



Phenology Activities

At the Red Butte Garden by Christine Melvin

DETAILS

Grade Level: 3rd Grade

Overview:

For the 3rd Grade Field Trip, students will be led on a two-hour hike in the Red Butte Garden Natural Area. During the hike, students will engage in the practice of collecting data within *Nature's Notebook* citizen science database. Between recording *Nature's Notebook* data, students will be participating in four different hands-on learning activities that focus on one change in a plant or animal's life cycle (birth, growth, reproduction, and death). Each hands-on stop will also give a closer glimpse of a phenophase stage that the students may witness throughout their field trip.

Each hands-on activity is geared to try to practice "Phenology" the science of showing or appearing.

This lesson looks closely into a reproductive part of a plant's lifecycle and the flower phenophase of a specific flower, alstroemeria.

These students are a one-time school group audience, typically 12-15 students.

Background for Instructors:

- Teachers have completed a pre-visit Phenology Scavenger Hunt (adapted from [Michelle Coe's Phenology Scavenger Hunt activity](#) for 3rd grade SEEd standards in Utah) with their students prior to the field trip. From this, an introduction has been set on phenology (show or appearing), life cycles, and phenophases.
- At the start of a field trip, always seek awareness of the groups' existing knowledge and gauge how in-depth their instruction should be into phenology and life-cycles.
- Be aware of the needs of the students and adapt field trip to a less steep trail or paved path option if it serves your students best.
- Be aware and mindful of allergies of students before any tasting activity

Real-world Connection:

Students that take part in this activity will practice skills in looking closer at a part of a plant's lifecycle. Potentially students will leave the trip looking at seasonal changes differently, feeling empowered to explore nature, and feeling more inclined to participate in citizen and community science.

Learning Objective from this activity:

- Students gain knowledge about the reproductive stage in a flower's life cycle
- Students have a keener sense to look at phenophases

State or National Standards:

Utah Science with Engineering Education Standards (SEEd):

3.2.1 Develop and use models to describe changes that organisms go through during their life cycles. Emphasize that organisms have unique and diverse life cycles but follow a pattern of birth, growth, reproduction, and death. Examples of changes in life cycles could include how some plants and animals look different at different stages of life or how other plants and animals only appear to change size in their life. (LS1.B)

CONDUCTING THE ACTIVITY

Time: 10-20 minutes hands on activity ~30 minutes if you need to introduce phenology to students

Logistics:

You have stopped in a spot on the trail that is conducive to hold a group of 15 students.

Materials needed:

For activity

- 1 small Tupperware holding (~10) alstroemeria with pollen not developed
- 1 small Tupperware holding (~10) alstroemeria with pollen developed on the anther
- 1 small Tupperware with unopened alstroemeria flower

For *Nature's Notebook* observation before and after activity

- *Natures Notebook* iPad or Observation sheets and wet erase
- Phenophase cheat sheets for plants on the trail

ENGAGE (Connect to prior knowledge)

- **Broad Engage if students are new to phenology or need a refresher:** Start with Birthday Phenology.
 1. Ask:
 - Think about how you have spent your birthday.
 - What have you done?
 - Has it changed much from year to year?
 - Anyone with a spring or fall “transitional birthday” has a likelihood that activities have ranged. Why do you think there’s been such a range? The changing weather and climate changes how humans go about their daily lives. What other things revolve around this seasonal change?
 2. Proceed to Quick Engage
- **Quick Engage:**
 1. Mention: Seasonal changes can be witnessed as big as a winter weather in March and as small as changes on flowers.
 2. Share phenomena.
 - **Supporting Phenomena:** Not all flowers that are open at the same time taste sweet.
 - See if the students have any initial thoughts or questions about what you’ve shared.

EXPLORE (Hands-on learning)

- Split the group into two and hand each group one Tupperware with the alstroemeria examples.
- Have the students in their separate groups observe the flower in depth for a short time.
- Have students observe if the flower has any adaptations to attracts pollinators? What is its structure? What's making the flower desirable? What organisms do they think would visit it?
 1. If needed, students can describe to each other fine details of the flower as if they were on a phone to a friend who was not looking at the flower.

EXPLAIN (Listening and communicating understanding)

- Allow students time to describe to the other group their flower and what they've observed about it
 1. Although, it may sound like the flowers are the same there is the small difference that one is showing pollen and one is not.
 2. Help students understand this phenophase and its many complexities. Show the unopened alstroemeria so they can observe how it would look.
- Have the students then switch alstroemeria samples and look at the flower in depth again.

EXTEND (Group projects, real world connections)

- Have the students observe the other set of flowers.
- Stop the observation and have the students gather together and share any observations, questions, or predictions they have about the flower bud.
- Ask: Did anyone observe that the flowers look different?
- Ask: What about the flower do you think changed and why would this part of the phenophase stage in a flower be important?
- Dissect the flower with the students
 1. Point out the reproductive parts of the flower including pistil, ovary, ovules, anther and pollen
 2. Point out the coloration on the petal and how it is vibrant indicator to pollinators
 3. Have the students taste the bottom of the petal
 - They will often find that the petals from the flower with the developed pollen taste extra sweet and the ones without the pollen do not

EVALUATE (Summarize, check for understanding, assess)

- Ask: how did this experiment give you any new knowledge that would add to their evidence of this specific phenophase?
- Ask: How does weather/ climate effect this stage?
- Ask: Would any insects or animals be affected if this phenophase came quicker in the year? Would insects or animals be affected if this phenophase came later in the year?
- Ask: How would a change in this phenophase stage or budding of a flower affect you?
- Remind students why Red Butte Garden participates in the Nature's Notebook phenology program and remind them that they can participate in citizen and community science here and outside of the Garden in their free time.

Logistics for wrap up:

- Have students share how they will use this activity when they look at the next plant.
- Have students help to collect all flower parts as to help LNT on trails.

- Walk to the next plant and collect *Nature's Notebook* data separately on sheets and then enter collaboratively or enter as a group into the iPad if there is limited time.