

Teaming Up for Success

Professional Development Situation: Training Face to Face
Skill Focus: Encouraging Collaborative STEM Work
Time Required: 90 Minutes

Purpose: Frontline staff and volunteers will understand that collaboration and interaction are necessary in science and engineering learning experiences and will be able to effectively facilitate collaborative STEM learning experiences.

Time Required:

- Preparation (reviewing documents, emailing participants and gathering materials)—2 hours
- Workshop session—90 minutes

Objectives:

As a result of ongoing, consistent professional development efforts, frontline staff and volunteers will be able to:

- Describe the value of collaborative efforts in terms youth can understand, and provide real world examples.
- Portray science as a collaborative effort that involves groups of people working together to solve problems and build explanations of the natural world.
- Facilitate STEM activities in which youth develop the skills to collaborate and cooperate effectively.

Session Outline:

Welcome—5 minutes
Introduction—15 minutes
See the Skill in Action—45 minutes
Skill Discussion—15 minutes
Conclusion—10 minutes

Materials & Supplies:

Trainer supplies:

- Copies of Training Resource B (one copy for every group of four participants)
- Extra newspapers
- Flip chart paper and markers (and tape if necessary)

Participant supplies:

- Newspapers, masking tape, rulers

Before the Session

Step One: Print Training Resource B—Make enough copies of the activity card so each group of four participants will have one.

Step Two: Gather newspapers and masking tape for the hands-on activity.

Step Three: Identify a training space that has enough floor space to accommodate small groups building on the floor.

Training Outline

Welcome/Context - 5 minutes

What I Say	What I Do
Welcome! Thank you for making the time to attend this training and for committing to quality programming at your site.	Greet participants, let them know you value their time and share logistics for the meeting: Restrooms, break scheduling, etc.
Let's take a moment to go around the room and introduce ourselves by telling us *whether the youth in your setting work collaboratively or individually when doing STEM activities.	*Other possible options for introductions would be to tell one interesting fact about yourself, or tell about a time of positive collaboration you've experienced.

Introduction - 15 minutes

What I Say	What I Do
Today we are going to talk about collaboration in STEM activities—and we are going to participate in an engineering challenge.	
Socrates said, “Nothing enters the mind that hasn’t been in the hands.” Today’s activity will demonstrate the benefits of collaboration.	
Just to be sure we are on the same page...what do we mean by “collaboration” in STEM activities?	Chart participant responses. Be sure to include working together, listening to each other, respecting each other’s ideas, and having common goals.

See the Skill in Action - 45 minutes

What I Say	What I Do
Please count off by 4’s so that we can arrange ourselves into small groups of engineers.	Help participants form small groups. You want group size small enough so they can successfully complete the activity but large enough that no one is working alone.
Let’s spread out so that we have room to work.	Arrange the groups so that they have space around them to work.
Here’s the challenge for today! Would someone please read the instructions?	Have a participant read the activity card text (Training Resource B).

This challenge requires that you work together to build a device that will hold your whole team 6 inches off the ground for 10 seconds using only the newspapers you have and masking tape.

Here's a hint for success: Everyone has to collaborate to be successful!

At the end of 20 minutes, each group will demonstrate their device. We'll confirm that each group's device is 6 inches off the ground by measuring, and we'll count to 10 to make sure each device is off the ground for 10 seconds.

Repeat the instructions.

Give participants a 3-minute warning before time is up so they can wrap up the activity.

You have 20 minutes to engineer a device that will save you from the alligators. Let's get started!

Give participants 20 minutes to work on the device. Encourage them to test it and make adjustments as they work. Ask questions that will help them think about shapes that are supportive (columns, triangles). Remind them that while the newspaper is flimsy, there are ways to make it stronger. Encourage them to test their device as they build.

*In order to be successful in this activity, the teams must figure out that they need to roll the newspapers into short, stout columns or triangles and tape them together into a small platform. To test the device, everyone in the team must place at least one foot on the platform and hold each other in place as they step up and (quickly) count to 10.

Let's come back together and test the devices. We will go around the room and ask each group to demonstrate their success.

Call the groups back together after 20 minutes. Ask each group to demonstrate its device. If a team is successful congratulate them. If they made an effort but are not quite there yet, ask them what they might do next to improve their chances of survival in the swamp.

Skill Discussion: 15 minutes

What I Say	What I Do
<p>Why was collaboration so important in this activity?</p>	<p>Make the following points:</p> <ul style="list-style-type: none"> • Everyone contributed in some way to the design. • With each trial of the device, participants recommended improvements that the group agreed upon. • The final part of the activity (stepping on the device) would be impossible to do without collaborating.
<p>What were some of the elements of collaboration?</p>	<p>Make the following points:</p> <ul style="list-style-type: none"> • The teams communicated their ideas. • The teams worked together to build the device in a set time. • The teams worked together to get everyone on the device—even for a short time. • Everyone's position on the device was moderated by the need to include everyone—the entire team made accommodations.

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Closure: 10 minutes

What I Say	What I Do
<p>In real-world STEM, the stereotype of the mad scientist working alone in a lab just doesn't exist. Real-world STEM requires real-world skills—like collaboration.</p> <p>The ability to collaborate—to share and improve on each other's ideas, to work together to solve problems, to create a shared vision, and to make the team's goal central is essential.</p>	
<p>It would have been very difficult, if it was possible at all, to get all of the team members off the ground without collaborating. By working together and by putting the team's goal first, you were either successful or on your way to success.</p>	<p>Take a few minutes to look back at the list you created earlier. Is there anything that you can add to that list? Anything you would remove?</p>
<p>When we go back to our sites and work with youth, what are strategies we can use that encourage collaboration in youth?</p>	<p>Chart the responses. Tell participants you will type them up and send them out after the training.</p>
<p>Are there any final questions or concerns?</p>	<p>Address questions and concerns. Encourage the participants to answer each other's questions from their experiences if possible.</p>
<p>Thank you for being here today and for participating. Please remember that I am a resource and that I look forward to hearing about your successes.</p>	<p>Encourage staff to implement one of the strategies this week.</p>

After the Session:

Step One: Type up the charts.

Step Two: Email the participants thanking them for attending the training and reminding them that you are a resource. Ask if they have follow-up questions. Include the charts participants created and an electronic copy of “Danger in the Okefenokee!” in the email.

Want to earn credit? Click2Science has partnered with BetterKidCare (BKC) to provide continuing education units to create moments that click. Find out more at:

<http://extension.psu.edu/youth/betterkidcare/school-age-practitioners/click2science>

Training Resource A

Pre-session Email

Email to participants before the Training Session: Send 10-14 days prior to session.

Dear Participant,

Welcome to STEM training! The next professional development session is scheduled for DATE at TIME and LOCATION. We will focus on Encouraging Collaborative STEM Work.

Please bring a newspaper with you to the session.

Please feel free to contact me with your questions or concerns at CONTACT INFORMATION.

Training Resource B

Danger in the Okefenokee!

Activity Card Text:

Your team is stranded in the Okefenokee Swamp where a new species of people-eating alligator lives. You know that the gators will attack after dark (in 20 minutes) and that your team will only be safe if the entire team is 6 inches above the swamp floor. There are no trees or other structures to climb; you are surrounded by grass. The only supplies you have with you are 5 newspapers and several rolls of masking tape (go figure...).

The task: Build a structure that will support your entire team 6 inches off the ground for 10 seconds (the time it takes the gators to get bored and walk away).