Professional Development Situation: Training

Skill Focus: Preparing STEM Learning Opportunities

Time Required: 60 minutes

PREPPING FOR LEARNING

Participants will experience a poorly facilitated STEM activity and develop a list of considerations to make when planning for STEM learning.

Agenda

Welcome—5 minutes
Introduction—5 minutes
See the Skill in Action—10 minutes

- Getting Youth Ready to Do STEM video-based learning module

Hands-On learning—25 minutes

- The Moon Contraption

The Final Checklist—15 minutes
Conclusion—5 minutes

Materials

- Computer with Internet connection
- Supplies for The Moon Contraption
- Projector and speakers
- Flip chart paper and markers
- Pens for participants
- Blank paper (one piece for each participant)
- Getting Youth Ready to Do STEM video-based learning module
- One copy of The Moon Contraption for the facilitator

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 "Preparing STEM Learning Opportunities." 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

Welcome & Introduction (5 min)

- Greet participants as they arrive. Make sure everyone feels welcome and comfortable.
- Introduce yourself and the focus of the session: preparing STEM learning opportunities.
- Ensure participants are aware of the locations of restroom facilities, refreshments, etc.
- Pass out paper and a pen to each participant.
- Ask participants to think about a time where an event, activity, or trip wasn't planned well, either by themselves or others. Ask participants to write down five words that describe how they felt about that experience.
    - *Today we are going to focus on getting youth ready to do STEM. Some of the feelings you may have written down include frustration, feeling anxious, or not being able to focus. This happens to youth, as well, when we don't consider their needs in the planning process. It is very hard to learn when you are experiencing these feelings, so we'll be working together to create a shared list of considerations to make when planning STEM learning experiences.*

See the Skill in Action (10 min)

- Cue up the Getting Youth Ready to do STEM video-based learning module.

  - *As we watch this video we will be listening for considerations Alex and Lemond make when planning STEM learning opportunities.*
- Watch the skill video under Step 2.
- Reflect on what Alex and Lemond talked about. Chart the responses on a chart titled "Checklist for STEM Learning".
  - *What considerations do Alex and Lemond make as they are planning for STEM lessons with youth?* (Possible responses: reviewing STEM concepts and content to support the lesson; thinking of ways to give youth voice and a role; tailoring activities to the age group and different ways that youth learn; room set-up)
  - *How are these considerations different than just making sure you have enough materials and have selected a high-quality activity?* (Possible responses: take more time/thought from the facilitator; centered on the youth and what you know about youth in your program).
- Watch the video again if needed to allow enough time to process and respond to questions about preparing activities.

Hands-on Learning (25 min)

- Using The Moon Contraption as a guide, ask participants to get into groups of three (if you have a smaller group, adapt this activity to fit your needs).
  - *Today, as a team, you will be completing an engineering design challenge. Your challenge is to build a contraption that can take someone to the moon. The roles for this activity are the designer and builder, so please choose who will take on these roles and the builder can come select some supplies.*
- Place supplies at the front of the room.
  - *Now that the builder has gathered the supplies, the designer will have 10 minutes to create the design without any input from the team. I encourage the designer to look at the materials and design based on these materials.*
- After 10 minutes, stop the groups and instruct the builders to create the design. Give them 10 minutes to create the design.
  - *Okay builders, it's your turn to build! You have 10 minutes to build the design without any help from your team.*
- After 10 minutes, end the activity.
  - *Thanks for the great STEM learning activity today! I hope you enjoyed being engineers and designing a contraption that can take someone to the moon!*

The Final Checklist (15 min)

- Bring the group back together for discussion about the activity that participants just experienced. Using a popcorn strategy (each person shares one idea as you 'pop' around the room to the next person) generate a list that includes the learning opportunities and other considerations that were missed during the hands-on activity. Chart the ideas on the list you started with the title "Checklist for STEM Learning".
    - *You may have noticed that I missed some crucial learning opportunities in the planning of that activity. We are going to do a popcorn brainstorm to list out what I should have done to make this a better quality STEM learning experience. Each person will share something they observed and we will go around the room until everyone has contributed and there are no new observations to share. Someone please start with what you observed.*
    - (Possible responses: there was no relevant challenge for the engineering design challenge, one person didn't have a role, there were no opportunities to collaborate, there was no STEM content taught, there was no questioning to help us learn, it appeared there was no real learning objective, the order of events seemed out of place, the activity didn't follow the engineering design process).
- Continue the popcorn strategy until all participants have contributed or no one has any new observations to share.
- Review the list with the group.
    - *These are all considerations that we should make every time we prepare for a STEM activity with youth. STEM should be more than just fun, which it inherently is, it should also be an opportunity for meaningful learning. If you think about the final checklist we have created when you select and plan for STEM learning, I am confident it will be a better quality experience than the one you just had.*

Conclusion (5 min)

- Facilitate a final discussion about selecting the qualities to focus on during STEM learning.
    - *Should we be making sure every STEM activity includes all of the considerations on our list? Why or why not?* (Based on your program goals, you may select some as a focus and some considerations and approaches lend themselves better to different types of activities).
- Thank participants for coming and share that you will be sending the final checklist out for them to use in their planning following the training.

After the Session

- From the list you created on chart paper, compile the "Final Checklist for STEM Learning" that was created by the group. Add other strategies and considerations that are relevant or helpful. 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 "Preparing STEM Learning Experiences". I hope you found it useful. 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

The Moon Contraption

Learning Goal:

- Staff will participate in a poorly facilitated STEM activity and identify how the facilitation benefits youth learners.
- Adapt this activity as needed to highlight different facilitation or organization strategies that staff may benefit from experiencing.

Supplies

Generic supplies*

- Pipe cleaners
- Cotton balls
- Glue
- Tape
- Scissors
- Construction paper
- Crayons
- Popsicle sticks
- Dixie cups

*Add any other supplies you have on hand or would like to include.

Instructions:

1. Group participants into teams of threes.
2. Introduce the engineering design challenge – to create a contraption that can take someone to the moon.
3. Introduce the roles in the activity are the designer and builder.
4. The builder selects the supplies from the supply table.
5. The designer is then given 10 minutes to create a design for the contraption. The designer cannot get input from other team members.
6. The builder is then given 10 minutes to build the design using the supplies, without getting help from other team members.
7. End the activity.