

# Looking for STEM in all the Right Spaces

Professional Development Situation: Training – Level 1

Skill Focus: Maximizing Your space

Time Required: 90 Minutes

## Purpose:

Frontline Staff and Volunteers explore strategies for arranging their environment to maximize youth engagement

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

- Create stimulating and attractive STEM learning environments that generate interest and encourage participation with a sense of creative autonomy
- Continually engage youth in their environment by going outside as much as possible
- Stimulate wonder by creating places that are safe, appropriate, and feel different from school

## Session Outline:

Welcome: An introduction to the training – 5 min

Introductory Activity: Introduction to STEM – 20 min

See the Skill in Action: Getting into the skill – 45 min

Closure: Feedback and debrief of the skill – 20 min

## Materials & Supplies:

- Chart Paper
- Computer/Projector/Screen
- Internet for video
- Internet access/ipad/phones for teams to look at different “spaces”
- Copies of Training Resources A, B and C
- Paper, pens/pencils for activity

## Before the Session

**Step One:** Read through the entire resource and familiarize yourself with the training.

Gather the necessary materials and supplies. Make sure and go through the training, trying out the activities.

**Step Two:** Send an email inviting participants to attend. Ask each of them to bring a copy of a recent STEM activity they have done with youth at their usual program location. Please have extra copies of activities available for those who might forget. (See activities at: <http://www.click2sciencepd.org/all-activities> )

**Step Three:** If you are able, visit the location where the training will take place, making sure that the location, etc., will be conducive to effective learning. Make sure the facility has available access to Internet, preferably open for everyone. Make sure it is set up for your comfortable facilitation.

## Face-to-Face Training

### Welcome/Context - 5 minutes

What I Say	What I Do
<p>Welcome to the Training Session Focusing on the skill, “Maximizing Your Space.” My name is _____, and together we are going to learn from each other and develop strategies for using our environment effectively.</p> <p>Let’s talk about what we are going to do today:</p> <ol style="list-style-type: none"><li>1. Talk about Maximizing Your Space and what that means to you</li><li>2. Develop ideas and strategies for maximizing your current space to ensure</li></ol>	<p>Greet and welcome participants; pass out nametags and/or have them sign-in.</p> <p>Familiarize participants with the session outline, location of refreshments/restrooms, breaks, etc.</p> <p>Display the session outline on projector or flip chart.</p>



<p>STEM learning 3. Identify ways to stimulate creativity and encourage participation in STEM in Youth</p>	
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**Introduction Activity - 20 minutes**

What I Say	What I Do
<p>Before we get started, let's find your thoughts about your learning spaces:</p> <p>When you heard the topic, "Maximizing Your Space," what came to your mind? What does the term, "Maximizing Your Space," mean to you?</p> <p>Why is having an engaging creative STEM learning space important?</p> <p>Are we doing STEM activities that include everyone? Who is missing out?</p> <p>What are we doing that is different from the traditional school day environment? What are we doing that is the same?</p> <p>How do you know if you are the type of person who can maximize your space for effective STEM learning? Let's take a test on your problem solving skills. Don't worry! It won't be graded.</p> <p>No peeking – write down your own answers on a piece of paper:</p>	<p>Engage your audience in the questions.</p> <p>Remember when you ask a question, you have to give them time to process.</p> <p>For reflection, you can post responses on chart paper, or on a Google/Word document displayed on a computer/projector</p> <p>It may be helpful to have someone volunteer to record responses and enable you to focus on keeping discussion flowing.</p> <p>Put the questions either on a sheet of paper and copy them off or put them on the projector</p>

1. How do you put a giraffe in a refrigerator?
2. How do you put an elephant in the refrigerator?
3. The Lion King is hosting a conference. All the local animals are in attendance but one. Who is not present?
4. You are going to be the final speaker at the conference. Unfortunately, to get there, you have to swim across a river inhabited by crocodiles. What do you do?

Now let's go through the answers:  
Let me know if anyone got these correct.

When we work together and keep it simple, we can solve problems. It's important that we recall the facts, problem solve as a team and remember that the *crocodiles are already at the conference!*

Here are the answers:

- Q1. Answer: Open the door and put him in.
- Q2. Answer: Take out the giraffe and put in the elephant.
- Q3. Answer: The elephant, he is still in the refrigerator.
- Q4. Answer: You swim; all of the crocodiles are all ready at the conference.

*Point: A professional problem solver looks for the simplest solution (#1). Keeps things simple (#2). Recalls facts (the elephant is still in the refrigerator and thus can't go to the conference-#3). And, uses his/her deductive skills in problem solving (the crocodiles are at the conference- #4). Side note: most four year olds score 100% on this.*

Have people share their funniest answers.



**See the Skill in Action - 45 minutes**

What I Say	What I Do
<p>Let’s dive into the skill, “Maximizing Your Space.” I heard you say a lot of different things about what this skill means to you.</p> <p>With those things in mind, let’s watch a video together that highlights using your environment for STEM and see what other frontline staff do to maximize their space.</p> <p>What did you notice about the spaces in this video?</p> <p>Did the facilitators incorporate the space into the activity? How?</p> <p>Did you see an activity that you could <b>not</b> do at your program? Could you adapt the activity to your space?</p> <p>Let’s watch the video again</p> <p>What did you notice differently this time?</p> <p>What did you notice about the mood, facial expressions, and interactions of the children?</p> <p>Many of us might not have the access to botanical gardens or scaled models of the</p>	<p>Review the chart/Word document from original discussion. Highlight a few of the participants’ responses.</p> <p>Show Video “Maximizing Your Space” at: <a href="http://www.click2sciencepd.org/organizing-your-environment-stem-learning">http://www.click2sciencepd.org/organizing-your-environment-stem-learning</a></p> <p>Keep walking around the room. Position yourself near your audience to keep engagement.</p> <p>Again, allow them time to process. Call on people to encourage group sharing. If someone is continually answering, that is great! But, you can encourage other voices by saying, “That’s great! Let’s hear from someone else.”</p>



<p>Mississippi River in our settings. Instead, youth enrichment may take place in a traditional classroom space that might not have much flexibility. In training today, we discuss how you can we know that you are effectively making the most of your space to ensure STEM learning?</p> <p>Let's look at three areas of focus that can guide STEM learning in our spaces:</p> <p>Physical Interaction Cognitive Interaction Social Interaction</p>	<p>Familiarize yourself with <b>Training Resource A</b> and be prepared to engage in discussion with the participants. Put the resources either on a chart of handout copies. There may be questions about the terms or how it relates to “maximizing their space.”</p>
<p>From the test earlier, you have proven to me you are great at coming up with solutions. Today, your challenge will be to develop an activity and adapt it to a given space so that the activity interacts with the “space” you are given.</p> <p>You will divide into groups. Each group should develop 2-3 activities they can effectively facilitate to encourage youth to interact with a space on a field trip. To make sure you are effectively using your space, you will want to review Training Resource A.</p> <p>Now each group will find out what space you get to work with. Once you have your</p>	<p>Group participants - by color of nametag, count off to four - about 4-5 people in a group. Get people to move around and mix-up. It might be good to ask key leaders to be group leaders.</p> <p>Encourage staff when developing activities. Make it fun. The focus is not on the activity, but on adapting it to the space. Have extra activities ideas available.</p> <p>Walk around the room and review their activities. Provide assistance but refrain from</p>



<p>space, as a group, design a mock “Field Trip” for youth with the 2-3 STEM activities you developed. The lesson must include how the space will interact with the activities.</p> <p>You are welcome to use the Internet to research your space. Pick a local museum, zoo, etc., if you want!</p> <p>You have 20 – 30 minutes to complete the activity. At the end, your group will take us on a mock “field trip,” share with us your activities and how you incorporated the activities into the space you were given</p>	<p>giving suggestions. Keep the activity fun and spark their creativity.</p> <p>Hand out Training Resource B – Each group should get a separate scenario, one per group – Be familiar with the instructions.</p> <p>Take time to help your participants get comfortable with the activity.</p> <p>If you can, it might be nice to have upbeat music playing softly in the background.</p> <p>Keep track of Time. Remember that each group will need time to present. Give the group a warning when they have 5 minutes left so they can complete the activity.</p>
<p>Let’s wrap up the activity now. I want each group to come up and present their mock “STEM activity field trip.” Each group has 5 minutes to present. Will anyone volunteer to go first?</p> <p>What did you do first in order to incorporate STEM learning in the space</p> <p>How did researching the space help in planning your activity?</p> <p>Do you think it would be helpful for youth to research spaces before they go on a field trip? Why?</p> <p>Research has proven that youth are more likely to retain science learning if they have had prior knowledge of the science learning that is going to take place in informal</p>	<p>As each group presents, display Training Resource A on the screen. Go through the questions with each group.</p> <p>Point out to participants that when groups researched their spaces or made a plan of what the space would be like, it helped with the activity.</p> <p>If you have a large group, have one group pair up with another group and present their experience. Have the groups ask each other the</p>





<p>activity took place. Next, go through and ask each other the guiding questions for interactions with learning spaces from Training Resource A.</p> <p>Does your space effectively meet those three requirement areas?</p> <p>Are you doing anything in your space that you might need to adapt to make a more effective STEM learning environment?</p>	<p>Take about 10 minutes to work on this activity</p> <p>Walk around the room but not giving advice or telling people what to do.</p> <p>We can't change the physical spaces for many of our programs. You want to instead focus on all the resources and materials <i>they do have</i> to work with, especially partners, local facilities, such as parks, etc.</p>
<p>I want to thank you all for your participation today.</p> <p>Let's revisit what we discussed today</p> <p>Research shows us that STEM learning can occur when we set up spaces that focus on guiding questions around 3 areas</p> <p>Physical</p> <p>Cognitive</p> <p>Social</p> <p>What did you learn about integrating STEM into an unfamiliar space?</p> <p>What else did you learn about doing STEM in your space?</p>	<p>Training Resource A displayed</p> <p>Record responses. Have someone type these up and send out in your follow-up email.</p>



<p>Is there something you can change? Did you think of ways that you could enhance your space to integrate STEM learning?</p> <p>I want to give you a “one word” challenge. Let’s go around the room and use only ONE WORD to share what you learned about Maximizing Your Space when doing STEM activities.</p>	<p><i>Have staff record the “One Words” on a chart. Make a Wordle (<a href="http://www.wordle.net/">http://www.wordle.net/</a>) of the “one words” and send it out in an email after the training</i></p>
<p>Thank you so much for being here!</p> <p>You will be getting an email from me and I want to hear your feedback so please respond!</p>	<p>This would be a great time to let them know when the next training will be, how they can reach you if they have questions or if they would like coaching in this area</p>

**After the Session:**

**Step One:** Collect the chart paper or Word documents from the training and compile a list of strategies to send to participants in an email. Attach the Wordle, in this email.

**Step Two:** Within 2-3 weeks of the training, send another email letting participants know that you welcome feedback. Include a quote, strategy, etc., from the training to spark connection. Remind staff to use you as a resource. Let staff know about further opportunities for professional development, such as Coaching designed for this skill. Attach Training Resource A to the email.

## Training Resource A

### Maximizing Your Space

Do we Physically interact with the space?

1. Is the space set up to move around safely and comfortably for everyone?
2. Is the information conveyed that everyone can perceive what we are doing?
3. Can a diverse group manipulate all the things in that space on their own?

Do we Cognitively engage in this space?

1. Is there information or activity conveyed in a variety of ways to allow full engagement with materials?
2. Do the materials take into account a wide range of learning and cognitive skills?
3. Do the materials take into account a diverse set of experiences and background knowledge?

Do we Socially interact with each other in this space?

1. Are the spaces safe, welcoming and encouraging creativity and open learning?
2. Does the space facilitate collaboration and engagement amongst groups?
3. Do the materials foster interaction and discussion among groups, especially diverse groups?

## Training Resource B

**Scenario 1 - Local Zoo** - One group of 4 -5 people per each scenario. Plan a field trip to a local zoo with the 2-3 activities you developed integrated into the location.

Together as a group, develop 2-3 activities and how you would integrate those STEM activities into your virtual field trip space. For Example, one of your activities might be making “Elephant Toothpaste. (see at: <http://www.click2sciencepd.org/all-activities> ) You could do that activity right after you visit the elephants at the zoo and connect the size of the elephant to the size of how much toothpaste you would need (Math Skills). As a challenge, see if you can find a way to utilize every part of STEM: Science, Technology, Engineering and Math - into your field trip scenario! Plan on presenting your activities, your virtual space, age group of youth, and what you did to maximize the space to fit your STEM activities. Remember, you need to take into account the three areas – Physical, Cognitive and Social interactions in the space, and should have 2-3 activities to do at that space. You are welcome to research the spaces via the Internet!

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### **Scenario 2 - The California Museum of Science and Industry (or local science museum)**

One group of 4 -5 people per each scenario. Plan a field trip to a local museum with the 2-3 activities you developed integrated into the location.

Together as a group, develop 2-3 activities and how you would integrate those STEM activities into your virtual field trip space. For Example, one of your activities might be “What is a Soil Scientist.” (see at: <http://www.click2sciencepd.org/all-activities> ) You could do that activity right after you visit a part of the museum that talks about digging for dinosaur bones and talk about what careers there are at a museum that relate to STEM. As a challenge, see if you can find a way to utilize every part of STEM: Science, Technology, Engineering and Math - into your field trip scenario! Plan on presenting your activities, your virtual space, age group of youth, and what you did to maximize the space to fit your STEM activities. Remember, you need to take into account the three areas – Physical, Cognitive and Social interactions in the space, and should have 2-3 activities to do at that space. You are welcome to research the spaces via the Internet!

**Scenario 3 - State or National Park (or neighborhood park)** - One group of 4 -5 people per each scenario. Plan a field trip to a park with the 2-3 activities you developed integrated into the location.

Together as a group, develop 2-3 activities and how you would integrate those STEM activities into your virtual field trip space. For Example, one of your activities might be “Designing and Building a Stove.” (see at: <http://www.click2sciencepd.org/all-activities> ) You could do that activity at a place designated for building fires and talk about fire safety, issues related to cooking around the world or cooking outdoors. As a challenge, see if you can find a way to utilize every part of STEM: Science, Technology, Engineering and Math - into your field trip scenario! Plan on presenting your activities, your virtual space, age group of youth, and what you did to maximize the space to fit your STEM activities. Remember, you need to take into account the three areas – Physical, Cognitive and Social interactions in the space, and should have 2-3 activities to do at that space. You are welcome to research the spaces via the Internet!

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**Scenario 4 - The Botanical Gardens** - One group of 4 -5 people per each scenario. Plan a field trip to a local botanical garden with the 2-3 activities you developed integrated into the location.

Together as a group, develop 2-3 activities and how you would integrate those STEM activities into your virtual field trip space. For Example, one of your activities might be a hide and seek type of search for creatures. Ask students to carefully and quietly sneak around the garden and look for creatures who have made the space their home. Talk about ecosystems, different homes for wildlife, etc. As a challenge, see if you can find a way to utilize every part of STEM: Science, Technology, Engineering and Math - into your field trip scenario! Plan on presenting your activities, your virtual space, age group of youth, and what you did to maximize the space to fit your STEM activities. Remember, you need to take into account the three areas – Physical, Cognitive and Social interactions in the space, and should have 2-3 activities to do at that space. You are welcome to research the spaces via the Internet!

## Resources

[http://www.nap.edu/openbook.php?record\\_id=12190&page=295](http://www.nap.edu/openbook.php?record_id=12190&page=295)

Learning Science in Informal Environments: People, Places, and Pursuits (source for Training Resource A)

Designing Spaces for Effective Learning

[http://www.jisc.ac.uk/uploaded\\_documents/JISClearningspaces.pdf](http://www.jisc.ac.uk/uploaded_documents/JISClearningspaces.pdf)

Examining the Impact of Afterschool STEM Programs

<http://www.afterschoolalliance.org/ExaminingtheImpactofAfterschoolSTEMPrograms.pdf>

Inclusion, Disabilities, and Informal Science Learning

[http://www.informalscience.org/documents/InclusionDisabilities\\_ISE.pdf](http://www.informalscience.org/documents/InclusionDisabilities_ISE.pdf)

### **Want to Earn Credit?**

Frontline Staff can earn credit in a variety of training modules online. Go to:

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