

Lesson: Darwin's Orchid

Grade Level: Fourth Grade, Life Sciences

Overview: Students will learn about the importance of studying plant structures to understand how it grows. Students will learn the study of plants, **Botany**. The class will learn about the naturalist, Charles Darwin and his study of the Star Orchid. They will learn that Darwin was able to determine that the only pollinator able to drink nectar from this plant was the Wallace's Sphinx Moth, known for its extremely long tongue. Darwin was able to predict this pollinator by investigating in a flower dissection of the Star Orchid. Students will model similar duties of a botanist by investigating in their own flower dissection. In a science journal, students will illustrate, label, and describe their given flower. Students will also predict what possible pollinator(s) would visit their flower based on the plant's internal and external structures.

Science standards:

4-LS1-1: Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Science Practices:

APPENDIX F – Science and Engineering Practices in the NGSS www.nextgenscience.org

Practice 1 Asking Questions and Defining Problems

- Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.

Practice 6 Constructing Explanations and Designing Solutions

- Construct an explanation of observed relationships (e.g., the distribution of plants in the backyard).

Science Content:

Life Sciences-

From Molecules to Organisms: Structures and Processes

ELA Standards:

CC.1.4.4.C: Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic; include illustrations and multimedia when useful to aid comprehension.

ELA Practices:

PENNSYLVANIA CORE STANDARDS English Language Arts Grade Pre K–5

Standard 4: Writing develops the skills of informational, argumentative, and narrative writing, as well as the ability to engage in evidence based analysis of text and research.

ELA Content:

Informative & Explanatory: 1.4 Writing Students write for different purposes and audiences. Students write clear and focused text to convey a well-defined perspective and appropriate content.

Science & ELA Connection:

Relationships and Convergences Found in the Common Core State Standards in Mathematics (practices), Common Core State Standards in ELA/Literacy*(student portraits), and A Framework for K-12 Science Education (science & engineering practices) *Venn Diagram NSTA Science, Math, & ELA*

- **E2.** Build a strong base of knowledge through content rich texts
- **E5.** Read, write, and speak grounded in evidence
- **M3 and E4.** Construct viable arguments & critique reasoning of others
- **S7.** Engage in argument from evidence

Materials:

- Flowers and/or plants
- Scissors
- Tweezers
- Paper Plates
- Markers and/or coloring pencils
- Tape

Resources:

- Read a-loud, “*POLLEN: Darwin's 130-Year Prediction*” By: Darcy Pattison
<https://www.amazon.com/Pollen-Darwins-Prediction-Moments-Science/dp/1629441201>
- Student video resource, “*Look inside a Flower!*” <https://youtu.be/R9sn7HZM7uY>
- Flower Dissection worksheet Pdf
- Extension activity, Penn State Extension-
https://sites.psu.edu/augmentedlearning/files/2019/09/Plants_v5_9_20_2019.pdf

Learning Objectives:

- Students will learn about how dissections help scientists understand how things work or made, (Dawin’s Orchid story).
- Students will learn about the structures of a plant and/or flower.
- Students will dissect to investigate and understand the structure of a plant and/or flower.
- Students will take observation notes and illustrate the parts of the plant/or flower.
- Students will create predictions and/or hypotheses about the pollination of the plant and/or flower based on what they learned from the dissection.

Procedure:

- The teacher will guide students into a read aloud, “*POLLEN: Darwin's 130-Year Prediction*” By: Darcy Pattison.
- Students will then observe and watch a short student video, “*Look inside a Flower!*”.
- The teacher will then prep and guide students into the flower dissection worksheet. (Teacher discretion: to use flowers and/or plants that are native to the area OR purchase flowers at the store.)
- Students will work individually or in small groups to complete the dissection.
- After dissection, teacher will will guide students in whole group discussion using the following guided questions;
 - What did you learn about your flower and/or plant?
 - What kind of pollinators do you think visit your flower and/or plant?
 - Why do you think that pollinators are attracted to your flower and/or plant?

- The teacher can extend the lesson by using the following extension activity from Penn State extension.