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### California AfterSchool Network

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# Assessment and Planning Tool for STEM
## in Expanded Learning Programs

## Assessment and Planning Tool
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For additional information and resources, please visit: **www.powerofdiscovery.org**

# About this Program Planning Tool

Collaboration and partnerships between expanded learning programs, the core instructional day, business and industry, and higher education represent the power to exponentially increase quality STEM learning opportunities for California's youth. This is the foundation of The Power of Discovery: STEM², a partnership effort between the California AfterSchool Network (CAN) and the California STEM Learning Network made possible with generous support from the S.D. Bechtel, Jr. Foundation, the Noyce Foundation, and the Samueli Foundation.

The Power of Discovery: STEM² initiative seeks to:

- Increase the quality and depth of regional and statewide partnerships in support of OST STEM learning opportunities.
- Increase frequency, intensity, duration, and quality of STEM learning opportunities for youth in OST programs.
- Increase staff competence, confidence, and motivation to facilitate STEM learning opportunities.
- Increase student interest, engagement, and knowledge of STEM processes and concepts.

The purpose of this Program Planning Tool is to:

- Assess your existing STEM learning opportunities and assets.
- Determine where you are on the OST program STEM pathway and identify next steps to move along the pathway.
- Develop your STEM program plan.

By completing this Program Plan, you and your organization are furthering your commitment to helping young people engage in STEM learning.

## Supporting STEM Quality

**STRONG PROGRAM GOALS, STRONG STAFF DEVELOPMENT, STRONG PARTNERSHIPS**

High quality STEM in OST is engaging and enriching for youth and can be a valuable professional development opportunity for staff. Taking time to get clear about how STEM supports your program's goals, and how your staff will be supported in leading STEM activities, will help to ensure success.

**Strong STEM programs need:**

■ Big picture STEM learning goals that are linked to the program goals and/or school goals.

■ A themed unit or project-based learning approach. Each unit includes a series of STEM activities linked by a common theme and unit-specific goals that build concepts and learning from one session to the next.

■ Lesson goals for each lesson within the units.

**Strong Staff Development requires:**

■ Regular staff meetings and regular one-on-one meetings with individual staff to maintain communication about program goals and challenges.

■ Staff development plans that are reviewed at least once a year.

■ Time for staff to plan, practice, and prepare upcoming lessons.

■ Regular program observation, including direct feedback for staff and coaching by the Site Coordinator.

■ Regular staff training.

**Strong Partnerships include:**

■ Relationships with principals, teachers and District staff who can support strong STEM content and effective instructional practices

■ Partnerships with local museums, zoos or other institutions that provide informal STEM education

■ Collaboration with local STEM industries

*For more on how strong goals and strong staff development might look in a STEM context, see "A Guide to Integrating STEM Into Expanded Learning Programs" available through the Power of Discovery website (http://www.powerofdiscovery.org).*

## Get Inspired

Find your own STEM passion. Check out the following resources for ideas and inspiration for your STEM programming.

**Power of Discovery:**
http://www.powerofdiscovery.org.

**4-H:**
http://4h.ucanr.edu/files/154115.pdf.

**Afterschool Alliance:**
http://afterschoolalliance.org/STEM.cfm.

**Click 2 Science:**
http://www.click2sciencepd.org/training-resources/coaching.

**Every Hour Counts:**
http://www.afterschoolsystems.org/content/document/detail/4020/.

**The Orange County STEM initiative:**
http://ocstem.org/.

**The University of Pennsylvania's OST STEM resources:**
http://impact.sp2.upenn.edu/ostrc/stem/index.html.

**You for Youth's STEM-specific resources:**
https://www.y4y.ed.gov/teach/stem/.
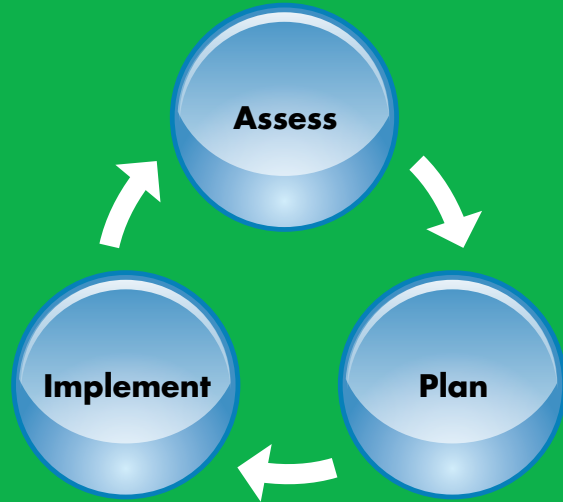
# Program Assessment: Where are you on the pathway?

## OST Quality STEM Program Pathway

Great STEM takes time. OST programs follow a common pathway on their way to high quality practice. Use these steps to determine where your program currently lies and to give you ideas to move your program along this pathway.

The development of STEM programming in OST programs follows a 4-step pathway from **not yet ready** to initiate STEM, to **initiating** STEM programming, to **improving** the quality of existing programming, and finally to **expanding** high quality STEM programming.

## START HERE.

**Gut Check: Where are you on the STEM program pathway?**

☐ *I am not sure that we are ready: We are not implementing any STEM activities other than what comes up during homework help. Our program does not feel particularly stable right now. Some days are pretty chaotic. We do not have a system in place for staff supervision and feedback.*

If your program is still struggling with any of the following, you may not be ready to take on the added challenge of STEM programming:

- Your program does not yet reach minimum safety standards.
- Your program is experiencing high staff turnover.
- You are still training staff to meet minimum requirements.
- Your program has not yet achieved a stable schedule and routine with youth.
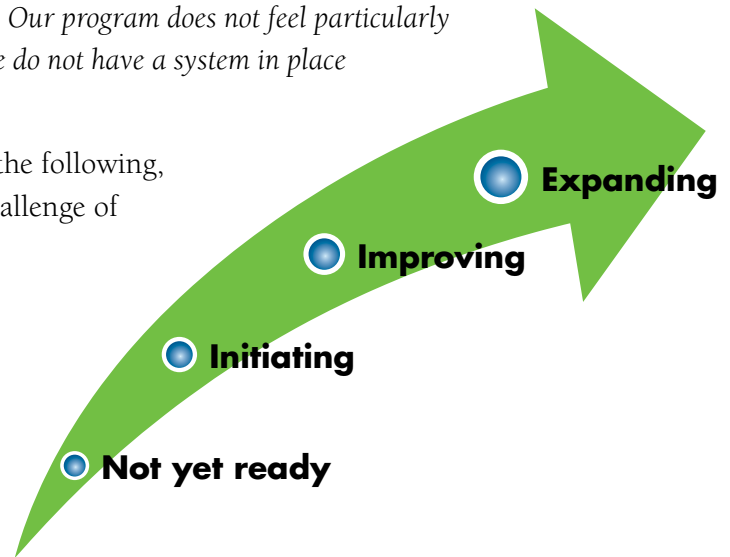
**Figure 3. OST Quality STEM Program Pathway**

Don't despair! For programs that find themselves at this stage in the pathway, this Tool suggests resources to help achieve this minimum foundation, so you can prepare to initiate STEM activities at some point in the near future.

Proceed to page 8: Is Your Program Ready? OR Skip ahead to page 10: Resources to Get Ready.

☐ *I think we are ready to initiate regular STEM programming. We are a pretty stable program. We may already have some STEM programming, but it happens rarely, maybe as a special event or provided by an outside facilitator.*

Programs that are ready to initiate STEM programming have already achieved a stable program, and are ready to take on the challenges specific to STEM programming, page 13. For these programs, this Tool offers resources to help start off right by building necessary partnerships and adding manageable STEM programming to your existing OST program.

Proceed to page 8: Is Your Program Ready? OR Skip ahead to page 12: Initiating Your STEM Program.

■ ***We are already doing regular STEM programming, but we may need to improve the quality.***

Once programs have initiated STEM, the next step is to enter into a cycle of continuous STEM quality improvement. For these programs, this Tool offers resources on STEM program quality assessment, staff feedback and improvement planning, as well as ideas for how to strengthen or sustain those initial partnerships.

Proceed to : Are You Ready to Improve STEM Quality?

■ ***We are STEM superstars! We have high quality, regular STEM programming and I am looking for suggestions to expand and help other programs.***

Once a program has developed high quality STEM programming among a few staff, it is time to expand the lessons learned to other staff, other grade levels, or other OST programs within its agency or networks. For these programs, this Tool offers resources to (a) support peer leadership and training and (b) apply your program's experience building high quality STEM programming to other areas of your program.

Proceed to : Are You Ready to Expand STEM Programming?

## Is your Program Ready?

If you are not currently doing any STEM programming at your program, except what comes up in homework help, is your program ready? Answer the questions below to see where you stand.

Circle the response that most closely matches your program. SA = Strongly Agree, A = Agree, D = Disagree, SD = Strongly Disagree.

*These questions are meant for your own reflection. Please feel free to skip any that are truly not applicable to your program, and to use your own best judgment for the guidance that follows.*

| Safety and Structure: | | | | |
|---|---|---|---|---|
| We provide a safe environment for the children and youth in our program. Our program follows a generally predictable routine. Children and youth in our program generally get along. Our staff are not constantly handling behavior problems such that they can't get through lessons. | SA | A | D | SD |

| Materials, Space and Storage: | | | | |
|---|---|---|---|---|
| Our Program Leaders are ready to smoothly facilitate activities with multiple materials (more than just paper and pencils/pens). | SA | A | D | SD |
| We have regular access to a large, secure storage area (closet or large cabinet or dedicated program room) for specialized STEM materials such as kits, supplies. | SA | A | D | SD |
| We have a budget for specialized STEM materials. | SA | A | D | SD |
| We have access to a sink.* | SA | A | D | SD |
| We have access to multiple computers.* | SA | A | D | SD |
| We have access to outdoor space.* | SA | A | D | SD |
| We can make a mess as long as we clean it up afterwards.* | SA | A | D | SD |
| We can move furniture out of the way.* | SA | A | D | SD |
| We can set up work stations (e.g. group tables or cluster desks together).* | SA | A | D | SD |

* These materials/spaces may not be needed for all STEM activities. However, we list these common materials/spaces to prompt you to think through what you might need, depending on the types of STEM activities you choose to initiate.

| Staffing and Supervision: | | | | |
|---|---|---|---|---|
| Nearly all of our staff have been working here since the program year began (or several months). | SA | A | D | SD |
| Our staff have strong, positive relationships with the youth in this program. | SA | A | D | SD |
| We have at least one reliable and communicative staff member who is willing to lead STEM activities. | SA | A | D | SD |
| I have 1-2 hours a week to support a staff member to implement STEM (planning, ordering and managing materials, providing support for complicated activities, and/or providing support and feedback). | SA | A | D | SD |
| We have staff meetings with the whole team at least once a month. | SA | A | D | SD |

| STEM Team and Partnerships: | | | | |
|---|---|---|---|---|
| We have a relationship with an Instructional Coach, such as a current or retired teacher, who can help us provide high quality instruction and activities (does not need to be a STEM teacher). | SA | A | D | SD |
| We have access to a local science museum or science specialist with whom we can consult. | SA | A | D | SD |

| Activities and Lesson Plans: | | | | |
|---|---|---|---|---|
| We have structured enrichment and recreation activities. | SA | A | D | SD |
| Our Program Leaders regularly develop lesson plans. | SA | A | D | SD |
| Program Leaders feel confident about developing new activities for our participants. | SA | A | D | SD |

| Program Assessment and Improvement: | | | | |
|---|---|---|---|---|
| We regularly (at least once per year) assess the quality of our program. | SA | A | D | SD |
| We regularly (at least once per year) develop a program improvement plan. | SA | A | D | SD |

| | | | | |
|---|---|---|---|---|
| **Count the times you circled each rating and enter it here:** | | | | |
| **Add the number of times you circled Strongly Agree and Agree:** | | | | |

- ■ If you circled Strongly Agree or Agree **18 times or more**, you are probably ready to initiate STEM. Proceed to page 12: Initiating Your STEM Program.

- ■ If you circled Strongly Agree or Agree between **10 and 17 times**, you may still be ready to initiate STEM. Review those items where you marked Disagree or Strongly Disagree and work to improve those as you plan your STEM programming. Please turn to page 10: Getting Your Program Ready. Then, proceed to page 12: Initiating Your STEM Program.

- ■ If you answered Strongly Agree or Agree **10 times or less**, you may need to strengthen your overall programming and access to facilities first, before beginning to plan your STEM programming. Please turn to page 10: Getting Your Program Ready.
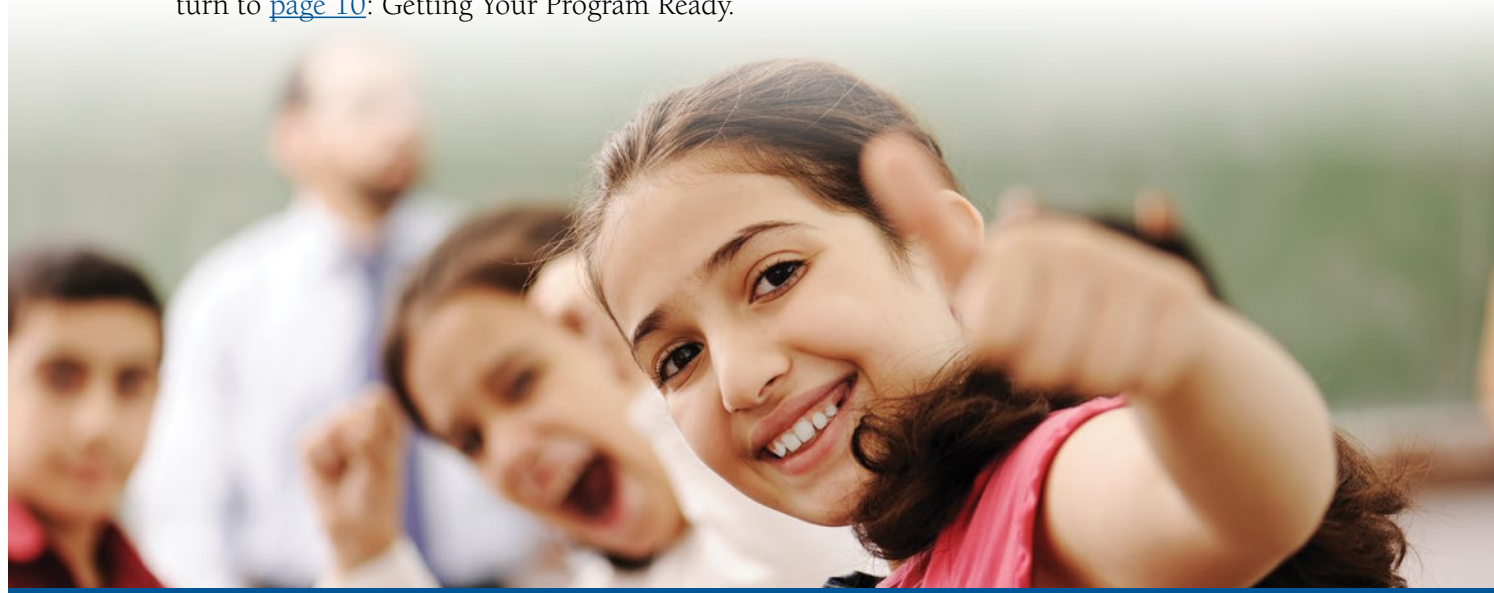
# Resources to Get Ready

Programs may not be ready to implement STEM because basic safety and structure is not in place, the program does not (yet) have stable staffing or a regular time for staff to meet, there is not a strong system in place for creating activities such as lesson plans, or because there is no system in place for assessing program implementation and quality and making improvements based on that assessment.

### Safety and Structure:

If your program feels unsafe or is chaotic, you will need to create safety and structure before turning to other strategies to get ready.

There are too many resources for improving the safety, structure and routine of your program to list them here. You may wish to start with your agency, District, or school site for resources to help you build a consistent, safe program.

### Materials, Space and Storage:

STEM activities often require more – and more specialized – supplies, materials and spaces. Although using a few materials may sound simple, working with materials beyond paper and pencil can be more challenging than expected. To set your program and your staff up for success, consider the following:

- Encourage your staff to practice activities with multiple materials. Have them practice with materials-heavy activities such as an arts and crafts activity or complex academic game.
- Work with your site early on to identify a secure place to store and organize materials.
- Work with your site early on to identify a range of spaces (indoor, outdoor, access to water, access to computers) that you might need.

### Staffing and Supervision Resources

If you are having trouble finding and hiring the right staff, the following are excellent resources specific to after school programs. They also provide best practices for staff supervision:

- "Supervision at the Beacons" available through the Youth Development Institute: http://www.ydinstitute.org/resources/publications/Supervision.pdf
- "Utah's After School Guide" available through Afterschool Alliance: http://www.afterschoolalliance.org/utah4hafterschoolguide.pdf

### STEM Team And Partnerships:

In order to build a strong STEM component, after school programs often must rely on partnerships with school day staff and local community resources who can help strengthen instruction and develop or review content. As you get ready to initiate STEM, consider:

- Develop relationships with school day staff who are interested in supporting the after school program and/or STEM efforts.
- Attend school-day staff meetings if possible, especially those related to STEM.
- Identify local STEM resources such as local STEM industries, science and technology museums, nature centers and the STEM departments at local colleges and universities. Be prepared to reach out to them to ask for resources and ideas.

**Activities and Lesson Plans**

If staff still struggle to deliver a structured activity, the Internet contains many lesson planning and youth activity resources. Below is a very short list of places to start:

- Afterschool Exchange: http://www.thirteen.org/edonline/afterschool/activities/tips_dev_act.html
- Edutopia (http://www.edutopia.org) – especially their After School Learning page
- Pinterest (https://www.pinterest.com) has many educational activity ideas
- You for Youth: https://www.y4y.ed.gov/

**Program Assessment and Improvement Resource**

Program assessment and improvement are key to providing high quality STEM programming. As you get ready to initiate STEM, build a site-wide program improvement culture. There are many program assessment tools in the field. Use "A Crosswalk Between The Quality Standards for Expanded Learning and Program Quality Assessment Tools" to find an assessment that works for your program: (http://www.cde.ca.gov/ls/ba/cp/documents/qualitycrosswalk.pdf).

## Initiating your STEM Program: Making a Plan

The following steps walk you through some key considerations in developing your STEM program, followed by specific resources you may find useful. Once you've thought through these steps – and talked them through with your STEM team – you can enter your plan in the STEM Program Plan at the end of this Tool.

Note: These steps are laid out in an order that many programs find useful. However, you may need to do them in a different order depending on the situation at your program. Also, this process is iterative: you will probably have to return to previous steps and update them because of things you decide in later steps.

1. **Form your STEM Team.** Implementing STEM in OST programs is often challenging. In order to meet that challenge, programs should form STEM program teams that meet regularly, share ideas, and troubleshoot problems as they arise. At the heart of the STEM team are the STEM Program Leaders who will regularly facilitate the STEM activities. Identify your Program Leaders who are already experienced facilitators and/or have an interest in STEM.

   The STEM program team should also include:

   • **Site Coordinator:** the person who will back up the STEM Program Leaders on a day-to-day basis. This person may also be responsible for developing and maintaining school and community partnerships.

   • **Program Director:** the person who can advocate for STEM – and the money, time, and other resources required – at the agency level. This person may also be responsible for developing and maintaining school and community partnerships.

   • **Instructional Coach:** a teacher, retired teacher, or experienced after school worker who can support STEM Program Leaders in classroom management and instructional strategies.

   • **STEM Content Coach:** may be the same as the Instructional Coach. A STEM educator, museum staff, or industry representative who can help STEM Program Leaders understand STEM content and connect them to trusted resources.

2. **Develop 2-4 STEM program goals.** These should be overarching goals that draw on school or community goals or existing data on the needs and interests of your youth and staff.

3. **Access existing lesson plans or curricula.** While you eventually may want to write you own lesson plans or curricula, it is OK to start with what someone else has already written. An Internet search will yield many existing curricula, but here is a short list of sites to investigate:
   • Power of Discovery (http://powerofdiscovery.org/curriculum_activity).
   • InformalScience.org.
   • HowToSmile.org for science and math activities.
   • Kidzscience (http://www.lawrencehallofscience.org/programs_for_schools/programs/afterschool_kidzscience).
   • PBS's Fetch hands-on science (http://www.pbs.org/parents/fetch/index.html).

- Your local science or kids museum, amusement park, nature center, District office or University to see if they have available curricula.
- Return to the "Get Inspired" list on page 4.

**4. Budget for STEM.**
- Budget for materials. Even if you have not yet picked curricula, include a generous supplies budget in your annual budget. While there is no way to be exact, doubling your existing supplies budget may provide a rough estimate of what you will need.

- Budget time to check in with STEM Program Leaders at least monthly. Because STEM activities often bring unique challenges, STEM Program Leaders will need additional support.

- Budget additional planning time for STEM Program Leaders. They may need at least one hour to plan each lesson.

**5. Identify space, order materials.** Once you have picked curricula and/or lesson plans, review all space and materials that you will need and begin to plan for them right away.

**6. Create a Program Plan.** If your program has an existing program plan template, use that. Otherwise, complete the Quality STEM Program Plan starting on page 21.
   a. Mark your program as "Initiating."
   b. Enter your goals. Enter both Program-Wide STEM Goals as well as the goals for each Unit or Project. You may need to conduct more than one Program Plan if your program is conducting more than one unit (see "Goals Within Goals" at right).
   c. Use the rest of the template to document your plan for each Themed Unit or Project that you wish to initiate.

## Challenges Raised by STEM Programming

STEM programming can present some unique challenges compared to other types of activities. As you plan, consider the following common STEM challenges:

- Content that is often new for staff.
- Materials-heavy activities that require secure storage and advanced planning, practice, and preparation.
- More active learning environments that require staff to strengthen or update their behavior management strategies.
- Resistance among youth who think they do not like science or math.

## Goals Within Goals

You will probably have multiple layers of interconnected goals. For example, you may have an overarching STEM goal for your program (e.g. "to increase participants' confidence with STEM topics and skills"), more specific goals for each themed unit or project (e.g. "to be able to explain the ecosystem of a local lake"), and yet more specific goals for each lesson or day (e.g. "to use our observation skills to observe different birds at the lake and compare and contrast their beak structures and eating habits").

As an outcome of your initial planning, you should be able to clearly describe how your STEM program relates to your program as a whole (your overarching, or program-level goals). You should also be able to clearly describe the goal of the STEM themed unit or project and how it relates back to the program goals.

See also "A Guide to Integrating STEM Into Expanded Learning Programs" available through the Power of Discovery website (http://www.powerofdiscovery.org).

## Resources for Programs Initiating STEM

### Materials, Space and Storage

- If you have not yet identified a secure place to store materials, do so as part of your planning. Turn to your STEM Team for help.

- Once the materials arrive, make sure your STEM Program Leaders have a chance to play with the materials. Ask them to practice the lesson with other staff members.

### Staffing and Supervision

- As part of your initial planning, include your Program Leaders who will lead the activities. Have them review the "Get Inspired" list that appears on page 4. Ask them:

  - What are you passionate about?
  - What STEM topics interest you most?
  - What excites you about leading STEM? What scares you? How can I help you?

- Seek out STEM-specific professional development opportunities in your community and online. Resources include:

  - Your CDE Regional Lead.
  - ASAPConnect's network of TA providers (www.asapconnect.org).
  - CalSAC trainings (www.calsac.org).
  - Click 2 Science (www.click2sciencepd. org/training-resources/coaching).
  - Techbridge (www.techbridgegirls.org).
  - The University of Pennsylvania's OST STEM resources (impact.sp2.upenn.edu/ ostrc/stem/index.html).
  - You for Youth's STEM-specific resources (www.y4y.ed.gov/teach/stem).

### STEM Team and Partnerships

- The Afterschool Alliance lists many resources for building effective partnerships: http://www.afterschoolalliance.org/funding-PartnerWebToolKit.cfm.

- The National Afterschool Association offers "10 Tips for Aligning the Learning Day:" http://naaweb.org/tip-of-the-week/item/83-10-tips-for-aligning-the-learning-day.

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### Keywords for an Internet Search:

Look for these keywords when conducting an Internet search to find professional development and other resources in addition to what is listed here.

- STEM
- Science
- Technology
- Math
- Numeracy
- Maker
- Tinkering
- Informal Science
- Engineering
- Physics
- Project-based Learning
- Inquiry-based Learning
- Citizen Science

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### Critical STEM Staff Skill: "I Don't Know."

Out-of-school time staff are rarely experts in the STEM field. While it is necessary for STEM program staff to brush up on their content-area knowledge, there will always be unexpected questions. STEM Program Leaders need to be able to say "I don't know. How can we find out?" They can model the process of investigation or ask participants to investigate the question and present their own evidence.

Asking participants "What is your evidence?" and having the participant present their reasoning (a) prevents misinformation and (b) encourages habits of mind aligned with the Common Core State Standards.

■ See high quality STEM in action. Find out who is already implementing high quality STEM in your area or at your school and ask to observe one of their sessions.

### Activities and Lesson Plans

When planning your STEM program, consider including the following two elements. They can inspire sustained participation and help focus the lessons themselves toward these events.

■ Include a culminating activity (e.g. a science presentation to their peers, parents, or the school day; a STEM-related non-fiction story; or robot race) to provide opportunities for youth to build skills and to present their work.

■ Include a field trip to a relevant museum, park or natural area, business or industry site to promote connections to the STEM topics.

### Program Assessment and Improvement

■ If you don't already, seek out a program quality assessment tool and be sure to include your STEM program as part of this assessment: http://www.cde.ca.gov/ls/ba/cp/documents/qualitycrosswalk.pdf.

■ If you already assess your program regularly, consider using a STEM-specific assessment tool. See page 20 for a list.

## Are You Ready to Improve Your STEM Program Quality?

If you are already implementing regular STEM programming, the following questions ask you to think about your program practices that build high quality STEM.

Circle the response that most closely matches your program. SA = Strongly Agree, A = Agree, D = Disagree, SD = Strongly Disagree.

*These questions are meant for your own reflection. Please feel free to skip any that are truly not applicable to your program, and to use your own best judgment for the guidance that follows.*

| Existing STEM Program Plan | | | | |
|---|---|---|---|---|
| Our STEM goals align with our overall program goals. | SA | A | D | SD |
| Our STEM goals align with our school-day goals (school-based or school-partnered programs). | SA | A | D | SD |
| We follow our STEM Program Plan well. | SA | A | D | SD |

## Staffing and Supervision:

| | | | | |
|---|---|---|---|---|
| STEM Program Leaders have been implementing STEM for several months. | SA | A | D | SD |
| The Site Coordinator meets with individual staff at least a few times a year. | SA | A | D | SD |
| The Site Coordinator has demonstrated the ability to provide constructive feedback to staff. | SA | A | D | SD |
| The Site Coordinator has developed professional development plans with individual staff. | SA | A | D | SD |
| STEM Program Leaders have accessed at least a few STEM-specific professional development opportunities. | SA | A | D | SD |

## STEM Team and Partnerships:

| | | | | |
|---|---|---|---|---|
| We meet regularly with an Instructional Coach who helps us provide high quality instruction and activities (does not need to be a STEM teacher). | SA | A | D | SD |
| We participate in school-wide STEM planning meetings (for school-based only). | SA | A | D | SD |
| We meet regularly with a local science museum, science specialist, or science teacher. | SA | A | D | SD |

## Activities and Lesson Plans

| | | | | |
|---|---|---|---|---|
| Our program successfully implements the STEM lessons we are currently using. | SA | A | D | SD |
| Our STEM Program Leaders have successfully created or modified existing lesson plans (not necessarily STEM). | SA | A | D | SD |
| We have ideas for new curricula that better meets the needs of our participants. | SA | A | D | SD |
| We have ideas for how to develop a community-action component for our curricula. | SA | A | D | SD |
| Our STEM Program Leaders have led at least one successful STEM-related field trip. | SA | A | D | SD |

## Quality Assessment and Feedback:

| | | | | |
|---|---|---|---|---|
| More than once per year, we assess our program quality and make improvement plans based on the findings. | SA | A | D | SD |
| We develop individual professional development plans based on our program quality assessments. | SA | A | D | SD |
| We assess STEM program quality using a STEM-specific assessment tool. | SA | A | D | SD |

| | | | | |
|---|---|---|---|---|
| **Count the times you circled each rating and enter it here:** | | | | |
| **Add the number of times you circled Strongly Agree and Agree:** | | | | |

- ■ If you circled Strongly Agree or Agree **15 times or more**, you are probably ready to improve STEM quality. Proceed to page 17: Resources for Programs Improving STEM Quality.

- ■ If you circled Strongly Agree or Agree between **10 and 14 times**, you may still be ready to improve STEM quality. Review those items where you marked Disagree or Strongly Disagree and plan to work on those as well (see page 12: Initiating Your STEM Programming). Then, proceed to page 17: Resources for Programs Improving STEM Quality.

- ■ If you answered Strongly Agree or Agree **9 times or less**, you may need to revisit your fundamental STEM programming. Please turn back to page 12: Initiating Your STEM Programming.

# Resources for Programs Improving STEM Quality

The Power of Discovery: STEM² recommends that programs improve the quality of existing STEM programming before expanding to other staff, grade levels, or sites. This section outlines resources for program improvement: strengthening existing partnerships, improving staff feedback and improvement, STEM quality assessment, and customizing curricula.

- Review and update your existing STEM Program Goals.
  - If your current STEM program plan does not align with your program and/or school goals, return to : Initiating your STEM Program, for ideas about how to develop a strong program plan.
  - Keep a STEM-related goal central to your general program plan.
- Continue regular meetings with an Instructional Coach and a STEM Content Coach (may be the same person).
- If your program is school-based, join school day meetings related to STEM instruction. Reach out to your principal or other school-day allies to support your participation in these meetings.
- Maintain or expand STEM-related field trips to a relevant museum, park or natural area, business or industry site to promote connections to the STEM topics.
- Maintain or expand the culminating activity (e.g. a science fair, school-wide "maker faire," or math-based talent show) to provide opportunities for youth to build skills and present their work.
- Consider adding a community action component to your existing STEM programming, such as volunteering at the local science museum, influencing a local environmental justice issue, participating in a habitat restoration or community education project, or joining a related online "citizen science" project.

## Facilitate Discovery

Leading high quality STEM activities requires that staff make a shift from *delivering information*, such as in a lecture, to *facilitating discovery*.

We encourage you to think of your lesson plans as facilitation guides rather than a precise set of directions. As you move away from the approach of telling youth what they need to know to facilitating learning, lesson plans should evolve from a prescriptive, cookbook approach to one that allows for open-ended and student-driven exploration across multiple sessions.

For example, in a robotics unit, a less open-ended activity might have youth choose to build one of three different robot models (where the object is to learn how to build a robot). More open-ended activities would have youth build one of their own design (where the object is to learn about the engineering design process).

Some key program practices that will support open-ended activities:

- Scaffold the skills youth will need to make this successful: team work, the necessary technical skills, and the ability to plan their projects and refine those plans.
- Plan time for multi-session, project-based activities.
- Develop staff skills in asking open-ended questions and active listening.

This requires staff to be comfortable with more open-ended activities and to share control with youth in the program. Programs should be prepared to coach staff as they develop this new approach.

### Staffing and Supervision

- Send your staff to an existing STEM-related Professional Learning Community. If none exists, meet with staff at other sites conducting STEM to exchange ideas and learn from each other.

- As a Site Coordinator, ensure that you are prepared to provide constructive feedback and coaching to your staff (see sidebar).

- Have your staff observe and give feedback to each other. This takes practice! Try to create multiple opportunities for staff to do this.

### STEM Team and Partnerships

- Continue to nurture your partnerships. Review previous resources for new ideas, as needed.

- Remember: you may need to re-build relationships from the very beginning when staff at your exiting partners change.

### Activities and Lesson Plans: Customize Your Own

- Modify or create your own activities, lesson plans, and curricula. The Dimensions of Success program planning tool is an excellent guide to developing strong lesson plans (http://www.pearweb.org/tools/dos.html#planningtool).

### Program Assessment and Improvement: STEM-specific

- Assess your program with a STEM-specific quality assessment, in addition to your regular program assessment process. Be sure to budget staff time for training and for the actual assessment time. See http://www.pearweb.org/atis for a list of assessment tools, such as:
  - PQA STEM supplement
  - Dimensions of Success (DoS) assessment

### Next Step: Complete a Program Plan for Quality Improvement

If your program has an existing program plan template, use that. Otherwise, complete the Quality STEM Program Plan starting on page 21.

- Mark your program as "Improving"

- Enter your 2-4 STEM Program Goals. Be sure to include both program-wide goals and unit-specific goals as necessary. You may want to use a new copy of the Plan for each Unit.

- Use the rest of the template to document your Quality Improvement Plan.

## Staff Supervision

As the Site Coordinator, continue to provide support and feedback for your staff.

It can be hard to give constructive feedback to staff, but it is necessary for staff to continue to improve. Also, staff usually appreciate that you are paying attention and that you want them to do better. Some strategies for improving your supervision skills include:

- Look for local workshops on supervising staff.

- Seek out a mentor or coach who can support you in providing strong feedback.

- Ensure that you have one-on-one checks in with staff regularly.

- Observe your STEM Program Leaders every month or so, for at least 15 minutes. De-brief the observation with the Program Leader later that week so they can improve before the next session. Listen to their opinion about how they did, validate their opinion, and add your own observations.

- Videotape your STEM Program Leaders and review together to provide feedback on presentation and facilitation.

## Are You Ready to Expand STEM Programming?

The following questions can serve as a gut check to see if you might be ready to expand your high quality STEM programming.

Circle the response that most closely matches your program. SA = Strongly Agree, A = Agree, D = Disagree, SD = Strongly Disagree.

| STEM Program Plan: High Quality STEM | | | | |
|---|---|---|---|---|
| Our STEM activities run smoothly. | SA | A | D | SD |
| Our program has the resources (money and time) to support our STEM Program Leaders to become leaders in the field. | SA | A | D | SD |

| Staffing and Supervision | | | | |
|---|---|---|---|---|
| Our STEM Program Leaders are models for our other staff. | SA | A | D | SD |
| STEM Program Leaders have observed and given feedback to their peers. | SA | A | D | SD |
| Our STEM Program Leaders initiate self-assessment and feedback. | SA | A | D | SD |
| STEM Program Leaders are part of an existing STEM professional learning community. | SA | A | D | SD |

| STEM Team and Partnerships | | | | |
|---|---|---|---|---|
| Our Team meets regularly and can serve as a model of successful partnerships for our other staff or for other programs. | SA | A | D | SD |

| Activities and Lesson Plans | | | | |
|---|---|---|---|---|
| Our STEM Program Leaders have developed and implemented several new STEM lessons. | SA | A | D | SD |

| Program Assessment and Improvement | | | | |
|---|---|---|---|---|
| We are comfortable with our STEM program cycle: assess, plan, implement. | SA | A | D | SD |

| | | | | |
|---|---|---|---|---|
| **Count the times you circled each rating and enter it here:** | | | | |
| **Add the number of times you circled Strongly Agree and Agree:** | | | | |

- If you circled Strongly Agree or Agree **8 times or more**, you are probably ready to expand STEM programming. Proceed to : Resources for Programs Expanding STEM Programming.

- If you circled Strongly Agree or Agree between **5 and 7 times**, you may be ready to expand STEM programming. Review those items where you marked Disagree or Strongly Disagree and plan to work on those as well. Please turn back to : Resources for Programs Improving STEM Quality. Then, proceed to : Resources for Programs Expanding STEM Programming.

- If you answered Strongly Agree or Agree **6 times or less**, you may need to continue to improve your existing STEM programming. Please turn back to : Resources for Programs Improving STEM Quality.

## Suggestions for Expanding STEM Programming

If you are already implementing high quality STEM and answered "Strongly Agree" or "Agree" to most of the questions on , or you already know you are a STEM superstar, you are ready to expand what you have learned. Some possible ways to expand include:

**Expand high quality STEM to your entire program.** Support other staff to initiate high quality STEM programming at your site. Make STEM an integral part of your OST program. Expand activities to other grade levels.

- Arrange for existing STEM Program Leaders staff to mentor and train others.
- When hiring new staff, make "leading STEM activities" a job requirement.
- Send all staff to STEM conferences and trainings.
- Make STEM activities or discussions a regular part of staff meetings.
- Find, modify, or develop lesson plans for all your grade levels. Seek out low literacy activities for grades K-2. Seek out activities with many opportunities for youth leadership for the older grades.
- Make STEM-related goals central to your program plan. Consider using your STEM-related goal as the driving theme for your entire program.

**Expand high quality practices more generally to your entire program.** Apply the strategies for high quality programming (e.g. instructional practices, lesson plan development, staff feedback, program assessment) to other areas of your program.

- Arrange for STEM Program Leaders to train others on instructional practices.
- Apply lesson planning structures and tools to all staff and activities, including recreation, arts, and even homework help.
- Seek out quality assessment tools specific to sports and recreation, arts, and other activities.

**Expand high quality STEM to other programs in your networks.**

- Share your successes at OST conferences such as BOOST, How Kids Learn, and the National After-school Association, and at STEM conferences such as CDE's annual STEM symposium.
- Partner with another site to train and support their STEM Program Leaders and Site Coordinator as they initiate STEM. Provide peer observation and feedback between STEM Program Leaders.
- Create a local STEM Professional Learning Community and invite other sites to join.

**Next Step: Complete a Program Plan for Expansion**

If your program has an existing program plan template, use that. Otherwise, complete the Quality STEM Program Plan starting on .

- Mark your program as "Expanding."
- Enter your expansion goals.
- NOTE: You may want to complete a separate Program Plan to outline how you will maintain and improve your current STEM program.

# Quality STEM Program Plan

Steps to a successful Program Plan:

1. **Assess** where you are on the STEM Pathway.
2. **Develop** (or revisit) your overarching STEM Goals.
3. **INITIATING PROGRAMS:** Develop a Themed Unit or Project Plan that fits your STEM Program Goals. You will need to develop one for each STEM unit or project.
4. **IMPROVING PROGRAMS:** Develop a Quality Improvement Plan. You may also want to develop new or additional Themed Unit or Project Plans.
5. **EXPANDING PROGRAMS:** Develop a Program Expansion Plan. You may also want to record a separate Program Improvement or Themed Unit or Project Plan.

Whichever type of plan you are developing, use the form below to prompt questions and record your plan.

---

Name of our program/site:

Name of person completing this plan:

List your overarching STEM Program Goals (list 2-4):

☐

☐

☐

☐

Your program is:  ☐ Initiating   ☐ Improving   ☐ Expanding

What is your current planning goal? *(Select one and describe why.)*

☐ A Unit or Project Plan.
☐ A STEM Quality Improvement Plan.
☐ An Expansion Plan.

---

Describe your planning goal in detail (e.g. the # of sessions, curricula to be used, grade levels of the students, and field trips or culminating activity OR program improvement goal and data used to determine the areas for program improvement OR the expansion goal):

Describe how your planning goal relates to your STEM goals:

Describe how your planning goal relates to your school's goals (if applicable):

Describe how you will be assessing STEM Program Quality moving forward:

Below, describe at least 3 steps you will take to implement your Plan.

## Step 1

Who is responsible:

Timeline for this step (When will we start? By when will we finish?):

Existing resources (What do we already have):

Needed resources (What do we still need):

Other notes and considerations for this step:

## Step 2

Who is responsible:

Timeline for this step (When will we start? By when will we finish?):

Existing resources (What do we already have?):

Needed resources (What do we still need?):

Other notes and considerations for this step:

## Step 3

Who is responsible:

Timeline for this step (when will we start? By when will we finish?):

Existing resources (what do we already have):

Needed resources (what do we still need):

Other notes and considerations for this step:

## Next Steps

Below is a space for you to enter any additional next steps.

# Definitions

Throughout this Tool, we refer to the following roles. Not all programs have these exact roles or call them by these titles. Review the descriptions below and match yourself and your staff to the role with the best fit:

- **Site Coordinator –** The person responsible for the day-to-day operations of the program. This person is usually responsible for program scheduling, staff supervision, and grant compliance, and acts as the primary liaison to parents, school and community partners, and the administration of the agency.

- **Program Leader –** These line staff work directly with youth day-to-day. They develop and facilitate activities for participants.

- **STEM Program Leader –** A Program Leader that specifically provides STEM content. We recommend that programs initiate STEM programming by identifying 1-2 Program Leaders who will provide this content.

- **Program Director –** The person who supervises and supports the Site Coordinator. The actual title might be After School Manager, Program Coordinator, or similar. We are referring to the staff person who directly supports the Site Coordinator and the site as a whole.

- **Instructional Coach –** Someone who can support the program – and specifically the Program Leaders – to develop key teaching skills such as lesson planning, instructional techniques, and classroom management.

- **STEM Content Coach –** Someone who supports the program – and specifically the Program Leaders – to understand and apply key STEM concepts.

# Assessment and Planning Tool for STEM in Expanded Learning Programs

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