Bay Area Scientists in Schools Presentation Plan

in partnership with UC Botanical Garden at Berkeley

Lesson Name **Botany On Your Plate**

Grade Level K/1st **Standards Connection(s)** Plant parts; How Plants/Animals meet needs

Botany on Your Plate is an investigative life science unit that inspires children to explore the fascinating realm of plants we eat. Students observe, draw, predict, dissect, describe, compare, and diagram their discoveries as they study edible roots, stems, leaves, flowers, fruits, and seeds. Children learn about the nutrient values of these edible plant parts while savoring the taste, texture, and aromas of foods from the gardens of the world.

Preparation:

- On a classroom table, organize the produce by the part of the plant that's eaten and display the tomato plant parts poster. Request that the children's chairs be arranged in a semi-circle near the table or have the table in front of a rug area for the children to be seated.
- If students will be tasting food samples, have them washed and prepared for students to taste on a paper plate. (Can leave with the teacher if there is not enough time.)
- Optional: the night before, put the base of an asparagus in food-colored water overnight to show water and mineral transportation in a stem.

Introduction:

- Introduce yourself and the topic.
- Ask students to close their eyes and imagine a world without plants. Could we live without plants? Why do we need plants?
    - Plants produce the oxygen people and animals breathe. Without plants, there would be no people or animals on Earth! It's a mutually beneficial relationship—we breathe out the carbon dioxide that plants need.
- What do we use plants for?
    - Food, clothing (cotton), shelter, fuel, medicine (e.g. aspirin from willow bark), paper, beauty ...
- When you're hungry, can you make food inside your body?
    - Plants use sunlight, water, and carbon dioxide to make their own food!

Motions:

Introduce the 6 parts of a plant. Have the children stand to use their bodies to model the plant parts as each part is briefly described. Repeat.

- Roots: Scrunch-up toes to hold you in place and to take up water and minerals from the soil.
- Stems: Stand tall like a stem as the water and minerals move through you to the leaves.

- Leaves: Extend hands out to collect sunlight to make food inside your leaves.
- Flowers: Cup hands into a flower shape to attract bats, bees, beetles, birds, butterflies, or moths.
- Fruit: Create a package for seeds. Put the backs of your hands together. (Pause to give the group time to position their hands correctly.) Interlock fingers, then fold your palms down closing your hands with fingers (seeds) hidden inside.
- Seeds: Flip your hands upside down (interlocked fingers towards the floor) and open to reveal the seeds that can grow into new plants.

Poster:

Use the tomato plant poster to review plant parts and their functions. Ask questions to help children come up with the answers. "What might the roots do for the plant?"

- Roots: All roots have root hairs that take in water and nutrients. (If root hairs are missing from the produce, they may have been removed during handling.)
- Stems: Support the plant and hold leaves up to collect sunlight. Water and minerals flow from the roots up the stem to the leaves. Food made in the leaves moves to other parts of the plant through the stem.
- Leaves: Green leaves (chlorophyll) make food for the plant using energy from sunlight, a gas in the air (carbon dioxide), and water. Leaves breathe. (They take in carbon dioxide and release oxygen.)
- Flowers: Flowers may have colors, shapes, sweet nectar rewards, and/or smells to attract animals such as bats, bees, beetles, birds, butterflies, or moths. These visitors (pollinators) get covered with a powder (pollen) that travels with them to the next flower.
- Fruit: Encloses and protects seeds. Every fruit began as a pollinated flower (i.e. the flower received pollen from another flower like itself or it self-pollinated). The flower's petals fell off when they were no longer needed to attract a pollinator. The center of the flower becomes a fruit, swelling and ripening as seeds grow and develop inside.
- Seeds: Each seed contains a baby plant. Seeds provide food for the baby plant inside until its leaves are exposed to sunlight and begin to make food.

Plant examples:

Some plants store extra food that it makes in different parts of the plant. We can eat this nutritious food plants make! Explore each plant part with 2 or 3 examples, more information, and possibly photos. Ask lots of questions. Move along at a lively pace.

- Roots: Show a plant with a fibrous root system (e.g., **mint, lettuce**), and roots where food is stored (e.g., **beets, carrots**).
- Stems: Describe how **asparagus** is cut off at soil level, so no roots are seen.
- (Optional: if you put an asparagus in food-colored water overnight, make a straight vertical cut to open and show water/mineral transportation.) **Nopales** cactus is a stem, not a leaf (the spines are modified leaves!) Have students identify **cinnamon** bark by smell. (Optional: show a photograph of cinnamon being harvested.)

- Leaves: Use **beets with tops** to show typical leaves, and look at the leaves of the other root and stem examples. Cut a purple **cabbage** vertically to show the arrangement of compressed leaves inside.
- Flowers: Present a **lily** with large flower parts to show the ovary and pollen, then **broccoli** and/or **cauliflower** as a collection of edible flowers, like a bouquet of roses.
- Fruit: Show the chart of apple development from flower to fruit. Use an **apple** to point out where the blossom was attached at the base of the apple. Cut each fruit open, including a **bell pepper**, **tomato**, and **pea or bean pods**, to reveal seeds. **Blueberries** are a fun addition for the "rainbow" effect at the end of the presentation.
- Seeds: Show seedlings or **sprouts** with seed coat attached if possible. Show a **coconut** and photo of it sprouting on a beach. (Coconuts, the world's largest seeds, can float on ocean waves for years before washing ashore and sprouting.) Explore the collection of dry seeds from the kit, including **beans, rice, corn, and nuts**.

Do not have students handle nuts to avoid possible nut allergies in the classroom. **Never bring peanuts**.

Conclusion:

- Scientists and doctors advise people to try and eat all the colors of a rainbow every day (candy not included) for good health, to grow, and be strong. Ask students to name plants they could eat for each color of the rainbow: red, orange, yellow, green, blue or purple. If hints are needed, hold up examples from the table.
- If including snack tastings in the presentation, show and describe plant samples and see if students can identify what part of the plant they are eating. Or let them know they will be left with the teacher. (e.g., peas in pods or snap peas, blueberries, heirloom tomatoes (cherry-size red, orange, yellow), purple grapes, sunflower seeds ...).

Optional activities with more time:

- If children are old enough, use the flower diagram and finger puppet to go more in depth with flower parts and the process of pollination.)
- Have students dissect a fresh fava bean to find the baby plant inside.
- Have students dissect a nasturtium flower, which is also edible, and identify the parts.
- Use the Fresh Fruit & Vegetable Photo Cards to explore more foods we eat with the students and identify them by their plant part. Older students may explore the nutrition facts on the back of the cards.

Follow-up – After Presentation

Suggest students write a letter explaining "How we learned about _____?"
List or attach examples of activities, websites, connections for additional learning.
Attach worksheets, hand-outs, visuals used in classroom presentation.