Professional Development Situation: Training

Skill Focus: Encouraging Collaborative STEM Work

Time Required: 60 minutes

WORKING TOGETHER

Participants will watch "Inspiring Youth in STEM" and conduct the sink and float activity to learn how roles can support youth to collaboratively build ideas and use materials.

Agenda

Introduction—10 minutes

- Inspiring Youth in STEM video-based learning module

Hands-On Learning —40 minutes

- Sink and Float

Conclusion—10 minutes

Materials

- Computer with Internet connection
- Projector and speakers
- Flip chart paper and markers
- Pens for participants
- One copy of Sink and Float copies for each participant
- Materials for Sink and Float
- One copy of The Sink and Float Data Table 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 "Encouraging Collaborative STEM Work." 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 conversation. Review any key terms or ideas that may be unclear.
- On the day of the training, test the audio and video equipment.

Training Outline

Introduction (10 min)

- Introduce the video.
  - *In this videos, you will see teenage club members helping younger students do the Eco-Bot design challenge. These teenagers are gaining their first experiences as facilitators of learning. You will note what they do well and what they might improve on while supporting youth collaboration*.
- Allow participants to watch the overview video in Step 1 of the Inspiring Youth in STEM video-based learning module.
- Ask:
  - *What did you observe in the video? What stood out about the collaborative process for the youth?*
- Have a volunteer record participants' responses on chart paper or a whiteboard.

Hands-on Learning (40 min)

- In this portion of the training, you will do the Sink and Float Activity just as you would with students. Encourage the adults to be playful and kid-like in their investigation
- Demonstrate the soda cans with the tub of water
- Go over the roles for the participants:
  - **Recorder** – Writing and encouraging consensus
  - **Questioner** – Can only ask questions of others, like "why do you think that is?"
  - **Project manager** – Makes sure everyone is participating and the project is on track
  - **Materials manager** – makes sure materials are present and put away at end
- Allow participants time to do "sink & float" with their partners

- Debrief the activity and outcomes as described in Sink & Float.
- Debrief the roles that the students took on:
    - *Who were our questioners? How did you feel?*
    - *How did your questioners do at your table?*
    - *Is this a new role for you?*
    - *How does the "questioner" role encourage collaboration? Can collaboration be intellectual – not just about managing materials or having "all hands" on the materials?*

Conclusion: Skill Video (10 min)

- Play the skill video under step three of the Inspiring Youth in STEM video-based learning module.
- Ask participants to share what they saw and heard related to collaboration.
- Take out a piece of chart paper and ask participants to think about the two videos and the sink/float activity. Ask them to share:
    - *How can collaboration happen (a) with materials, (b) with ideas, and (c) what the space should look like to allow for collaboration?*

After the Session

- From notes you took on the pieces of chart paper, compile a list of strategies for allowing youth to collaborate with materials, ideas, and in the physical space. Share this in your follow-up email to the participants.
- Within 2-3 weeks of the training, email the list to all participants as well as an electronic copy of the Sink & Float activity as a resource of ideas for participants.
    - *Thank you for your participation in the recent Click2Science training on "Encouraging Collaborative STEM Work". I hope you found it useful. Attached are some strategies the group discussed during the training. Consider meeting with a co-worker, supervisor, or friend to share what you learned. 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

Sink & Float Activity

Materials

- Can of diet soda
- Can of full-sugar soda
- Can of sparkling water
- Clear tubs (one per group) half-full of water
- Baggies of objects that will sink or float. Consider:
    - Coins
    - Plastic
    - Wood
    - Styrofoam
    - Glass
    - Wrapped candies (like a Tootsie Roll or Starburst)
    - Other things youth have with them
- The Sink and Float Data Table

Introduction

- Ask students to think
    - *Why do objects sink when placed in water?*
    - *Why do objects float?*
    - *How can knowing an objects density give us an idea whether it will sink or float?*
- Hold up the two cans of soda – ask students to compare them. (One is "diet" and one is regular.) Then ask them to predict which will sink and which will float in the tub of water.
- Demonstrate with the regular and diet soda by placing them in the tub of water.
- Ask youth to predict what will happen when the sparkling water is placed in the tub. Encourage youth to have this discussion at their tables and to come to a consensus. Do NOT DEMONSTRATE THE SPARKLING WATER YET.

Investigation

- Group youth into groups of four.
- Assign each person in the group a role: a recorder, a project manager, a materials manager, and a questioner.
    - **Recorder** should do all of the documentation of the activity.
    - **Project manager** should make sure that everyone is involved.

    - **Materials manager** should make sure the materials are present and well cared-for. They should get a table to write their observations and the tub of water and bag of materials.
    - **The questioner** should ask questions to see what other students are thinking about the activity. The questioner can ask: "what did you see happen? Why do you think that happened? Do you think we should try it again?" The questioner cannot bring their ideas into the conversation, but only elicit the thinking of others.
- Have youth predict what will sink and float by grouping the objects into three categories: "sinkers," "floaters," and "not sure." Have groups come to consensus.
- When the teacher says "go" the students will begin to test their objects. Once the students have tested their objects, they should record their findings. This process will continue until all objects have been tested.
- Debrief each item and ask youth to describe what happened.
    - *Why did you predict that it would sink? Why did you predict it would float? Did anything surprise you? Did some things float for a while and then sink? Did some seem to sink then float?*

Conclusion

- Ask youth to describe what they have learned about sinking and floating
    - *What big science ideas did we learn from this activity?*
    - *What do you think is true about water that makes objects sink and float in it?*
    - *What about air? Would these objects sink or float in a bin full of air?*
    - **Optional**: The teacher can share why objects sink or float (Discussing density and volume)
- Ask youth to nominate one person in their group who helped them do a good job at the investigation. Highlight the behaviors that that youth exhibited, "Kept us on track, asked us what we were thinking, had a positive attitude, etc."
- Hold up the can of sparkling water (which has not yet been demonstrated). Ask the youth to make a final prediction about whether it will sink or float. Then drop it in the bin. (This can also be used as a reminder activity for the next meeting of the program.)

Sink & Float Data Table

Our Predictions

Write the objects in each column that sink and float:

Sinkers	Floaters	Not sure

Our Test Results

Sinkers	Floaters	Not sure