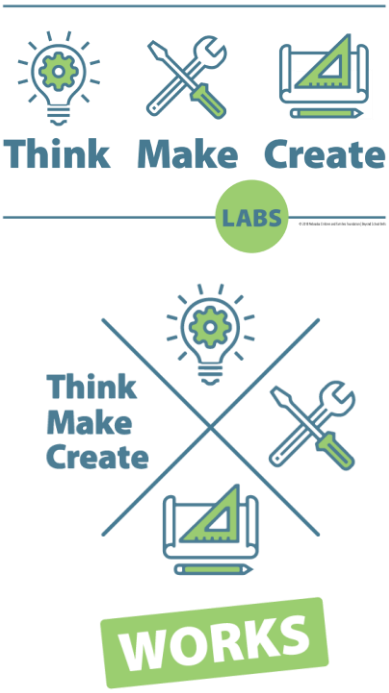
TMC Works STEM Ambassador LIVE Training GUIDE

Instructions: STEM Supervisors, use this guide to lead STEM Ambassador training. Schedule three hours for the training, or schedule three one-hour sessions. Session 1 can be completed online, but session 2 and 3 need to be conducted in person. This training should follow STEM Ambassador Orientation with the Idaho Out-of-School Network.

Session 1: Learning Goals (60 minutes)



Date and Time:
Location:

Set up:

- Plan a TMC activity from the TMC Labs activity guide found at the "For Educators" page on the Idaho Out-of-School Network website.
- Prep materials for the activity (enough for every participant).
- Practice the TMC activity.
- Print/copy handouts listed below for each participant.

Materials:

- TMC activity materials
- Your notes for leading the TMC activity
- "Identifying a STEM Learning Goal" professional development guide (one copy)
- "TMC Works Learning Plan" worksheet for each participant
- "Common Out-of-School Activities" (page 3 of the "Identifying a STEM Learning Goal" training guide) 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) Have each Ambassador introduce themselves and share something about STEM they enjoy (or use a different ice-breaker question).

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 (which is built into the "TMC Works Learning Plan" worksheet).

Introduce and Practice Writing Learning Goals (25 mins)

1) Follow the "Identifying a STEM Learning Goal" guide.
    a. Share the following: "*Every lesson is unified by its goal for youth learning. We often use a "SWBAT" to write a lesson goal, or a "Students will be able to" phrase to start out the objective. This is the most important part of planning a lesson; we want all learning activities to be tightly focused around what youth will learn.*"
    b. Pass out "TMC Works Learning Plan" worksheet. Explain that as STEM Ambassadors, they will be using this worksheet to plan their STEM activities.

c. 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. 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).
d. Pass out the "Common Out-of-School STEM Activities" worksheet
e. Have the STEM Ambassadors practice writing goals for the activities listed on the "Common Out-of-School STEM Activities" worksheet. Have the group share.

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?

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

Date and Time:
Location:

Set up:

- 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.
- Print/copy handouts listed below for each participant.
- Ensure the TMC Lab is stocked with items listed below, or gather them ahead of time.

Materials:

- Computer hooked up to internet and audio-visual equipment
- Computer or tablet for each participant
- Print/copy the "Learning Goals and Model" handout for each participant.
- Two "TMC Works Learning Plan" worksheet for each participant (three total for each participant for all three training sessions)
- Pencil or pen for each participant
- Optional: printed TMC Labs Stocking List
- Optional: printed copies of TMC Labs activities if the internet is unreliable.
- These supplies (should be stocked in the TMC Lab):
    - 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
- 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) Watch the Experiential Learning Model video together. (On YouTube, find the "Teaching Tips: Experiential Learning Model" video by Humber Innovative Learning.)
2) Pass out the "Learning Goals and Model" handout. This handout can be used for future reference. Point out the diagram and explain that the five steps of the experiential learning model can be more easily remembered as "Do, Reflect, Apply."
3) Discuss as a group any or all of the following questions.
    a. Why do you think it's beneficial to learn by doing?
        i. Share this information; learning by doing is memorable, it builds strong connections in the brain which makes the learning faster and easier
    b. Why is reflecting an important part of the process?
        i. Share this information; reflecting makes sense/understanding out of the experience, helps us know what we need to change next time.
    c. How can you practice generalizing (part of applying)?
        i. Share this information; draw on past experiences to make sense of new ones, apply existing skills to new situations, apply new learning to familiar situations.
    d. What is something you have learned by doing?

i. Share this information; babies/young children almost exclusively learn by doing. Things like walking, eating, etc. are usually learned experientially.

e. What is something you would like to (or would have liked to) learn experientially?

Plan an activity (30 mins)

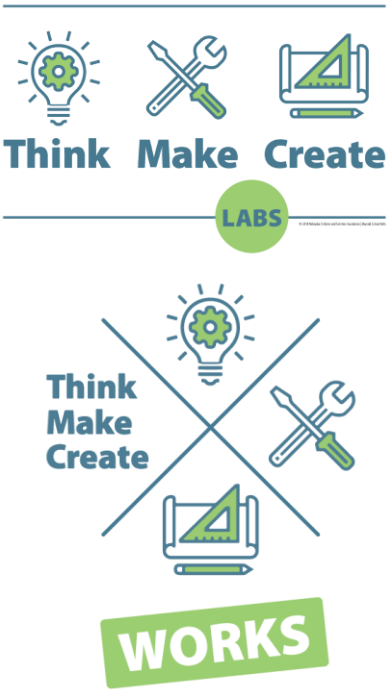
1) Pass out two more copies of "TMC Works Learning Plan" worksheet. They will work on one today and keep the other for future reference and copying.
2) Tell the group that they will be planning an activity to facilitate with younger kids.
3) Point out the different sections on the worksheet. Remind them 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.
4) Have the STEM Ambassadors log into the TMC Labs activity guide (on the "For Educators" page, the LiveBinder password is "16"), and explore the list of activities.
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 activities (see also "Easy and Quick TMC Labs Activities" at the end of this packet.)
    - Binary Bracelets (use pony beads and lacing to "write" letters)
    - Flowers from Mars
    - Origami Bookmarks
    - Sundial
    - 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 for their first one. 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 organization 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.

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 TMC Lab, 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 make a practice-version of their activity.
3) Have the STEM Ambassadors practice doing their activity.
4) Have the STEM Ambassadors go back to the TMC Lab and gather enough materials to lead the activity with their peers (the other people taking the training).

5) 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.
6) STEM Ambassadors may not have time to finish preparing an example or all the materials for their activity during this session, especially if they chose a more complex activity. Ask them to finish after this session, but before the next training session.



End the session with a 5-minute discussion:

1) Have the STEM ambassadors share their activity and their learning goal 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 prepare before leading the activity with kids, know what to expect when leading the activity, 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 can 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.

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

Date and Time:
Location:

Set up:

- Hook up your computer to the internet and audio-visual equipment so you can watch a video together during the session. Test your equipment and be sure that you have sound.
- Pull up the "Getting Youth Ready to do STEM" page. (If you can't access the link, go to the Click2Science website (click2sciencepd.org) and search for the title.)
- Set up the room so that STEM Ambassadors can do their activities in small groups or pairs.
- Print/copy handouts for each participant.
- Gather materials for the training session.
- Remind STEM Ambassadors to bring their prepared materials, or they won't be able to fully participate in the training. You might want to have the TMC Lab (and/or supplies) available as a back-up.

TMC Works STEM Ambassador LIVE Training GUIDE

Materials:

- Computer hooked up to internet and audio-visual equipment.
- STEM Ambassadors' activity materials.
- Print/copy "STEM Facilitation Quality Checklist" worksheet for each participant
- Timer
- Pencil or pen for each participant

<u>Training Session Instructions:</u>

Quality STEM Education (10 mins)

- Pass out the STEM Facilitation Quality Checklist.
- Explain that in order for the learning experience to make an impact and be memorable, it needs to be high quality.
- This STEM Facilitation Quality Checklist is a tool they can use to ensure they prepare and present high-quality STEM activities.
- There are many different quality tools out there, and they can all be useful. This one was created specifically for TMC Works.
- Read through the STEM Facilitation Quality Checklist as a group, discussing items that need further explanation and answering questions.
- Explain that they will use the STEM Facilitation Quality Checklist to reflect upon their experience facilitating their STEM activity.

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

1) Have STEM Ambassadors pair up with other STEM Ambassadors that prepared a different activity. Have them space themselves out in the room so they can practice their activities.
2) Have STEM Ambassador practice facilitating their entire activity with their peers. 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 the reflection/application piece of their activity plan and facilitate that section.
4) Switch activities. Have the other STEM Ambassador(s) lead their activity. Repeat steps 2 and 3 in these new roles.

End the session with a reflection and application (10 mins)

1) Have each participant pull out their STEM Facilitation Quality Checklist. Tell them that they can use this checklist to conduct a reflection after they facilitate an activity with kids. 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 enables them to learn from their experience of facilitating an activity, using the experiential learning model.
2) Have them go through each item, rank themselves and make notes of examples.
3) If they don't know what an item means, put a question mark in the "score" box. They can either ask you about it now or later. You can direct them to trainings on the topic.
4) Be encouraging about low scores; it's hard to incorporate every quality element into every activity, especially when you are inexperienced. Low scores aren't necessarily weaknesses;

they can identify new things to try and/or learn about as you become more comfortable leading STEM activities.

5) Have STEM Ambassadors share with the group:
    a. What did they learn by facilitating the activity with their peers? What is something they either want to change, or make sure they do when they lead the activity with kids?
    b. What are some elements they scored themselves highly on in the STEM Facilitation Quality Checklist? Where did they give themselves a low score?
    c. Have the Ambassadors go through the STEM Ambassador Training Menu and identify one or two trainings that could help them address an area with a low score.
    d. Ask the STEM Ambassadors if they can use any of their strengths to improve one of their low scores. For example, if they scored high on preparation (#2) but low on reflection (#6), can they prepare reflection questions ahead of time and put time in the schedule for a reflection discussion or activity? This is called strengths-based coaching.

Training Follow-Up Options:

- Training Plan: As part of the STEM Ambassador Essential Trainings Pathway, STEM Ambassadors will create a training plan and submit it to their STEM Supervisor. They can change this plan during the program, but it will give them some goals and a timeline. Check in with your STEM Ambassadors periodically to ensure they are on track to complete their trainings, and applying what they learned.
- STEM Ambassadors can shadow STEM Supervisor before they lead an activity themselves, in order to become more comfortable with the process.
- 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 (optional):

Date and Time:
Location:

Set up:

- Plan with the 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 activity. Give them a chance to get more comfortable leading STEM before setting up a reflection session.
- Bring a recording device (phone or camera) to the observation (optional)
- Arrange a quiet meeting spot to meet with the STEM Ambassador after they facilitate the activity. Meet with them as soon as possible after the observation.

TMC Works STEM Ambassador LIVE Training GUIDE

Materials:

- Two copies of the "STEM Facilitation Quality Checklist"
- Two pencils or pens
- One or two copies of the "STEM Ambassador Professional Development" menu
- Phone or camera to record, and/or a TV or computer to watch video (optional)
- Optional: tripod for recording
- Optional: clipboard for marking the "STEM Facilitation Quality Checklist" while observing

Session Instructions:

STEM Facilitation Observation

- Arrive early to the STEM Activity you are observing to set up your recording device and be ready to observe
- As you watch the STEM Ambassador facilitate an activity, fill out the "STEM Facilitation Quality Checklist," taking notes on specific examples.

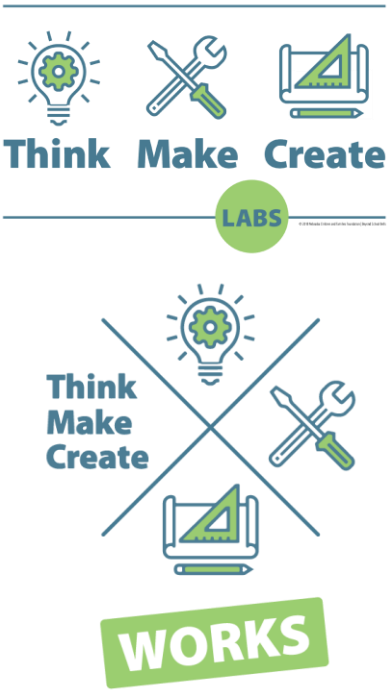
Reflection:

- In a quiet, private space, meet with the STEM Ambassador.
- If you took video of the activity, watch it together.
- Have the STEM Ambassador think about their experience facilitating the activity, and fill out the "STEM Facilitation Quality Checklist" according to how they think the activity went.
- Compare your scores and discuss why they might differ (if they do).
- Together, identify 2-3 strengths. Make a plan to incorporate these into future STEM activity facilitation.
- Identify 1-3 opportunities for growth.
    - Opportunities for growth can be areas that can be improved upon.
    - 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.
- Tips for giving feedback:
    - Use sentence frames, such as:

Strengths	Opportunities
• When you..., it was a strong example of... • It really impressed me when... • I was interested when...	• 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]."

- 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.
- If you *and* the STEM Ambassador scored them low on specific skills, talk about the cause. 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 skills, 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.
- 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.
- Can they apply their strengths to their weaknesses or opportunities for growth? Strengths-based coaching can be very effective.



Applying what they learned:

- Revisit the STEM Ambassador's training plan and the STEM Ambassador Training Menu. Choose one or two training that address areas of interest or opportunities for growth. Revise the STEM Ambassador's training plan accordingly, if applicable.

TMC Works STEM Ambassador LIVE Training GUIDE

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://idahooutofschool.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