

Toolkit: Becoming a Science, Technology, Engineering, and Math (STEM) Mentor

The Challenge:

“Every person in this room remembers a teacher or mentor that made a difference in their lives. Every person in this room remembers a moment in which an educator showed them something about the world - or something about themselves -- that changed their lives... And innovators... are made in those moments. Scientists and engineers are made in those moments ...” - President Barack Obama
January, 2010

President Obama has recognized the need to move students from the middle to the top of the pack in math and science as a national priority. Mentorship is often cited as a key strategy for exciting, supporting, and keeping students and young scientists and engineers in the fields of science, technology, engineering, and math (STEM). This is particularly true for individuals who haven't historically participated in these areas— such as young women and underrepresented minorities.^{1 2}

Many community-based organizations do not have enough capacity to manage a large number of volunteers, so they need you to organize yourself in coordination with them. This tool kit is designed to either help you organize a group and be a positive addition to a community-based organization, or, if such an organization does not exist, to be a well-organized independently-run group that fills a needed gap in the community.

Commit yourself and a team of your friends, co-workers, family, and neighbors to help young people unlock a lifelong passion for science and engineering. This tool kit will give you the basics to connect with programs in your area, recruit a team, organize your group, and make an impact.

A step by step guide to getting started and executing service activities follows. Please let us know how your project goes and what you learn by telling your story at Serve.gov.

Getting Started:

While no two projects will be the same, successful projects will share a few common practices. We encourage you to incorporate the following elements into your service project:

¹ “Why So Few?”, American Association of University Women, 2010, pg. 70
<http://www.aauw.org/learn/research/upload/whysofew.pdf>

² “Expanding Underrepresented Minority Participation: America’s Science and Technology Talent at the Crossroads” (http://www.nap.edu/catalog.php?record_id=12984), Pg. 10.

Step One: Identify Local Partners

Check out the organizations already doing good work in your area. Many existing service groups have identified community needs and built the expertise to provide solutions.

- [Click here](#) to search for national and local STEM Mentoring organizations
- Reach out to local schools and teachers to see if they can help identify particular needs or local resources, or ways that your efforts can be most useful to students.
- Find STEM professionals who are [volunteering in your area](#).
- Search [additional databases](#) for other [STEM-based organizations](#) that may be looking for mentors.
- If no STEM mentoring organizations exist in your community, contact university groups, local educational authorities, or youth-serving organizations .

Learn more about [finding local partners](#).

Step Two: Build a Team

Teams can help share the work, motivate members and hold each other accountable. Teams build community. Ask your family, friends, co-workers, faith group members, shop club devotees to serve with you. Work with teachers or others who work with youth and can help you plan activities and connect with students.

- Host a house meeting or pot luck to choose a project, set goals, recruit volunteers and plan next steps.
- Get a guide for hosting a house meeting.

Learn more about [building a team](#).

Step Three: Set Goals

Set a service goal and hold yourself accountable. Commit as individuals and as a team to mentoring young scientists and engineers a certain number of times per month. Continuity and dependability are important in mentoring students. Set your goals high to stretch yourself. Then keep track of how you are doing and designate someone to be responsible for updating the group on how you are progressing toward your goals. You'll be surprised at how much you can do when you commit, focus, and follow through.

- Get a goal-setting guide.

Learn more about [setting goals](#).

Step Four: SERVE YOUR COMMUNITY!

The key to effective service is planning. Organize your materials, make confirmation calls and, if you have time, read supplemental materials before you volunteer.

- [Get a tip sheet](#) for your service activity.

Step Five: Report and Celebrate Successes

Your team members, the community, and the President want to know about your successes and hear your stories. Share your accomplishments by reporting your results. We will highlight the best stories throughout the year. Tell us about your successes and what you have learned, or just tell your story of service at [Serve.gov](#).

Continue to Follow Up.

Finding Local Partners: STEM Mentoring

Check out the organizations already doing good work in your community. Many existing service groups have identified community needs and built the expertise to provide solutions. Get plugged in with them!

It will be helpful to provide background on the local service landscape to the attendees of your house meeting. A few phone calls can produce all the information you need to know your options.

For STEM mentoring programs:

- [Click here](#) to search for national and local STEM Mentoring organizations
- Reach out to local schools and teachers to see if they can help identify particular needs or local resources, or ways that your efforts can be most useful to students.
- Find STEM professionals who are [volunteering in your area](#).
- Search [additional databases](#) for other [STEM-based organizations](#) that may be looking for mentors.
- If no STEM mentoring organizations exist in your community, contact university groups, local educational authorities, or youth-serving organizations .

Sample Phone Script

- Hi, my name is _____ and I'm interested in volunteering with your organization. May I speak with your Volunteer Coordinator?
- Are you the best person for me to contact?
- How can a volunteer best serve your organization?
- If I organize a group of my friends to volunteer with me, how many volunteers can you take?
- How many days per week do you need volunteers?
- Do your volunteers participate in science and engineering activities with young people one-on-one or in a group?
- What age group do you work with?
- What kind of training/background check do you provide?

Remember to keep track of who you have contacted so you can follow up as necessary. You can use the chart below or create one that fits your project.

Group Name	Contact Name	Contact Number	Days to Volunteer	# of Vols Needed

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Build a team

House meetings

House meetings are a valuable tactic for recruiting volunteers and building a team. House meetings allow community members to share their concerns and join together to work for progress. Within the room, you already have all the tools you need to enact change on a local level. Every attendee can contribute time or resources or leadership abilities.

Your house meeting will help you identify your leadership team. The people that are committed enough to come to your house meeting should be considered potential leaders of the initiatives being implemented in their communities.

As a house meeting host, invite people from your social network to participate in a discussion about your community, pressing needs, and potential solutions. House meetings often engage people new to service and unclear about next steps. Serving with the support of a team will increase the ease and comfort of many new volunteers.

Building community through house meetings is a critical step toward the President's ultimate goal, which is to support everyday Americans in a grassroots effort to improve lives and strengthen communities.

Goals and Duties

Goals

- Choose and plan a service project.
- Set measurable group and personal goals for your United We Serve project.
- Identify 5 attendees to be team leaders.
- Plan the next meeting of the leadership team and identify next steps for each leader.
- Obtain commitments from all attendees to volunteer on a regular basis in the days and weeks leading up to your service project.

Host Duties

Before

- To have **20** people attend, you will need to invite **50**. Brainstorm a list of **50** people to invite. Include your friends, family, members of your faith group, colleagues, book club attendees, etc.

- Make calls to the **50** people on your list to invite them to your house meeting. Remember that phone calls are much more effective than a mass email.
- Post your house meeting on Serve.gov and invite local residents interested in volunteering to attend.
- Browse Serve.gov to see what needs in your community aren't being met and which organizations you might be able to partner with. Take some preliminary steps to identify local partners already working in the community.
- Prepare necessary materials.

During

- Be prepared to give a short explanation of why you became involved/what inspired you to serve.
- Consider how you most want to serve your community. President Obama has identified moving students from the middle to the top of the pack in math and science as a key priority for our Nation. That's why he called upon the 200,000 Federal STEM employees to do their part in their communities "to help stoke that same curiosity in students that led them to pursue a career in science in the first place," How can your community help meet this goal?

After

- Thank attendees and get their pledge to serve.
- Organize a follow-up volunteer leadership meeting with your new team to take next steps.

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House Meeting Agenda

*****Before starting the meeting, have everyone sign in and appoint a timekeeper who will keep each section running on time.*****

0:00-0:10 Host welcome and introduction

- Host of the meeting introduces themselves and welcomes attendees.
- Host shares why (s)he was inspired to organize the house meeting and the purpose of the meeting.

0:10-0:25 Attendee introductions

- Go around the room and ask each person to introduce themselves and share their reason for wanting to serve.

0:25-0:45 Choose a project

- Host introduces three or four project ideas or potential organizations to collaborate with and opens up the room for discussion.
- Discuss what projects will work best in your community.
- Group votes on project choice.

0:45-0:55 Set goals and identify leadership

- Ask which attendees are interested in being volunteer leaders - they should stay after the meeting for 15 minutes and commit to a weekly planning meeting beginning before the service project.
- Ask each attendee to consider personal goals and make a realistic but ambitious service commitment.

0:55-1:00 Conclusion

- At the end of the meeting, the group should have:
 - At least one project or organization to commit to.
 - A leadership team.
 - Pledges from each attendee to participate.

1:00-1:15 Leadership team meeting

- Meet with volunteer leaders to set weekly meeting and divide responsibilities.
- Fill out attached worksheets

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Leadership Team Worksheet

The members of my team include:

Name	Phone Number	Email

Our weekly leadership meetings occur every _____ at _____.

Who are 5 other friends and family members who you will call to enlist in your group's project? Make these calls during the leadership team meeting, if possible:

Name	Phone Number	Email

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Setting Goals and Tracking Progress

Breaking Down Your Goal

What is your group's project?

Who are your local partners?

What is your group's goal? (i.e., how many hours will you spend participating in hands-on science and engineering activities with kids?)

Have you connected with teachers or other professionals who work with your selected student population?

How many weeks do you have until the date of your service project?

What will you have to accomplish per week between now and your service project to reach your goal?

How many volunteers will you have to recruit on average per week to reach that goal? How many hours would you guess they have to work? If it's not clear at first, you should be ambitious and then adjust your recruitment goal as you go.

Where are the best places to find skilled volunteers in your community?

Tracking Progress to Goals

Our team will report progress to goals every _____ to _____.

_____ will share our progress to goals with all team members by **email/phone calls** every _____.

We will also share our story and accomplishments at serve.gov.

Setting Goals: STEM Mentoring

Mentorship is often cited as a key strategy for exciting, supporting, and keeping students and young scientists and engineers in the fields of science, technology, engineering, and math (STEM). This is particularly true for individuals who haven't historically participated in these areas— such as young women and underrepresented minorities.³

Identifying opportunities to mentor students in STEM, particularly through hands-on learning opportunities and real research experiences can greatly improve their chances of continuing to pursue the next level of coursework in math and science.⁴⁵

Identify a goal that makes sense for your schedule and stick with it throughout the year to produce the best possible outcomes.

What will you do to help young people succeed throughout the year?

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³ "Why So Few?", American Association of University Women, 2010, pg. 70

<http://www.aauw.org/learn/research/upload/whysofew.pdf>

³ "Expanding Underrepresented Minority Participation: America's Science and Technology Talent at the Crossroads" (http://www.nap.edu/catalog.php?record_id=12984), Pg. 10.

⁴ Nagda, B. A., S. R. Gregerman, J. Jonides, W. von Hippel, and J.S. Lerner. (1998). "Undergraduate student-faculty research partnerships affect student retention." *The Review of Higher Education* 22: 55-72.

⁵ Russell, S. H., M.P. Hancock, and J. McCullough. (2007). "The pipeline. Benefits of undergraduate research experiences." *Science* 316(5824): 548-9.

Tips: Being a Good STEM Mentor

The following are some tips to keep in mind as you set about inspiring the next generation of scientists and engineers through mentoring.

- ***Listen carefully to what your mentee is saying. Find out what your mentee wants you to do. Ask questions.***

Sometimes mentees may just need to talk through a project. Other times, they may want advice on how they should handle a challenge. In some circumstances, they also may be asking you to take action.

Asking questions can be as important as making recommendations. Until you understand what information your student is trying to sort out, and what they hope the outcome will be, it will be difficult to mentor them towards the best possible outcome.

- ***Help interpret feedback or failure when an experiment or project doesn't go as planned.***

Students can oftentimes be turned off when they get negative feedback (bad grades, unpredictable results) or when they find math and science coursework or projects to be difficult.

Remind them that this isn't a reflection on their ability to become a scientist or engineer!

Emphasize that intelligence isn't fixed, but developed by repeatedly exercising the brain and learning about a concept through different approaches.

Help them interpret feedback with the acknowledgement of how hard certain concepts can be, and work with them to identify their best path forward.

- ***Balance honesty with support.***

Indeed, not every student is going to grow up to be the next Marie Curie, but it's important to reserve judgment on a student's initial abilities. Maintain an open mind and keep supporting your students until they succeed or come to their own conclusions about pursuing a different path.

- ***The ultimate goal of a mentor is to use your experience to help others gain similar experiences that have set you on your path. But remember, your mentee isn't you.***

Your mentee might be coming to the table from an entirely different background or community than you are. This will have likely shaped their aspirations and expectations in ways that may even set them at odds to yours. Keep these differences in mind as you express opportunities and expectations for the future.

- *As much as possible, engage your student in hands-on projects, or real research opportunities.*

Whether it be through a formal research experience, or a fun experiment, attempt to incorporate these activities as an important part of your mentoring partnership.

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The following resources will help maximize the time you spend with students. As a volunteer you want to make sure students remain engaged in the session and in the materials. The following resources can be of help:

Mentor Guides

Entering Mentoring: A Seminar to Train a New Generation of Scientists (Mentor Guide), Wisconsin Program for Scientific Teaching, *Howard Hughes Medical Institute* -

http://www.hhmi.org/resources/labmanagement/downloads/entering_mentoring.pdf

DOD StarBase STEM Mentoring Guide -

<http://dodstarbase.org/sites/default/files/STEM%20Mentor%20Guidebook.pdf>

Get the Mentoring You Deserve, *Association for Women in Science* (Mentor Guide)

<http://www.awis.affiniscape.com/displaycommon.cfm?an=1&subarticlenbr=450>

Mentor Resources

American Association of University Women - <http://www.aauw.org/stem/STEMresources.cfm>

National Center for Women in IT (Mentoring Resource List)-

<http://www.ncwit.org/resources/evaluating-mentoring-program-guide>

Example Mentor Networks

COACH (Mentor Network) - <http://coach.uoregon.edu/coach/index.php?id=8>

MentorNet – <http://www.mentornet.net>

WiTSON: Women in Technology Sharing Online - <https://piazza.com/witson> |

ACE Mentor Program - <http://www.acementor.org/>

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