

TMC Works STEM Ambassador LIVE Training GUIDE

Instructions: STEM Supervisors, use this guide to lead STEM Ambassador live (i.e. in-person) training. Schedule three hours for the training, or schedule three one-hour sessions. Session 1 can be completed in a virtual meeting, but session 2 and 3 need to be conducted in person. Before the first session, STEM Ambassadors should complete steps 1 through 6 of [STEM Ambassador Training \(TMC Works\)](#) in the Idaho Out-of-School Network's online [Learning Academy](#).

Session 1: Learning Goals (60 minutes)

Learning Goals for Participants:

- Educators will do a STEM activity focused on a learning goal.
- Educators will be able to identify and evaluate STEM learning goals in an activity.
- Educators will practice writing STEM learning goals.

Set up:

- Read this training guide to become familiar with the content and allow time to personalize the activities to best suit your presentation style. Read all worksheets and handouts.
- Plan a TMC activity from the TMC Labs activity guide found at the [For Educators](#) page on the Idaho Out-of-School Network website. Use the [TMC Works Learning Plan](#) to plan your activity.
- Gather and prep materials for the activity (enough for every participant).
- Practice the TMC activity that you planned.
- Print/copy worksheets and handouts listed below for each participant.

Materials:

- TMC activity materials
- Your notes for leading the TMC activity
- 1 [TMC Works Learning Plan](#) worksheet for each participant
- 1 [Learning Goals and Experiential Learning](#) handout for each participant
- 1 [Common Out-of-School Activities](#) worksheet for each participant.*
- Pencil or pen for each participant

Training Session Instructions:

Welcome (5 mins)

- 1) Welcome the STEM Ambassadors and thank them for coming to the training.
- 2) Share the learning goals for this session:
 - a. Educators will do a STEM activity focused on a learning goal.
 - b. Educators will be able to identify and evaluate STEM learning goals in an activity.
 - c. Educators will practice writing STEM learning goals.
- 3) Have each Ambassador introduce themselves and share something about STEM they enjoy (or use a different ice-breaker question).



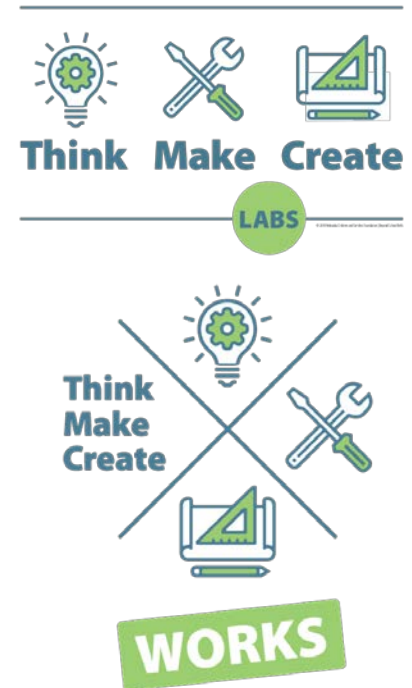
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Do a STEM Activity (25 mins)

- Do the TMC activity you planned with the training participants. The goal is to model a quality STEM activity for STEM Ambassadors. Identify your learning goal(s) and use the experiential learning model to teach the activity (which is built into the [TMC Works Learning Plan](#)).

Introduce and Practice Writing Learning Goals (25 mins)*

1. Pass out [TMC Works Learning Plan](#) worksheet and [Learning Goals and Experiential Learning](#) handout. Explain that as STEM Ambassadors, they will be using these handouts to plan their STEM activities.
 - a. Read through the [TMC Works Learning Plan](#) worksheet and point out where they will write their learning goal(s). Also find the reflection box, and explain that this is where they will connect the activity back to the learning goals.
 - b. As a group, read the top half of the [Learning Goals and Experiential Learning](#) handout.
2. Share the following: *“Every lesson is unified by its goal for youth learning. This is the most important part of planning a lesson; we want all learning activities to be tightly focused around what youth will learn. We often use a “SWBAT” to write a lesson goal. SWBAT stands for “Students will be able to...” It’s a phrase you can use to start writing the learning goal.”*
3. Share your learning goal(s) for the activity you did at the beginning of the training. As a group, practice writing additional learning goals for the activity. STEM learning goals may focus on learning or applying content, developing STEM skills, or developing a STEM identity—helping youth see themselves as someone who can do STEM. Identify other areas of STEM or other outcomes that could be taught with the activity. For example, write life-skills, social-emotional and/or literacy goals to complement the STEM goal(s).
 - a. Pass out the [Common Out-of-School STEM Activities](#) worksheet.
 - b. Have the STEM Ambassadors practice writing goals for the activities listed on the worksheet. If the participants are struggling with writing goals on their own, you can continue to work as a large group, break up into small groups, or work in pairs.
 - c. Have the group share their learning goals with each other.



End the session with a 5-minute discussion:

- 1) Ask the STEM Ambassadors, what went well for them in this session? What was challenging?
- 2) Ask the STEM Ambassadors, what are their take-aways from the STEM activity and from practicing learning goals? (What did they practice and/or learn?)
- 3) Ask the STEM Ambassadors, how can they use what you learned today while working with kids?

* Borrowed with permission from [Identifying a STEM Learning Goal](#) from [Click2Science](#).

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Session 2: Experiential Learning and Activity Preparation (60 minutes)

Learning Goals for Participants:

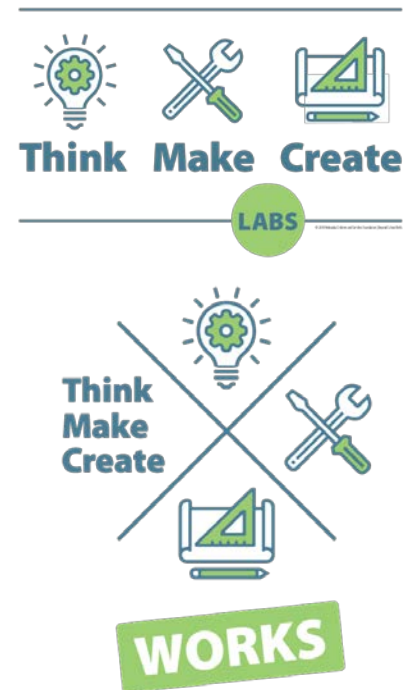
- Educators will practice planning and preparing to lead a STEM activity.
- Educators will be able to describe the Experiential Learning Model.
- Educators will develop their skills by writing learning goals.

Set up:

- Read this training guide to become familiar with the content and allow time to personalize the activities to best suit your presentation style. Read all worksheets and handouts.
- Hook up your computer to the internet and audio-visual equipment so you can watch a video together during the session. Test it and be sure you have sound.
- Pull up the [Experiential Learning Model video](#). (On YouTube, find the “Teaching Tips: Experiential Learning Model” video by Humber Innovative Learning.)
- Print/copy the worksheets and handouts listed below.
- Ensure the TMC Lab is stocked with items listed below, or gather them ahead of time and have them ready in the training location.

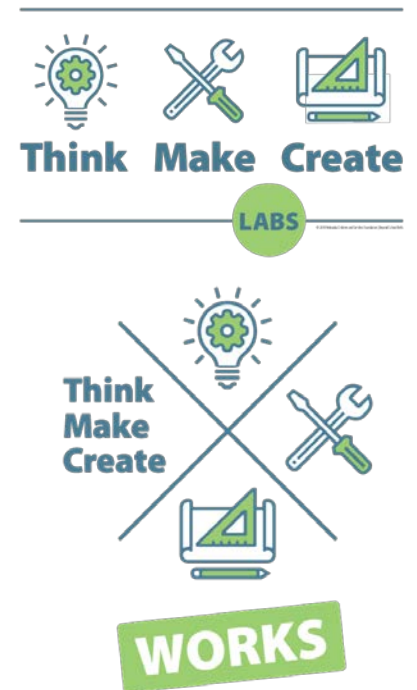
Materials:

- Computer hooked up to internet and audio-visual equipment
- Computer or tablet for each participant. (Phones don't work well.)
- 1 [Learning Goals and Experiential Learning](#) handout for each participant.
- 2 “[TMC Works Learning Plan](#)” worksheets for each participant
- Pencil or pen for each participant
- Optional: printed [TMC Labs Stocking List](#)
- Optional: printed copies of TMC Labs activities if devices or the internet are unavailable.
- Ensure these supplies are stocked in the TMC Lab, or gather them for the session:
 - Bag, brown paper
 - Battery, 3V coin cell
 - Beads, 9mm pony beads
 - Bottle Caps
 - Craftsticks (jumbo popsicle sticks)
 - Crayons
 - Decorative items (optional)
 - Glue sticks
 - Glue, hot glue sticks
 - Hot Glue Gun
 - Lacing cord, plastic
 - LED lights
 - Markers, washable
 - Paper clips
 - Binder clips, small



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- Paper towel tube
- Paper, construction
- Paper, origami
- Paper, printer
- Pencils, #2, pre-sharpened
- Plate, paper, 9 in
- Pom Poms
- Rubber Bands
- Rulers
- Scissors, kid
- Stapler
- Staples
- Straws, plastic (no bend)
- Tape, clear
- Tape, copper foil
- Tape, painter's masking
- Toilet paper rolls
- T-pins



Training Session Instructions:

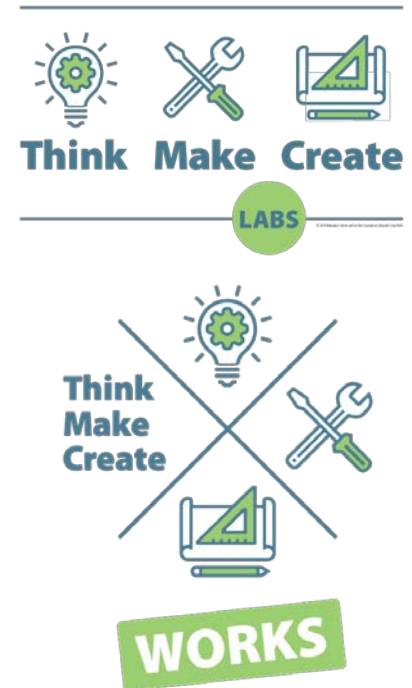
Experiential Learning Model (10 mins)

- 1) Greet the participants and share the learning goals of this session:
 - a. Educators will practice planning and preparing to lead a STEM activity.
 - b. Educators will be able to describe the Experiential Learning Model.
 - c. Educators will develop their skills by writing learning goals.
- 2) Pass out the [Learning Goals and Experiential Learning](#) handout. Watch the [Experiential Learning Model](#) video together. (On YouTube, find the “Teaching Tips: Experiential Learning Model” video by Humber Innovative Learning.)
- 3) On the Learning Goals and Experiential Learning handout, point out the diagram and explain that the five steps of the experiential learning model can be shortened to “Do, Reflect, Apply.”
- 4) Discuss as a group any or all of the following questions.
 - a. What is something you have learned by doing?
Share this information; babies/young children almost exclusively learn by doing. Things like walking, eating, etc. are usually learned experientially.
 - b. Why do you think it’s beneficial to learn by doing?
Share this information; learning by doing is memorable, it builds strong connections in the brain which makes learning faster and easier
 - c. Why is reflecting an important part of the process?
Share this information; reflecting makes sense/understanding out of the experience, helps us know what we need to change next time. It is important to focus on the learning goals when you ask youth to reflect; help them think about what they have learned.
 - d. How can you practice generalizing (part of applying)?
Share this information; draw on past experiences to make sense of new ones, apply existing skills to new situations and/or apply new learning to familiar situations.

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Plan an activity (30 mins)

- 1) Pass out two more copies of [TMC Works Learning Plan](#) worksheet. They will work on one today and keep the other for future reference and copying.
- 2) Tell the group that they will be planning an activity to facilitate with younger kids.
- 3) Point out the different sections on the worksheet. Remind them that they learned how to write learning goals in the last session. The boxes on the back give them room to plan their activity using the experiential learning model.
 - a. If needed, review SWBAT (“Students will be able to…”).
 - b. If needed, review using verbs to describe what the youth will be doing.
 - c. Tell the STEM Ambassadors that after they choose their activity, they should write their learning goals first. Everything in their activity should support their learning goals.
 - d. Tell the STEM Ambassadors to write some reflection questions second, to ensure that the activity refers back to the learning goals.
 - e. Tell the STEM Ambassadors to then fill in the rest of the worksheet.
- 4) Have the STEM Ambassadors log into the TMC Labs activity guide and explore the list of activities. Find the activity guide on ION’s [For Educators](#) page. The LiveBinder password is “16.”
- 5) Have STEM Ambassadors choose an activity and plan it using the worksheet. Allow them to work in pairs or small groups. Suggest STEM Ambassadors choose from this list of easy and quick TMC activities:
 - Binary Bracelets (use pony beads and lacing to “write” letters)
 - Flowers from Mars
 - Origami Bookmarks
 - Sundial
 - Crazy Kites
 - Whirlybird-Dropcopter
 - Make a Paper Circuit
 - Catapults (from “Catapults and Trebuchets,” PLUS “Catapult video”)
 - Tower Engineering



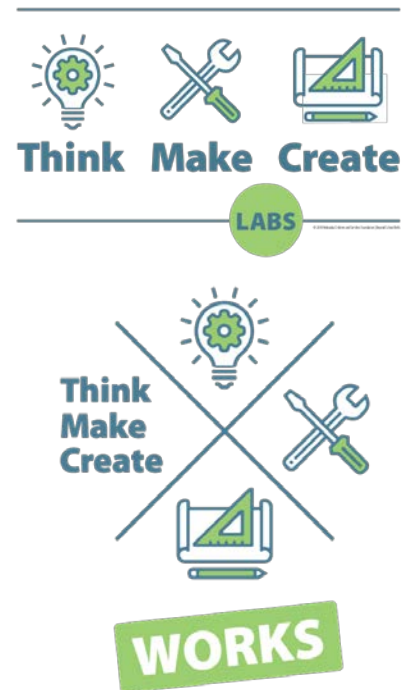
Note on choosing activities: For time management and a higher likelihood of success, we suggest that STEM Ambassadors choose a simple activity from the list above for their first activity. If they choose a complex activity, it will probably take more than the 15 minutes assigned to this part of the training session to prepare. If your facility allows it, STEM Ambassadors can use a different curriculum or educational resource, but we suggest planning a simple TMC Labs activity during this training to get experience with this resource.

- 6) Remind the STEM Ambassadors the order in which they should plan their activity: learning goals first, reflection questions second, and everything else after.

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Prepare an activity (15 minutes)

- 1) Have the STEM Ambassadors download the most current [TMC Labs Stocking List](#) from the TMC [For Educators](#) page. Point out the tab for your specific TMC Lab (according to its number), as well as the “Materials by Activity” tab. You can also print off a few copies of the stocking list for reference at the TMC Lab.
- 2) Have the STEM Ambassadors go to the TMC Lab and find the materials to do their activity. They should gather enough materials to 1) make a practice example of their activity and 2) lead the activity with the other people taking the training.
- 3) Have the STEM Ambassadors practice doing their activity and make an example.
- 4) Have the STEM Ambassadors prepare a set of materials for their peers to do their activity. Tell the STEM Ambassadors that they will practice facilitating their activity in the next training session.
- 5) STEM Ambassadors may not have time to finish preparing an example or all the materials for their activity during this session, especially if they choose a more complex activity. Ask them to finish it before the next training session.



End the session with a 5-minute discussion:

- 1) Have the STEM ambassadors share their activity, a learning goal, and a reflection question with the group.
- 2) Ask the STEM Ambassadors, why do they think it's important to practice making the activity ahead of time?
 - a. Share the following information: practicing the activity can help them figure out what they need to do before leading the activity with kids, know what to expect, identify challenges the kids will face, and troubleshoot these challenges ahead of time.
 - b. Tell the group that they might not want to show the kids their example before leading the activity because it could limit their creativity.
- 3) Have the group discuss: what do they need to do before they lead this activity with kids?
 - a. Answers will vary depending on their activity, but all STEM Ambassadors should prepare enough materials for every participant, plan a time and location for the activity with their STEM Supervisor, prepare the space for the activity, and practice facilitating the activity.

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Session 3: Facilitating a STEM Activity and Reflecting on the Experience (60 mins)

Learning Goals for Participants:

- Educators will practice delivering a STEM activity to their peers.
- Educators will discuss the elements of a quality STEM activity.
- Educators will reflect on the quality of their STEM activity delivery.

Set up:

- Read this training guide to become familiar with the content and allow time to personalize the activities to best suit your presentation style. Read all worksheets and handouts.
- Set up the room so that STEM Ambassadors can do their activities in small groups or pairs.
- Print/copy worksheets and handouts for each participant.
- Gather materials for the training session.
- Remind STEM Ambassadors to bring their prepared activity materials. You might want to have the TMC Lab (and/or supplies) available as a back-up.

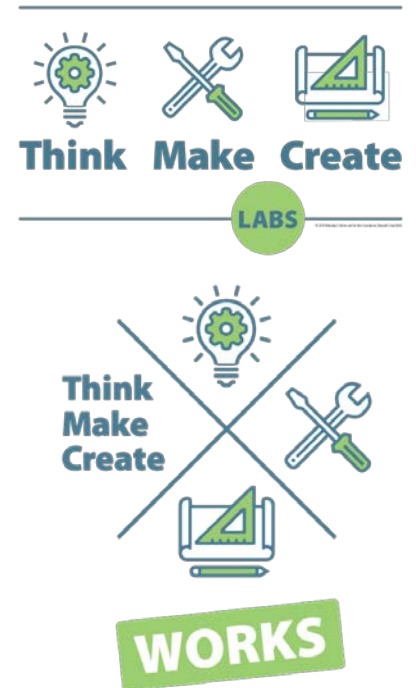
Materials:

- STEM Ambassadors' activity materials. (They should bring them.)
- 1 [STEM Facilitation Quality Checklist](#) worksheet for each participant
- Timer
- Pencil or pen for each participant
- Optional: TMC Lab or extra activity materials

Training Session Instructions:

Quality STEM Education (10 mins)

1. Welcome the group to the training and share your learning goals for the session:
 - a. Educators will practice delivering a STEM activity to their peers.
 - b. Educators will discuss the elements of a quality STEM activity.
 - c. Educators will reflect on the quality of their STEM activity delivery.
2. If STEM Ambassadors forgot their materials, give them 10 minutes to gather and prep them.
3. Pass out the [STEM Facilitation Quality Checklist](#).
4. Explain that in order for the learning experience to make an impact and be memorable, it needs to be high quality.
5. This STEM Facilitation Quality Checklist is a tool they can use to ensure they prepare and present high-quality STEM activities.
6. There are many different quality tools out there, and they can all be useful. This one was created specifically for TMC Works.
7. Read through the STEM Facilitation Quality Checklist as a group, discussing items that need further explanation and answering questions.
8. Explain that they will use the STEM Facilitation Quality Checklist to reflect upon their experience after facilitating their STEM activity.



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Practice makes it easier (let go of perfection) (40 mins)

- 1) Have STEM Ambassadors pair up with a STEM Ambassador that prepared a different activity. Have them space themselves out around the room so they can practice their activities.
- 2) Have one STEM Ambassador practice facilitating their entire activity with their peer. Although it might feel awkward at first, have the facilitator speak to their peers as if they are the age of the kids they will be working with. The peers should pretend to act that age (within reason; make it easy on your peers!).
- 3) After 15 minutes, give a 5-minute warning. If the facilitator won't be able to get through the entire activity, they should summarize the rest of the activity and skip ahead to their reflection questions.
- 4) Switch facilitators. Have the other STEM Ambassador lead their activity. Repeat steps 2 and 3 in these new roles.



End the session with reflection and application (10 mins)

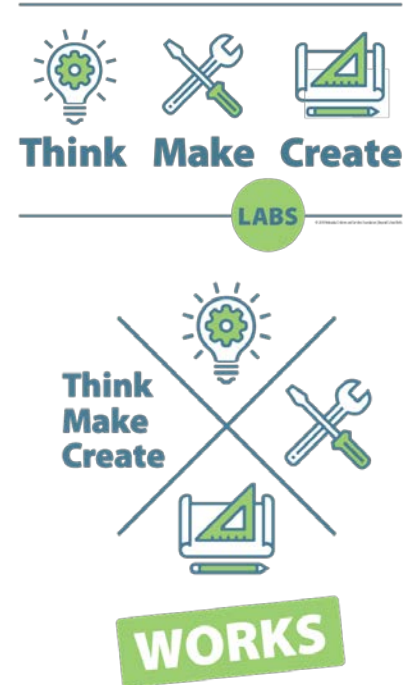
- 1) Have each STEM Ambassador pull out their [STEM Facilitation Quality Checklist](#). Tell them that they can use this checklist to reflect on their experience after they facilitate an activity with kids. Tell them that they can use the checklist to identify things they did well and things they want to change for their next activity. Using the checklist in this way completes the experiential learning model; it enables them to learn and grow from their experiences.
- 2) Have them go through each item on the checklist, score themselves and make notes of examples. Tell them that this is a private exercise; they don't need to show their scores to anybody.
- 3) Looking at their checklist, have the Ambassadors identify 1-3 strengths (high scores) and 1-2 opportunities for growth (low scores).
- 4) Explain that when you identify your strengths, you 1) celebrate your successes, and 2) in the future, you can do these things on purpose, and it improves the quality of your lessons.
- 5) Explain that opportunities for growth aren't necessarily weaknesses. It's hard to incorporate every quality element into every activity, especially when you are inexperienced. Opportunities can be new things to try and/or learn as they become more comfortable leading STEM activities.
- 6) Have STEM Ambassadors discuss any and/or all of the following with the group:
 - a. What was it like to teach your peers? What was it like to be taught to?
 - b. What did you learn by facilitating the activity with your peers?
 - c. How did your learning goal impact how you delivered the lesson?
 - d. What is something you either want to change, or make sure you do when you lead the activity with kids?



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Training Follow-Up Options:

- Go over the online training: Sit down with your STEM Ambassador and have them create an account/log into ION's [Learning Academy](#). Take a close look at the first 11 steps of the [STEM Ambassador Training \(TMC Works\)](#) to ensure they understand how their training works. Discuss their options in steps 12-23, and have them pick out some trainings that look interesting to them.
- STEM Ambassadors can shadow or assist a STEM Supervisor lead an activity before they lead an activity themselves, in order to become more comfortable with the process.
- Likewise, STEM Supervisors can assist STEM Ambassadors the first time they lead an activity, to help them feel comfortable and step in to help, if needed.
- After a STEM Ambassador has led at least one STEM activity, you can do a "STEM Facilitation Reflection" with them. See the next section for instructions.



STEM Facilitation Reflection (1-2 hrs., optional):

Learning Goals for STEM Supervisors:

- Supervisors practice observing and evaluating an activity.
- Supervisors practice delivering constructive feedback.
- Supervisors collaborate with Ambassadors to identify elements of quality the Ambassador will work on.

Learning Goals for STEM Ambassadors:

- Ambassadors deliver an activity while being observed and evaluated.
- Ambassadors practice reflecting on their experience of delivering a STEM activity.
- Ambassadors listen to feedback on their performance.
- Ambassadors collaborate with their Supervisor to identify elements of quality they will work on.

Set up:

- Plan with your STEM Ambassador which activity (and where and when) you will do an observation. Don't formally observe and give feedback on the STEM Ambassador's first few activities. Give them a chance to get comfortable leading STEM activities before setting up a reflection session.
- Optional: Bring a recording device (phone or camera) to the observation.
- Arrange a quiet meeting spot to meet with the STEM Ambassador after they facilitate the activity. If you took video of the activity, be sure to plan a way to watch it. Meet with the Ambassador as soon as possible after the activity observation.

Materials:

- 2 copies of the [STEM Facilitation Quality Checklist](#)
- 2 pencils or pens
- Optional: Phone or camera to record, and/or a TV or computer to watch video

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- Optional: tripod for recording
- Optional: clipboard for marking the STEM Facilitation Quality Checklist while observing

Training Session Instructions:

STEM Facilitation Observation

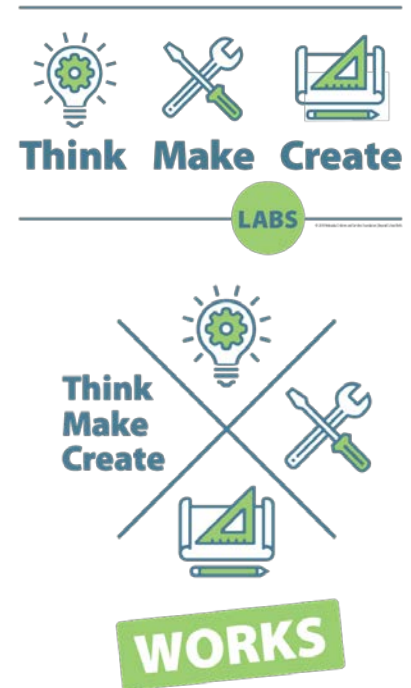
1. Arrive early to the STEM activity you are observing to set up your recording device, fill out the details on the top of the (back) page of the [STEM Facilitation Quality Checklist](#), and be ready to observe when the activity starts.
2. As you watch the STEM Ambassador facilitate an activity, score them on each line of the STEM Facilitation Quality Checklist.
3. Take notes on specific examples to support your scores, such as how the learning goal was used in the activity and/or reflection, and specific questions or instructions that youth responded to.

Reflection:

1. In a quiet, private space, meet with the STEM Ambassador.
2. If you took video of the activity, watch it together.
3. Pull out both copies of the STEM Facilitation Quality Checklist and give one to the Ambassador. Review with them that the checklist evaluates elements of quality for a STEM activity.
4. Have the STEM Ambassador think about their experience delivering the activity, and fill out the STEM Facilitation Quality Checklist according to how they think the activity went.
5. Compare your scores and discuss why they might differ (if they do).
6. Together, identify 2-3 strengths.
7. Identify 1-3 opportunities for growth.
 - a. Opportunities for growth can be areas that can be improved upon.
 - b. Opportunities for growth can *also* include doing something differently next time, or trying something new. For example, the STEM Ambassador could plan to incorporate teamwork or youth choice into a future activity, if they have not tried this before.
 - c. Opportunities for growth can be things they are unfamiliar with, so they present a learning opportunity.

Applying what they learned:

1. Talk about how the STEM Ambassador can incorporate their strengths into future activities. People aren't always aware of their strengths, so we want to identify them and then do them on purpose.
2. Talk about how the STEM Ambassador can address their opportunities for growth. They could:
 - a. Observe a different educator to learn about their strategies.
 - b. Talk to other educators about their strategies.
 - c. Research the topic and brainstorm ideas to try.
 - d. Take a training on the topic.
3. If the Ambassador hasn't finished their 20 training hours, look at their training options with them in steps 12-23 of the [STEM Ambassador Training \(TMC Works\)](#) on ION's [Learning Academy](#). Identify some trainings they could take to address their opportunities for growth.



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Tips for giving feedback:

- Smile and remind the STEM Ambassador that you are there to support their success, not give them a grade.
- Try to be encouraging and remind them that they are *learning* to facilitate STEM and learning is a process. They won't be an expert facilitator right away, and even when they are, things don't always go according to plan.
- Before suggesting changes, simply state what happened or what you observed. Let *them* think about what they could do differently. People can often self-identify improvements and make effective, authentic changes on their own.
- Use sentence frames, such as:

Strengths	Opportunities
<ul style="list-style-type: none"> • When you..., it was a strong example of... • It really impressed me when... • I was interested when... 	<ul style="list-style-type: none"> • I wonder... • Have you considered... • One idea to consider for next time is...



- Using the [Situation-Behavior-Impact \(SBI\) Model](#) of feedback is an objective way to explain the impact of an action ([Center for Creative Leadership](#)).
 - Situation: the context for the feedback
 - Behavior: what the facilitator did
 - Impact: the effect of that behavior
 - E.g. “During your activity [situation], you encouraged Peter to work more carefully [behavior], which reduced his frustration [impact].”
- If you *and* the STEM Ambassador scored the Ambassador low on specific skills, talk about the cause. For example, did the STEM Ambassador adequately plan for the activity, or did they need to be flexible and adapt the plan based on the group or circumstances?
- If the STEM Ambassador scored themselves higher than you in a specific area, ask them why they gave themselves that score. It could help you identify where they may have had a good plan, but things didn't go accordingly. Take this opportunity to discuss what they can do differently next time.
- If the STEM Ambassador scored themselves lower than you on a specific skill, their expectations of themselves or the kids might be too high; you might have them shadow another, experienced instructor to see what they can expect from a typical activity.
- Ask the STEM Ambassadors if they can use any of their strengths to improve an area of weakness. This is called strengths-based coaching and can be very effective. For example, let's say that Juan scored high on materials preparation (#2) but low on #8 (ALL youth are included in activity) because one kid, Julie was disruptive and refused to participate. Juan could use their strength of preparedness to plan ways to include Julie in the activity. Juan could plan an activity he knows Julie will enjoy, and talk to his assistant facilitator ahead of time, asking them to bring Julie into the activity if she isn't participating. Juan could also use his preparedness to develop a behavior plan for Julie ahead of time.

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Easy and Quick TMC Labs Activities

Access these activity plans on the TMC Labs activity guide, located on the TMC Labs “For Educators” page at the Idaho Out-of-School Network’s website:

<https://idahoutofschool.org/think-make-create-labs-curriculum/>

Art

- Binary Bracelets (use beads and lacing cord to “write” letters)
- Flowers from Mars
- Origami Bookmarks
- Sundial

Design

- Crazy Kites
- Whirlybird-Dropcopter

Electronics

- Make a Paper Circuit

Engineering

- Catapults (from “Catapults and Trebuchets,” PLUS “Catapult video”)
- Tower Engineering

