Professional Development Situation: Training

Skill Focus: Making Authentic Assessments

Time Required: 90 minutes

BUILDING FOR THE BIG ONE

Frontline staff and volunteers will be able to evaluate the content youth learn before, during, and after STEM activities.

Agenda

Welcome—5 minutes
Introduction—15 minutes

- KWLN Chart

See the Skill in Action—15 minutes

- Planning for Learning video-based learning module

Hands-on Learning—40 minutes

- Building for the Big One

Conclusion—15 minute

Materials

- Computer with Internet connection
- Projector and speakers
- Flip chart paper and markers
- 3-4 pieces of blank paper for each participant (for name tent, notes)
- One copy of KWLN Chart for each participants
- Planning for Learning video-based learning module
- One copy of Building for the Big One Activity for each participant
- Materials for Building for the Big One Activity (groups of 3-4)
- One copy of Assessment Prompts for each participant

Before the Session

- **Read this training guide** to become familiar with the content and allow time to personalize the activities to best suit your presentation style. Watch all videos and read informational materials.
    - *Italics indicate text that can be read aloud or emailed to participants.*
- Send reminder email about the training. Determine if any participants require accommodations (sight; hearing; etc.).
    - *The next professional development opportunity to enhance our STEM skills will be on DATE at TIME at LOCATION. Our focus for this session will be "Making Authentic Assessments". Let me know if you require any accommodations to participate in the training I am happy to answer any questions you have and look forward to seeing you at the workshop. I can be reached at CONTACT INFO.*
- Gather all materials needed for the training.
- Develop a list of possible questions participants might have during the training; create potential responses to be explored through informal discussion; review any key terms or ideas that may be unclear.
- On the day of the training, test the audio and video equipment.

Training Outline

Welcome (5 min)

- Greet participants as they arrive. Make sure everyone feels welcomed and comfortable
- Ensure participants are aware of the locations of restrooms facilities, refreshments, etc.
- Introduce yourself and the focus of the session: "Making Authentic Assessments".
    - *The focus of our session will be on "Making Authentic Assessments for STEM Experiences". We will be working together to apply strategies for authentic assessment and how to use this information to build knowledge around STEM concepts. We will have opportunities to share with one another strategies we currently use in our program for authentic assessment.*

Introduction (15 min)

- **Make dual-sided name tents.** Instruct them to fold them in half. On one half, have them write their names. On the other half, they should write what comes to mind when they think of authentic assessment.
- Perhaps that means what 'authentic' means, what a non-example of authentic assessment might be, etc.

- **Share their name tents at their group.** Challenge them to remember something someone else in their group said.
- **Introduce a KWLN chart.** On chart paper, hang an example of a KWLN chart – a "large sheet of paper turned horizontally and split into four columns each with one letter in it K-W-L-N. You can introduce it as follows:
    - *I'd now like us to discuss our answers and use an organizational tool called a KWLN chart to do this. This type of chart can easily be used in any setting with a group of children before a STEM experience to find out what they know – or think they know –about a particular concept or idea. The K stands for Know. The W stands for What we want to know. This column also can include questions we have about the concept/idea. The L stands for Learn—what we learned during the experience. The N stands for Next—what (if anything) should we do next as a result of what we've learned.*
- **Ask participants to share what their group members wrote on their nametags about authentic assessment.** Asking them to share their groupmates' thinking encourages careful listening and collaboration. Record these in the "K" column of the KWLN chart.
- Ask participants:
    - *What do you want to know about authentic assessment?*
- Record responses in the W column of the chart.
- Introduce authentic assessments.
    - *Authentic assessment means we really want to know how well we did, or if we did what we thought we did. We want to do this in an informal way in our settings—not to determine a grade on a test or to measure one student's ability compared to another, but to know if we can/should go to the next step in a project or change projects altogether.*

Assessment is authentic when it relates to real-world problem-solving.

See the Skill in Action (15 min)

- Participants will now compare open-ended vs. closed-ended prompts while watching a video and keeping track of the kinds of prompts the activity leaders use in the video. Describe each type of prompt to participants before starting the video.
    - ***Open-ended prompts** do not have a right/wrong or specific answer. They require more explanation about what the person is thinking. These types of prompts give insight to what children are thinking.*

- ***Closed-ended prompts*** *have a specific answer that are often 1-2 words. Using a closed-ended question can be effective as long as it is followed by an open-ended question to allow children to think and clarify their thoughts.*

- Cue up the Planning for Learning video-based learning module. Play video under Step 3.
  - *We are going to watch a video of a facilitation of the Building for the Big One Activity. Pay special attention to the types of questions and statements the activity leaders use during and after the activity.*
  - *Write one example of an open-ended prompt and one closed-ended prompt that the instructor uses during the video. We will share these after watching the video.*
  - *We also want to respect this instructor who is doing their best to get kids involved in hands-on learning. This is a video of real practice, not necessarily perfect practice.*
  - *Everyone ready?*
- Watch the skill video in Step 3. Ask participants follow-up questions:
  - *What did the instructor do well?*
  - *What open-ended prompt did you notice? Closed-ended?*
  - *How might you use each of these prompts in your work?*

Hands-on Learning (40 min)

- Group participants into groups of three.
- Pass out the Assessment Prompts Handout and the Building for the Big One Handout.
- Read the Building for the Big One handout. As participants read, they should circle key terms, such as “seismologist”.
- Assign roles to the group members: geologist, architect, and structural engineer.
  - Note: **Call attention to the geologist role.** Youth with the geologist role will have considerably less responsibility to the group than the other two roles. Consider modifying this activity so that the geologist develops a report of the multiple types of soil or collaborates with other geologists. This will keep group work more equitable.
  - Note: It is also important to think about whether or not you want group members to alternate roles during the activity.
- Do the Building for the Big One activity.
- As the participants finish completing the activity, have them write several questions they can use to ask youth about their experiences. Optional: distribute the Assessment Prompts handout to support their thinking.
  - *Which prompts might help youth reveal what they know about the geology content in this activity?*

Conclusion (15 min)

- Share out. Ask participants to share their plans for assessing the "Building for the Big One" activity.
    - *What did you include as part of your assessment plan? (For each assessment strategy have participants give a thumbs-up if it is authentic.)*
    - *Did anyone include multiple-choice questions as part of your assessment? Why or why not?*
    - *What can you do when youth don't know the answer to a question? (rephrase the question, avoid telling them the answer)*
- Revisit the "L" on the KWLN chart.
    - *What did you learn during the Building for the Big One activity?*
- Revisit the "N" on the KWLN chart. Encourage participants to make a commitment to make an actionable commitment to assess their students authentically.
    - *What will you do next in your practice?*

After the Session

- Collect the chart paper from the training and compile a list of strategies used and concepts learned for making authentic assessment. Share this in your follow-up email to participants.
- Within 2-3 weeks of the training, email participants:
    - *Thank you for your participation in the recent Click2Science training on "Making Authentic Assessments in STEM". I hope you found some value in the information explored and have implemented one or more of strategies you identified in the session. I am including a list of strategies you and other participants shared about how to authentically assess youth in your settings. I hope you can use these as resources as you consider different ways to incorporate assessment strategies in your setting. Consider meeting with a co-worker, supervisor, or friend to share the strategies you are working on. I look forward to continuing our learning at the next session on SKILL/FOCUS on DATE at TIME at LOCATION. Please let me know if you have any questions. I can be reached at CONTACT INFO.*

Want to Earn Credit? Click2Science has teamed up with Better Kid Care to provide continuing education units. Check it out at: http://www.click2sciencepd.org/web-lessons/about

KWLN Example-Trainer Guide

A KWL chart is often used to organize topics to be explored by adults and youth. Use the following example as a way to guide the conversation with participants about the parts and their importance in understanding authentic assessment. The "N" is an additional column to indicate Next steps—could be used for goal planning for participants to implement strategies of authentic assessment in their settings. The KWLN chart also is an assessment tool. The K gives baseline or initial information about what youth know, and the L column gives information about what the youth know after a STEM experience. The two columns could be compared to determine whether the youth's initial ideas about a concept were accurate or not.

K	W	L	N
K=What do we know about the topic—what are our ideas about it? Pre-conceived ideas (can include misconceptions). For training purposes: Ask participants to share **what they know** about authentic assessment Look for concepts: • Measurement of learning • Goals to guide learning • Guide to measure growth over time • Based on real experiences versus tests • Observation as a first step in understanding what youth are saying and doing	W=What questions do we have about the topic? What do we want to learn about the topic? For training purposes: Ask participants to share what they **want to know** regarding authentic assessment Look for: • Ways to find out what children want to know • How to support them • What the adult needs to be able to do, etc.	L=What did we learn? (To be completed after an experience/project.) For training purposes: Use after the hands-on activity to discuss new understandings participants have about skills needed for authentic assessment. Emphasize sometimes learning is re-affirmation of what we do well. Look for: • Questions • Paraphrasing • Observation • Goals • Way to measure or determine if goal was met	N=Next Steps: What would you do next to continue exploration of the topic? For training purposes: Ask participants to determine **what** they will do next to implement authentic assessment strategies learned in the training.

KWLN Chart

A KWLN chart is often used to organize topics to be explored by adults and youth. The KWLN chart also is an assessment tool. The K gives baseline or initial information about what youth know and the L column gives information about what the youth know after a STEM experience. The two columns could be compared to determine whether youth's initial ideas about a concept were accurate or not.

K What do we know about the topic—what are our ideas about it? (Pre-conceived ideas can include misconceptions).	W What questions do we have about the topic? What do we want to learn about the topic?	L What did we learn? (To be completed after an experience/ project.)	N Next steps: What would you do next to continue exploration of the topic?

Building for the Big One Activity Guide

(Courtesy of: www.techbridgeyouth.org)

Goals

- To design a structure that can withstand the shaking of an earthquake
- To understand how soil type affects a building's ability to withstand an earthquake

Materials

- 20 Popsicle© sticks per group
- Hot glue gun (low temperature)
- 2 sticks of hot glue per group
- 1 golf ball
- 1 aluminum 8-in round baking pan per group
- Play-Doh© (2 containers per "bedrock group")
- Grape-nuts© (1 box)
- Oobleck (1 ½ cup of cornstarch + 1 cup of water per "land group")
- Graph paper
- Ruler
- Pens
- Shake table
- Stop watch or other timing device
- Velcro© with adhesive backing
- Role note cards, one career role per card—Geologist, Architect, Structural Engineer (1 set
- per group)
- Soil type note cards, one soil description per car—Bedrock, Alluvium, Gravel, Land Fill (1
- card per group)

Steps

1. Divide the youth into groups of 3-4, and assign each youth in the group one of three career roles: Structural Engineer (1 or 2), Geologist and Architect.
2. Assign each group a soil type (Bedrock, Alluvium, Gravel or Land Fill).
3. After testing each structure, ask each group about some of their design decisions, whether certain features made their building more stable, and what they might change/add if they were to rebuild again.

The Geologist

Your job is to create the soil for your group.
Collect the following materials to develop the soil:

- Bedrock–pan filled with Play-Doh©
- Alluvium–pan filled with Grape-nuts© + enough water to soak them, but not
- fill the pan
- Gravel–pan filled with dry Grape-nuts©
- Land Fill–pan filled with Oobleck (1 ½ cup of cornstarch + 1 cup of water)

The Architect

Use the graph paper and a pen to design a structure that meets the following parameters:

- Must be at least 25 centimeters (10 inches) tall
- Must hold a person (represented by a golf ball) without shaking them off
- or out of the structure
- Must fit on a pan
- Must be able to withstand 15 seconds of shaking without falling or
- collapsing (on shake table)
- Work with the Geologist to determine if the design is feasible for the group's specific
- soil type.

Questions/Information to further inquiry:

- What will you have to do to make your structure stand on your soil type?
- How will it need to be different from the other structures on different soil?
- Do you think that people work alone to solve these critical problems? How do you think they might work?
- Do you think engineers get it right the first time? How many times do you think it might take?
- How many times did you have to try things? What did you learn that made you change things?
- What did the different roles add to the design?
- There are two kinds of surface waves during an earthquake: Love (up and down) and Raleigh (side to side). The energy released during an earthquake produces a force on the plates. This force has direction traveling spherically away from the point where energy is released (the focus). The force also has magnitude proportional to the amount of the energy released.
- Which ways did you see the waves move? (*Love and Raleigh*)

The following features affect building stability in designs:

- Foundation
- Shear
- Support/Reinforcement
- Triangles

The Structural Engineer(s)

Your job is to build the structure based on the Architect's design and the Geologist's recommendations.

Structures should be placed into pans and shaken for at least 15 seconds

- What did you have to consider in your building? (*Foundation*)
- Have you heard of the Richter scale? What does that mean? Why is it important to measure in this way? What does it tell us?
- In what ways does the shake table move?
- What determines the magnitude of an earthquake? (*The amount of energy released*)

- If you were to draw the force released from an earthquake, in what direction or directions do you think it travels? Starting where? (*Waves travel spherically away from the focus*)
- How did your structure hold up to the various wave motions? What design changes or modifications will you consider for your next design?
- Did you try to find a way to keep your structure anchored in the ground? How did you do that?
- What do we call that part of the building? (*foundation*)
- What shapes were used to build the structures that were able to withstand the earthquake (shake table) most effectively?
  - Wide to narrow (wide at base, narrow at top)
  - Low center of mass

Assessment Prompts

Open-ended prompts do not have a right/wrong or specific answer. They require more explanation about what the person is thinking. These types of prompts give insight to what children are thinking.
Close-ended prompts have a specific answer that are often 1-2 words. Using a close-ended question can be effective as long as it is followed by an open-ended question to allow children to think and clarify their thoughts.

Close-Ended Prompt	Open-Ended Prompt
What color is the _____? (Anything that requires a specific response)	Tell me about_____ OR Tell me more about_____
How big is the _____?	Why do you think that?
Do you like this? (Anything that requires a Yes or No answer)	I wonder what would happen if _____
What day is it? (Anything that requires a 1-2 word response)	How do you know?
Did you _____?	How did you do that?
Is it hot or cold? (Anything with two different choices)	How could we figure it out?
Do you want to _____?	What ideas do you have?
Should we use _____?	What materials could we use?
Is it a _____?	What do you think it is?
	Begin to paraphrase what the child said and stop before the full thought is shared to allow child to finish it.