Supplemental Activity: Lettuce Varieties

There are many varieties of the plant species commonly known as lettuce. In this activity, students will grow a random mix of lettuce varieties (e.g., Johnny's Encore Lettuce Mix), which are all the same species, all look the same at first, and develop a distinct range of leaf types by about 6 weeks. Use pictures to identify the varieties and discuss these inherited traits vs. differences caused by environment. Then eat the results of the experiment!

Alternatively, buy several types of lettuce at the grocery store (Iceberg, Romaine, Boston Bib, Red Leaf, etc.) and discuss the differences in varieties of lettuce.

Learning Goals

Big Idea 7: Intraspecific differences

Breeding is the purposeful selection of certain traits over many generations. This process results in substantial changes in the physical characteristics of organisms in a population.

Materials

- Variety pack of lettuce seeds. The supplied mix is from Johnny's Seeds, a combination of Allstar Gourmet and Encore. It has the following varieties:

Variety	percentage
Blackhawk (red)	6.3 (1/16)
Dark lollo rossa (red)	6.3
Deer tongue (red)	6.3
Defender (green)	6.3
Firecracker (red)	12.5 (1/8)
Outredgeous (red)	6.3
Parris island (green)	6.3
Rouge d'hiver (red)	6.3
Royal oak (green)	6.3
Salad bowl (green)	12.5
Salad bowl (red)	12.5
Tango (green)	12.5

- pictures of all the varieties (see Lettuce Varieties pages at the end of this document)
- soil
- flowerpots (plastic six-packs)
- felt
- plastic shoeboxes (for wick-watering system)
- lighting system for 24hr/day light
- links:
    - http://www.johnnyseeds.com/

Procedure

1. Estimated time

Allow an hour or so for planting. The plants take about 6 weeks to develop nice leaves. Schedule occasional observations during that time and about 1 hour at the end to identify the varieties.

2. Introduce the activity (Engage)

Begin by building on students' prior knowledge of edible plants. Ask them:

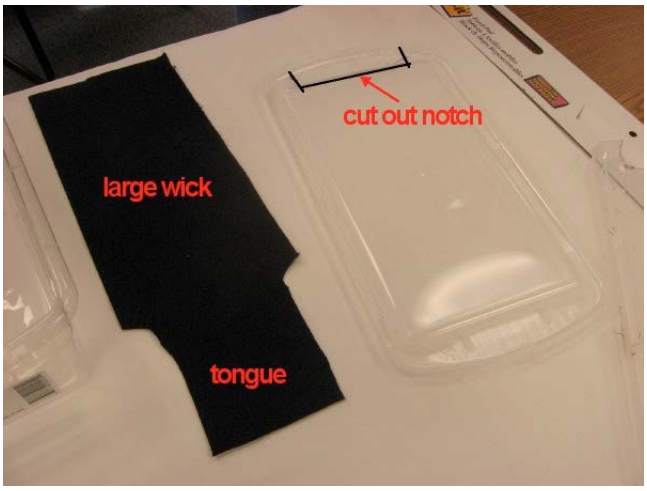
- What parts of different plants do we eat? What are examples of plants that we eat the stems, the roots, or the leaves of?
- What are examples of vegetables or fruits that come in different varieties (e.g., apples, potatoes, lettuce)? How are the varieties different?
- How do you think farmers created different varieties? (Note: in many cases, such as potatoes and lettuce, farmers created varieties by selective breeding over many

generations. Apples are unusual because each variety is cuttings from a single parent tree. All Golden Delicious apple trees are grafts from a single original Golden Delicious tree!)

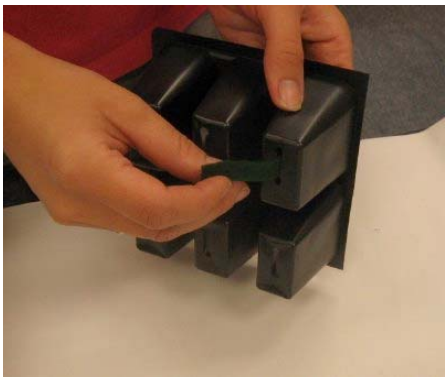
3. Planting (Explore)

In the end there will be a random distribution of varieties. Students will identify them by leaf appearance, using the pictures (and make charts of the distribution. The whole class could share all the plants, or each student (or team) could have a six-pack to plant and care for. Twenty six-packs can fit under each grow-light setup.

- Add 1 inch of water to the watering bin (shoebox).
- Place the large wick on the bin top with its "tongue" hanging down, and put the top on the bin so that the tongue reaches into the water.



- Dampen the soil by placing some of it in a large bowl, adding some water, and mixing.
- Push a felt wick halfway through the hole in each plastic cell of the six-pack.



- Fill the six-pack pots with soil. Press the soil down. Leave about 1/2 inch space at the top.
- Make 4 small dents in the soil with the eraser end of a pencil. It should be only as deep as the eraser.
- Place one lettuce seed in each hole.
- Push a little bit of soil into the hole to cover the seed. Pat it down.
- Place the six-pack on the large wick. Two six-packs fit on top of each shoebox.
- Label the cell or the six-pack with the date and other information (e.g., student name or group). A piece of a plastic yogurt container makes an excellent label.

- If you are using grow lights, keep the lights within 5-10 cm of the plants as they grow. Leave the lights on all the time. (Attach a note to your setup, asking that the lights remain on!)
- Make sure the large felt wick stays wet and the soil feels moist.
- Thin the plants to two plants per cell after the cotyledons form.

Observations

Students can observe the process of germinating, forming two cotyledons (seed leaves), and forming true leaves. So far all the varieties will look remarkably similar.

Lettuce after 10 days. These are too thick!

After three weeks, differences will start to appear. After about six weeks each variety will have a distinct leaf type.

At this point (sooner if you wish), it's time to identify all of the varieties. This can be done in a number of steps, depending on the class and the available time.

1. Print the leaf pictures of lettuce varieties and post them where everyone can look at them closely.
2. Discuss the differences.
3. Have individuals or teams survey the lettuce crop, either as a whole or by six-pack, and make a list of all the different varieties they can identify.
4. Optional: count how many of each variety is present and make a bar chart of the distribution.
5. Do taste tests on the different varieties. Do they taste different?

Wrap-up

Harvest your entire crop and make a salad for everyone to share. Send the Concord Consortium a picture!

Lettuce Varieties
Encore + Allstar Gourmet Mix

Blackhawk

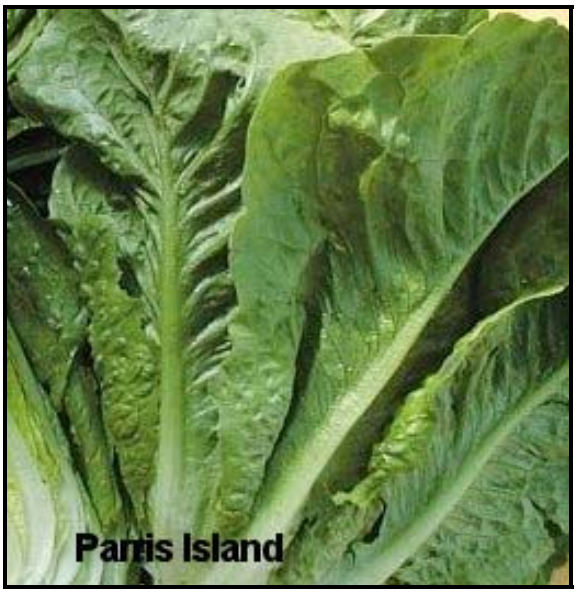
Dark LollaRossa

Deer Tongue

Defender

Firecracker

Outredgeous



Parris Island

Rouge d'Hiver

Royal Oak

SaladBowl (green)

Salad Bowl (Red)

Tango