by Vijaya Khisty Bodach (Capstone Plant Parts Series)
<http://www.capstonepub.com/product/9780736896214>
- Roots by Vijaya Khisty Bodach (Capstone Plant Parts Series)
<http://www.capstonepub.com/product/9780736896221>
- Stems by Vijaya Khisty Bodach (Capstone Plant Parts Series)
<http://www.capstonepub.com/product/9780736896245>

- Eyewitness: Plant by David Burnie <http://www.amazon.com/Eyewitness-Plant-David-Burnie/dp/0789458128>

- Science with Plants (Science Activities) by Mike Unwin

<http://www.amazon.com/Science-Plants-Activities-Mike-Unwin/dp/0746009763>

Mathematics Activity:

-Have students create plant graphs based on different plant parts. For example, students can graph number of pedals, seeds, etc.

Other:

More on growing plants in the classroom:

http://www.ehow.com/how_2247288_grow-plants-classroom.html