We all “do”—that is, participate in—science in some way. Everyone participates in science as part of their activities of daily living, such as using soap to make hand-washing more effective, using heat to cook food, and closing windows and doors to slow the movement of heat. We might use salt to melt ice on our front sidewalk, listen to bird calls, remove our shoes at the front door to reduce the amount of outside dirt tracked in, and listen respectfully to adults’ explanations of natural phenomena. We may not always identify our actions as a part of scientific inquiry, but they involve making choices in our interaction with nature and natural phenomena, choices that are likely influenced by our culture (NRC 2012, p. 284).

Our cultures are reflected in our everyday life and are central to our identities (Nasir et al. 2005, p. 686). Knowing children and their families well enough to become familiar with children’s daily life is a beginning step into culturally responsive science teaching.

For children to grow as science learners and doers and develop their science identity, teachers must understand “the cultural dimensions of science learning—how people make sense of the natural world in relation to the communities of which they are members” (Bell et al. 2017, slide 6). Early childhood educators work closely with families of children they teach and care for. Recognizing that physical and social spaces of educational programs have significant meaning, we intentionally honor all children’s home cultures. If children’s home cultures are invisible in their education program’s visual and material environment, and their home languages are not supported, “it undercuts their evolving self- and social identities” and they “can internalize a message that the program thinks there is something unimportant or wrong about their family and therefore about them” (Derman-Sparks and Olsen Edwards 2010, p. 58).

Inviting families to share their interests where science, technology, engineering, and math play a part can begin an exchange where you share your interests, too. Connect home activities with school science explorations to represent some aspects of children’s home culture. Cooking a meal at home can be related to exploring the properties of matter at school while making play dough, and building a set of shelves can be related to constructing a “house” of blocks. Talking with, and listening to, children reveals the meaning they make of both home and school activities. Use your developing knowledge of their interests and cultural identities to guide your instruction.

REFERENCES


HOW DO YOU DO SCIENCE?

Objective

For educators and students to reflect on how they participate in the cultural endeavor of science using a “self-documentation” formative assessment.

Ahead of time, participate with colleagues or alone in the “ACESSE Resource C: Making Science Instruction Compelling for All Students: Using Cultural Formative Assessment to Build on Learner Interest and Experience” professional development (Bell et al. 2017), a time commitment of about two hours.

1. Follow instructions on page 3 of the “Facilitator’s Guide for ACESSE Resource C” to draw five pictures or take five photos of “What are you an expert or developing expert about?” Your images will represent what you are knowledgeable about, such as, growing vegetables, changing a car’s oil, braiding hair, using apps, or cooking. Answer three questions about each of your images to help you (and others if working in a group) see which cultural communities you are part of that may use, or helped you develop, that expertise:

• What is in this picture?
• Where did you take this picture?
• What activity does this picture explain?

Alternatively, follow the instructions in the STEM Teaching Tools’ “Self-Documentation Instructional Technique” document to draw or take photos in your daily life related to a question, topic, or phenomenon that is of interest to your students. Answer the same three questions with a focus on how the topic or phenomenon is present in your everyday practices.

Participating in these activities will help you understand how your culture(s) is part of your everyday life and appreciate the cultural information young children will share when they do a similar activity.

1. Adapt the technique for younger learners using the same question, topic, or phenomenon of interest to your students. Although the example given in the STEM Teaching Tools is about “the things you and your family do to stay healthy and keep from getting sick,” your students may be more motivated to document another topic or phenomenon, such as “how I move using wheels: vehicles and other ways of transportation,” or, “shadows I see.”

2. Tell children that sharing images of what we do or see in our everyday lives outside of school is one way to begin an exploration and learn about each other. Elicit ideas of their current wonderings if your observations do not uncover a common interest.

3. Ask children to draw objects or events in their everyday lives that relate to the selected topic or phenomenon. Alternatively, send a note home asking families to have the children take photos that show how the topic or phenomenon is present in their home life. Print out the photos.

4. Have each child respond to the “What,” “Where,” and “What does it explain?” questions, through dictation or audio recording, and then in discussion, for one or two of their images.

5. Have children sort and group the images, both drawings and photos, into groups of similar objects or activities. Discuss how documenting a similar activity, such as observing shadows, lets the class understand something about each child’s everyday life. For example, some children may have shadows at bedtime from street lights shining in their windows and others see shadows at night when the Moon is full.

In discussion, bring up the science and STEM work by people from diverse cultures, currently and historically, that is related to the topic or phenomenon (Rodriquez and Bell 2018). Children may want to share the images and discussion with a larger community of family members or other classes.

RESOURCES


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