Case Analysis Protocol

The protocol and cases were written collaboratively by members of the Science 20/20 team.

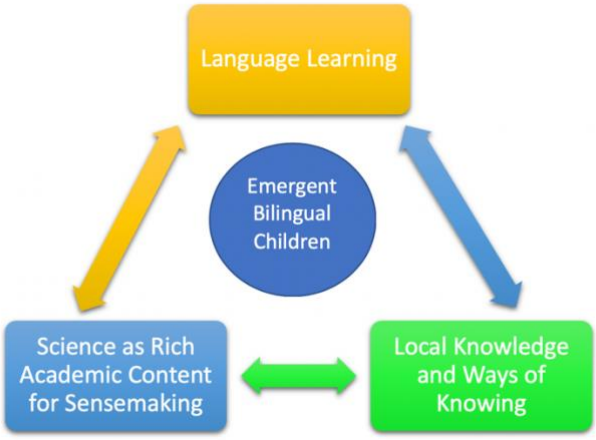
Description: Each case represents the lived experiences of those connected to the project as researchers, teachers, students, and student teachers. They are real, but names and minor details have been changed so as not to completely identify those involved. We do not intend for these cases to be black and white, right or wrong. Instead, each case illuminates areas of strength and potential and allow for self-reflection. They may ask us to articulate and question our own biases, assumptions, and taken-for-granted practices. Cases such as these are intended to surface tensions. Having group norms and protocols in place before engaging in case analysis is important for the success of the protocol. In discussing the case, we encourage you to think through the complexity of each case, seek to understand, imagine what else might be true, and exercise asset orientations.

Protocol: **Part 1.** Familiarize yourself with the Science 20/20 Framework before reading the case.

Science 20/20 Framework

Guiding Principles

1. *View **students as capable partners** in knowledge building.*
2. *Invite **productive participation** in science practices and sensemaking.*
3. *Utilize caring **formative assessment** and seek to understand what students know.*



Part 2. Read the case thoroughly. Once everyone has had enough time to read the case thoroughly, summarize the main events in the case and identify the problem(s) posed by the case.

Part 3. Use the Science 20/20 Framework and Guiding Principles to facilitate an open discussion related to the case. Same questions and prompts might include:

1. *What scientific practices and literacy practices are present in the case?*
2. *How has the teacher(s) and how might the teacher(s) invite students to draw on their funds of knowledge and local knowledge?*
3. *Where do you see evidence of students positioned as knowers, productive participation, and/or formative assessment?*
    1. *What are the opportunities to position students as knowers, invite productive participation, and incorporate formative assessment?*
4. *What else might be true?*

Part 4. Connect back to your context. Reflect. How might this case and the discussion of the case inform your work?

A Case of The Green Things

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Keywords/phrases
science teaching
students' curiosity
notice/wonder

Ms. Sharkey gathers a group of her students on the carpet to observe and wonder about a crushed plant with a broken stem. The lesson is for students to observe and wonder about the plant, and ultimately, she hopes students understand that water is in the stem and leaves.

The students sit in a circle as Ms. Sharkey holds up a plant, asks the small group what it is, and asks "How did you plant the seed for this pumpkin plant?" One student responds matter-of-factly, "Miss Miller planted the seed in the dirt." Ms. Sharkey shows the top of the plant where a seed lays on top of the dirt next to the stem. "Is the seed still inside the dirt?" As students shake their heads no, Ms. Sharkey passes around the seed, asking students to share how it feels and what they notice. Adjectives like *smooth* and *soft* were shared. She then says and gestures to the students, "Thumbs up if you think we should look to see what happened underneath the dirt." Thumbs shoot up as Ms. Sharkey dumps the plant into an empty, plastic, blue bin.

Students take a second to watch, discussing what they notice and observe with the group around them. Students notice the white things that are sticking out of the long green thing. One student claims, "these white things are roots" and the long green thing is a stem. Not wanting to put too much focus on terminology, Ms. Sharkey says, "Oh, we think these are stems and roots. Interesting."

Another student states, "I see green balls." The previous group also noticed the green fertilizer balls that were part of the soil, but wanting to avoid the fertilizer discussion, Ms. Sharkey ignores the comment and attempts to steer the lesson in another direction by saying, "I want you to put your hand in and tell me how it feels."

Most of the students put one of their hands in with a couple hesitant about getting dirty. However, after seeing the teacher and their friends playing with the dirt and plants, they soon begin to participate. Ms. Sharkey focuses on the stem, questioning, "What happens when I break it?" One student, Ryan, exclaims, "it will squirt you!", but other students are mesmerized by observing and investigating the dirt and plant that they do not hear what Ryan said.

Ms. Sharkey redirects their attention to what Ryan said: "Did everyone hear what Ryan said?" Students return their attention to their classmate. Ms. Sharkey breaks pieces of the stem, requesting that students squeeze and break them. Hillary discovers that "It feels kind of wet." The other students excitedly agree with Hillary and keep repeating that "it is wet" and "it feels like water". Ms. Sharkey then asks, "Where did the water come from?" The group was able to tell her that it came from the soil and that Miss Miller put water in it. Relieved that the students noticed this, Ms. Sharkey further challenged the students to tell her what they notice and wonder about the plant and dirt in front of them. … the green balls.

"The green balls." Ms. Sharkey thinks to herself, "*Oh those green balls. They keep coming back to them. Well, they are interested in the green balls. The whole point of these science investigations is for them to investigate what they are interested in. They are the ones that should drive the discussion...here we go...*

The students observe the balls, talk about how they are found in the soil, and squeeze them. Students are all observing their own green balls, so Ms. Sharkey removes the dirt and plant from the middle of the circle and shows the students one tiny green ball in her hand. The discussion continues with where they came from and what was inside them, with students wondering if the plants made them and if there was water inside. Ms. Sharkey lets students pop them and observe the soil from its original bag to see if they could answer their questions. She thought to herself, *mental note: next year we are using soil* ***without*** *green balls.*

Note: We also find that many of our cases are complementary to and can be analyzed with the protocol and Equity Literacy Framework in Gorski and Pothini's text *Case Studies on Diversity and Social Justice Education* (2nd Ed., 2018). [http://www.edchange.org/cases/Case-Analysis-Model.pdf]