Flower Power

Overview of Assessment

In this assessment, students are asked to help plan a flower garden for their school, using donated Hydrangea seeds. Students learn that these flowers are important in Japanese and Korean culture and are therefore often planted in gardens at homes, parks, and temples. Students will need to learn more about how conditions in the environment affect the flower trait of color in order to design a flower garden with specific colors of Hydrangeas. They first engage in a whole class discussion to revisit something they learned in instruction that could help them figure out how the environment can affect how flowers grow and develop different traits. Then, students work in groups to make observations from data about soil pH and flower color and use that information to create a possible plan for the flower garden. By the end of the assessment, students will individually use all of the thinking they have done throughout the assessment to develop a plan for a school garden with colors of Hydrangeas they have selected to submit to the school for consideration.

Alignment to NGSS

This assessment is designed to assess *key performances* related to the following Performance Expectations:

- **3-LS3-2.** Use evidence to support the explanation that traits can be influenced by the environment.
- **3-5-ETS1-3.** Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Implementation Guidance

Preparing for Implementation

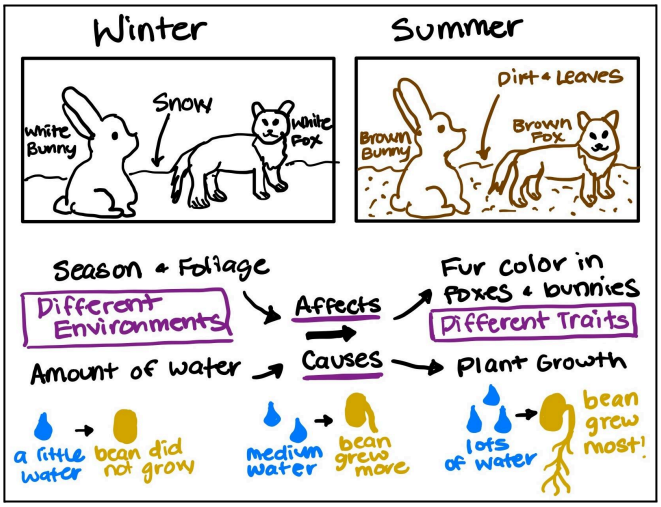
1. Before implementing the assessment with students, take a moment to reflect on your own experiences related to doing science.
    a. When you think of scientists or science activities, what do you think of?
    b. When you were assessed in science class, what was expected for you to show what you knew?
    c. What do you think it should look like for students to communicate their science thinking "accurately" in this task?
2. Science learning may look different than what you expect and what you experienced. These tasks may encourage students to share ideas in a variety of ways (e.g., everyday language, language other than English, drawings, gestures, relating to similar ideas and experiences, etc.), which requires us to expand how we recognize students' 3D science ideas. By attuning ourselves to the diverse ways students may express

accurate science ideas, we can better interpret evidence of where they are with their 3D science thinking and support their growth.

Part 1: Introduction (Whole Class)

The introduction is meant to support students in understanding the new context they are exploring, leverage students' own lived experiences and resources, and help them begin thinking about how ideas they learned in instruction could be applied to this new context.

3. Before introducing the assessment, reinforce or establish class norms that value all students' ideas and languages as important for science sensemaking. You might say, "As we go through this assessment, let's remember one of our norms: We can do and explain science in many different ways."
    a. As you facilitate this classroom discussion, explicitly encourage students to share a variety of ideas in different forms (e.g., everyday language, language other than English, drawings, gestures, relating to similar ideas and experiences, etc.). For example: " if you are not sure how to express your thinking in English, try sharing it in another way like drawing or showing with your hands!"
4. Read the introduction to the assessment and review image in the *Student Version* together (Pg. 1).
5. To make connections between the phenomenon and students' lived experiences and resources, discuss: Have you ever seen Hydrangeas before? Where have you seen other kinds of flowers? When you see different colored flowers, what do they make you feel? Do different flowers have specific meanings for your family and friends?
6. Then ask students to think about something that they learned about in class that involved how environmental factors impacted plants or animal traits. If it is relevant, bring out an artifact they created from that learning experience (e.g., video about plant or animal traits, investigation data about plant growth in different environments, drawings of plants or animals in different environments, etc.).
7. Use a think-pair-share protocol for each of the questions in the *Student Version* (Pg. 1). As students share their responses to each question, co-construct a whole-class version of this artifact to draw out ideas that students can use during this assessment (e.g., a model, like the one shown to the right).
    a. Listen for the variety of ways your students may express the same idea to elevate them for all students. Revoice and/or document on the whole-class artifact any connections between different ideas or ways of sharing.



8. Discuss together: how could this artifact help you plan a school garden with specific colors of Hydrangeas?

Part 2: Collecting Initial Data About Different Colors of Hydrangeas (Group Work)

This part is intended to engage students in discussing their ideas together, gathering evidence, and testing out ways to explain how they can use the evidence to explain the phenomenon. This is an opportunity to observe and listen to student talk and how it surfaces evidence of their use of the dimensions being assessed, particularly those students who may not fully express their ideas in writing in Part 3.

9. Organize students into groups (ideally 3–4 students) to work on the group work component of the assessment together (*Student Version*, Pg 2–4). You may use whatever group work supports you typically use in your classroom (e.g., designing groupwork, group roles, discussion starters, etc.).

10. Emphasize to students that while they will be working together, they should each be recording their thinking in their own *Student Version*.

11. Use the *Descriptions of Performance* in the Group Work Observation Tool to guide your observations of students as they work in groups. As in Part 1, listen and look for evidence of 3D science thinking that may come in a variety of different forms and record notes about what stands out to you about what students are saying, doing, writing, drawing, gesturing, etc.
    a. You can use these notes as additional evidence later when you score student responses and are deciding what to do next in instruction. **Some students don't always write down all their thinking, so pay particularly close attention to them.**

12. In the last question of this section, students are planning an investigation to test their group's garden design. If students need support with starting their investigation plan, you may want to use this example from another investigation to support their thinking:

Goal of this Investigation	*To cool the water in the bathtub to a safer temperature (from 105 degrees to 100 degrees).*
What (variable) would you change?	*Add 25 more ice cubes*
What (variables) would you control (keep the same)?	*Amount of water* *Same bathtub* *Size of ice cubes*
Describe your experiment. What would you do to test whether your design works?	*I would keep a thermometer in the bathtub and record the temperature every 2 minutes until it reaches 100 degrees or it stops changing temperature.*
How would you know if your design worked?	*If the temperature lowered to 100 degrees, which is the temperature I need it to be, then I know I added the right amount of ice cubes.*

Part 3: Plan for Hydrangea Colors in a School Garden (Individual Work)

13. Tell students that they will be completing this last section of the assessment individually so that they each have a chance to show their own ideas (*Student Version*, Pg 4).

14. Encourage students to reference all the previous pages in their *Student Version* so they can use any thinking they did in groups and as a whole class.

Evaluation of Student Data

15. Use the *Learning-Centered Rubric* to help you make sense of students' varied responses, identify where students are making progress with the dimensions, pinpoint where they need additional attention, and plan targeted instructional moves that can further students' learning.

    a. If this is your first time using the *Learning-Centered Rubric*, watch one of the following tutorial videos to learn all about how to use these rubrics: google doc rubric or rubric app.

16. Revisit your reflection on your own experiences above as you prepared for implementation. As you score student responses, remember that students represent their 3D science thinking in a variety of different ways. They might be using drawings or analogies to communicate their science ideas or they might not yet be using sophisticated scientific language you envision, but there are still many assets we can work with and leverage as we use this data to guide our instruction.

Online Resources

Think-Pair-Share | Harvard
https://pz.harvard.edu/sites/default/files/Think%20Pair%20Share.pdf

Roles That Encourage Equitable Collaborative Learning | Edutopia
https://www.edutopia.org/article/roles-encourage-equitable-collaborative-learning/

Talk Science Primer | TERC
https://inquiryproject.terc.edu/shared/pd/TalkScience_Primer.pdf

Designing Group Work | Ambitious Science Teaching
https://ambitiousscienceteaching.org/wp-content/uploads/2014/09/Designing-Group-Work.pdf

Flower Power Group Work Observation Tool
https://docs.google.com/document/d/10AWwY_QOIOIejrGF9s7dfHKI-M2MYcQCjwwi6xm8z14/copy

How to Use SCALE Science Rubrics – Google Doc Tutorial
https://youtu.be/eoaV3Io9ABo?si=KlKBbC3VY9O2rLX7

How to Use SCALE Science Rubrics – Rubric App Tutorial
https://youtu.be/RhN5z3v5Iuw

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