

# BRINGING STEM ROLE MODELS INTO YOUR PROGRAM



*The STEM Volunteer Toolkit offers in-depth resources, documents, and training to help to build strong relationships with Role Models. These are basic tips to serve as a basis for finding and maintaining STEM Volunteer Role Models.*

## Finding STEM Role Models to Volunteer

Many educational programs for youth are looking for STEM volunteers to spend time as role models for their students. Computer scientists, nurses, and electrical engineers are all present in most communities, whether in a rural or urban areas. Role models may be neighbors and friends or people who work in local businesses, universities, and museums. Don't be shy about asking them to volunteer their time; many people just need an invitation. Once you start, you'll find it gets easier to find and maintain great relationships with STEM volunteers who can act as role models for youth.

## Community as a Resource

- Start with **people you know**. Let colleagues, friends, and family know that you are looking for STEM volunteers.
- Network with members of your **local STEM hub** to find out what resources they have.
- Enlist high-school youth in your programs activities. They can be effective hosts or leaders for STEM challenges.
- **University faculty and students** can be inspiring role models and offer a unique perspective.
- **Staff at science museums** not only make interesting role models but may also offer behind-the-scenes experiences at their sites and insights into emerging fields in science and technology.
- **Local businesses and corporations** know that their long-term success lies with the next generation. Start with the community relations or human resources department to help recruit STEM volunteers.
- Look online for **professional groups** that have a mission to do outreach.
- Reach out to groups like the **National Society of Black Engineers and the Society of Hispanic Professional Engineers** for role models from diverse backgrounds.

## Try Web Resources

You can supplement in-person role models with online resources to introduce a new career or activity and to make connections to real-world issues. Online profiles can help expose youths to an array of role models from different backgrounds, careers, and disciplines.

[Click2Sciencepd.org](http://Click2Sciencepd.org)

Online STEM professional development for out-of-school-time providers



[Girlscouts.org/ImagineEngineering](http://Girlscouts.org/ImagineEngineering)

Interviews and profiles of women in engineering including guides for Hispanic, African American, and Native American girls

[Engineeryourlife.org](http://Engineeryourlife.org)

A guide to engineering for high school girls

[Engineergirl.org](http://Engineergirl.org)

Highlights of opportunity for girls in engineering

[Wonderwise.unl.edu](http://Wonderwise.unl.edu)

Aware-winning series with videos and activity kits for 4th through 6th graders

[Women.nasa.gov/a2i](http://Women.nasa.gov/a2i)

An inspiring site profiling the women of NASA

[Pbskids.org](http://Pbskids.org) or <http://scigirlsconnect.org/>

Video profiles of women and men highlighting STEM projects

<http://stemoregon.org/stemoregon-connections/>

Oregon STEM professionals and educators can connect online

## Outline for Successful Activity Facilitation with STEM Volunteer Mentors

Impactful interactions with STEM Volunteer Role Models require the right combination of academic and career guidance and social engagement. Whether you are planning an all-day event with multiple STEM volunteers and resources, or a short activity with 15 youths in an after-school program, we recommend following a schedule that incorporates the following essential elements.

### STEM Role Model Visit Including Hands-On Activity: Sample Schedule (1.5 hours)

- 15 minutes: Welcome & Icebreaker
- 10 minutes: STEM Role Model Introduction
- 50 minutes: Hands-on Activity
- 15 minutes: Reflection & Questions

Each element of the STEM role model visit builds upon the others. Youth and STEM Volunteers should have the opportunity to get to know each other, engage with hands-on activities, and talk about the real-world applications of the activity. To strengthen the impact of STEM role models, check out the following tips.



**Icebreakers** are often used to introduce and warm up the group. The icebreaker should be hands-on, interactive, and fun. Icebreakers can also introduce STEM (Science, Technology, Engineering, and Math) concepts and vocabulary that will be explored during the activity as well as help volunteers get an understanding of the background knowledge of the group. By building a rapport with the group through an icebreaker, volunteer role models set the stage for increased youth engagement.

**Introductions** give an opportunity for volunteer role models to share their story and STEM experiences. Personal stories engage youth and help them connect to the role models' lives and careers. Youth enjoy hearing about dreams, aspirations, and details that might help them relate and connect. Through their stories, role models can describe how their career path developed and how they dealt with challenges along the way.

**Hands-on activities** help youth engage in fun STEM, and potentially to role model's careers and experiences. Encourage role models to pepper information about their career throughout the activity. If there is not a direct connection between their career and the activity, role models can highlight the processes they use in their work like the engineering design process, scientific method, and collaboration.

Make sure there is time for **reflections and questions** at the end and throughout! Hands on activities take time and discussion time is an important way for youth to engage with STEM volunteers and activities. Youth voice is created when students have the opportunity to participate and inquire as much as possible.

## Get Started

Turn to your STEM Hub and to other programs that are having success with STEM Volunteers for ideas and resources to support your program.

## Invite Role Models

Role models, whether they are STEM professionals or college students, are busy people. Your invitation should make a compelling case for participating in your outreach program. Be sure to explain how STEM volunteer role models, regardless of how much time they have to engage students, are the “secret ingredient” to making an event or lesson meaningful for youth.

### Include in your invitation:

- Testimonials from youth and role models from past events.
- Research on the importance of role models.
- The time commitment and logistics for your event and training.
- The importance of training to prepare for the day.

# Volunteer Role Model Training



It is highly recommended that volunteer STEM role models receive some training before beginning their work with youth. Training can give them information on how to interact successfully with youth, how to engage them in STEM activities, and how to work with programs in general. A training in how to engage youth in STEM activities will also help STEM volunteers ideas for activities that will introduce STEM ideas and connect youth with STEM subjects. Below is a basic layout for what to expect in a STEM volunteer training. Whether you are a potential volunteer or a program seeking role model participation, this type of training layout will give you an idea of what might work well for STEM role model/youth engagement. This includes an icebreaker, introduction, hands-on activity, and reflection. This type of training and many more resources are available through the STEM Volunteer Toolkit.

Here is an example from Techbridge Rolemodel training, available through OregonASK and other organizations:

## Welcome and Introduction. 5 minutes.

To begin your training, share your background, the goals of your organization, and your work with youth. Did you have a role model who made a difference in your life? Invite participants to introduce themselves so that everyone gets to know who's in the room. If you have a large group, you may want role models to introduce themselves at their tables.

During your welcome:

- Be clear about the goals of the training.
- Make participants aware that they will be active during the training.
- Create or state the ground rules for the group.

## Icebreaker. 10 minutes.

Start the training with an icebreaker. Select an icebreaker that role models can use with youth. Remind role models why it is important to start with icebreakers when working with youth. We sometimes hear that role models and trainers to leave out icebreakers in the interest of time, but they are more than and set the stage for a role model's success.

Icebreakers help role models:

- Make youth feel more comfortable with one another and with the role.
- Establish an interactive mood from the start.
- Introduce new scientific topics, vocabulary, and careers.
- Gauge youth's background knowledge on a particular topic.

## Make the Case. 5 minutes.

Share experiences and research about why it is important to get more youth interested in STEM. The NGCP's website keeps updated statistics on the state of youth and women in STEM. Sharing stories about the impact that STEM can have for youth can be very compelling and let role models know they are part of the solution. The following data is from the Girl Scout Research Institute's 2012 Generation STEM report.

## Role Model Introduction. 15 minutes.

Discuss how role models can make connections with youth by sharing information about themselves, their jobs, and their lives outside of work. Role models can help combat stereotypes by highlighting the creative and collaborative nature of STEM-areas of interest to youth. Some role models like to share a PowerPoint presentation to show and tell their story. PowerPoint presentations should be brief and visually appealing to the youth. Encourage role models to use lots of pictures and very little text. It may be hard for some role models to describe what they do to a group of youths. It's helpful for role models to practice their introductions and share feedback with one another.

### **During their introduction, encourage role models to:**

- Be dynamic! Enthusiasm and passion for work are contagious and help engage and inspire youths.
- Make it personal. Share stories about family and interests outside of work.
- Use kid-friendly language and avoid industry jargon.
- Keep introductions short and include artifacts and pictures.
- Explain how engineers and scientists help change the world.
- Relate projects and work to the youths' knowledge and experiences.
- Share their academic and career path.
- Highlight the triumphs and challenges experienced in their studies and career.

## Strategies for Working with Youth. 15 minutes.

Supporting youths' exploration and discoveries helps develop their interests and curiosity. Through questions and feedback role models can help foster a growth mindset, where youth can learn that through effort and determination they will grow and succeed.

### **During the hands-on activity, encourage role models to:**

- Ask open-ended questions.
- Promote inquiry by encouraging youths to problem-solve and think critically.
- Give positive and specific feedback.
- Make connections to careers and real-world issues.

## Growth Mindset: The Research of Carol Dweck

Research Shows That Intelligence Can Be Developed With Effort.

Role models can teach youth that the brain is like a muscle that gets stronger and works better the more it is exercised. By supporting this kind of growth mindset, role models can encourage youths to want to learn new and challenging things. In the face of challenges, children with a growth mindset are more likely to be persistent and successful.

### **Here are some tips for reinforcing this mindset:**

- Highlight the importance of learning from mistakes by sharing personal experience.
- Offer positive reinforcement with a youth stretches beyond her comfort zone and takes on challenges rather than plays it safe.
- Highlight the fun of challenges.
- Focus your praise on the effort rather than the end result.

More information on Growth Mindset and how to encourage it can be found in the STEM volunteer toolkit .

## The Importance of Questions



Encourage role models to ask open-ended questions that have more than one possible answer. Open-ended questions help youths solve a problem or think through the challenge by stretching their reasoning and creativity. In this inquiry-based atmosphere, youth will feel inspired to ask their own questions. It's all part of the scientific process!

Sample Questions:

- Can you explain your design to me? How did you come up with it?
- I noticed that you're...Can you tell me more about that?
- What changes would you recommend to improve your design?
- What would happen if...?
- Did you get the result you were expecting? Why or why not?

## The Power of Feedback

Feedback can motivate and instill confidence in youth. Timely feedback helps them understand what they're doing while they are doing it—so don't wait until the closing discussion. Verbal feedback for younger groups can often be misunderstood, so encourage role models to consider a demonstration to clarify the feedback. For example, youths may understand how triangular-shaped elements can be used to strengthen a structure through a demonstration.

Give feedback that:

- Is *specific, provides guidance, and reflects back* what the youths are doing and how they can meet the challenge. Don't just say, "You're so smart! I know you can succeed." Instead, *praise how they are trying different approaches or designs to complete the activity.*
- Allows a little "think time" to give youths an opportunity to respond to feedback.
- Does not compare the work of one youth with another's.
- Helps youths think about their process and shows that their effort and persistence will make a difference.

Sample sentence starters:

- *I really like how you tried different ideas...*
- *I saw you were using a lot of effort when...*
- *This is really interesting because...*

## The Value of Positive Group Interactions

Role models may be experts in their fields, but may not have the skills or experiences to manage a group of youths. To prepare role models for success, it is helpful to share strategies for interacting with youths.



- Get youths' attention before talking or transitioning.
- Invite youths to rephrase directions or questions to make sure they're understood.
- Move around the room and increase proximity to restless youths.
- Send a silent reminder if youths are getting too loud.
- Invite active engagement with questions (instead of just talking on and on).
- Make youths aware of the time limits and remind them throughout the activity (e.g., "You have five minutes before cleanup.").
- Offer a choice. If some youths have a difficult time paying attention, provide an alternative activity for them. There may be something these youths can do quietly and independently like journaling or creating a picture or diagram of the activity.
- Use humor. Everyone is there to learn and have fun so encourage role models to enjoy their time with the youths.

### Hands-on Activity. 50 minutes.

Lead role models through a hands-on activity that illustrates the type of activity they will lead. This gives them a chance to practice the activity and anticipate what might be challenging for the youths.

#### **Invite them to consider the following questions:**

- What will you do if the activity doesn't work?
- What can the youths learn from this experience?

You can highlight hands-off facilitation by modeling strategies while practicing the activity. By taking a hands-off approach the role models are encouraged to help the youths through questioning and discussion. Role models can reflect on what approaches work and don't work to engage youth during a debrief of the activity.

#### **Introduce a hands-on activity that allows youths to:**

- Make connections to real-world issues and to topics they may be learning at school.
- Make connections to the role model's career Experience the practices of science and engineering like recording data and designing prototypes.
- Be creative and use their imagination in the design.
- Collaborate and work in teams.

### Reflection 15 minutes.

To close your training, lead role models through a debrief of the activity, modeling for them the importance of inviting youths to share what they learned and make real-world connections. Reflection makes youths more aware of their own learning and enhances their ability to process content or problems by relating their experience to their prior knowledge.

#### **When reflecting on the hands-on activity, encourage the role models to:**

- Discuss how youths handled challenges.
- Help youths understand how the activity relates to real-world situations.
- Relate science, technology, and engineering careers to the activity. Discuss how youths might apply what they learned in and outside of school.
- Talk about the challenges and benefits of collaboration.
- Think about how youths might continue to explore the concepts and ideas raised through the hands-on activity.

## Training Evaluation. 5 minutes.



- Gather information from participants training. Be sure to ask not only about and amount of the content, but about issues as well. Scheduling and timing important role in hosting a training. will help you understand what worked participants and how you can improve learn what kind of follow up and supplies role models will need.
- Find time to follow up with the participants after the event to gauge where the additional support .

## Preparing for an Activity or Event as much as Possible

It's important to prepare role models and youths before the big day to help them be successful. Engaged students are key to a successful experience. When youths participate and ask thoughtful questions, they learn more and the role models feel that their experience and expertise are appreciated.

### **If you have invited a specific STEM Role Model, Prepare Before the Visit:**

- Share role model bios with youth. Highlight any connections between the role models and the youths. This might mean identifying similar interests or hobbies, siblings, pets, or the neighborhood where they grew up.
- Familiarize youths with role models' careers. Provide information about the company they work for or the school they attend.
- Share news clips or articles about role models and the projects they have worked on. Better yet, share a video of the role model in action. This will help the youths see the impact of the role model's profession.
- Be sure to encourage all youths to participate. Invite youths to write their questions in advance on note cards or post-its. If the group is small enough the expectation can be set that every youth will ask a question. It's helpful to remind youths that there are no "bad" questions.

## Encourage Curiosity!

Encourage youths to think of questions that ask for a unique response or story from role models. These responses are not answers to questions that youths can find on their own. Invite youths to ask questions about role models' jobs, career paths, and work-life balance. You can prepare handouts with sample questions to help youths get started. Exchanging personal stories and photos in advance helps youths and role models. For the youths, it's fun to learn that a role model has a pet dog or shares the same hobbies.

This information helps youths connect with role models and ask more thoughtful questions. For role models, knowing personal information about youths helps them identify topics to discuss and areas to focus their academic guidance. Active participation during the role model visit makes the experience more meaningful for everyone.

# Checking in Prior to the Planned Activity or Event



**Teacher's and Program Staff's time is precious. There are resources such as template documents outlining clear Volunteer roles and expectations in the STEM Volunteer Toolkit. It is strongly recommended for program staff working with volunteers to:**

- Connect with role models before the event to review plans and address any last minute questions. During check-ins:
- Thank the role models for their participation and remind them how important they are in inspiring youth in STEM.
- Review the goals for the day. Reinforce the importance of being role models which means more than leading activities.
- Preview the role models' introductory remarks and remind them about positive messaging about STEM. If they are planning to share a PowerPoint be sure to review in advance to ensure it is visually appealing to the youths and not too long.
- Provide logistics and a detailed schedule of the event, including directions, parking, and meals. Make arrangements to meet before the event begins.
- Devise a plan for helping role models stay on track and on schedule. Agree upon a signal when it's time to move along and when it's time for closing comments and reflections so that they don't run out of time.
- Let the role models know who will assist them throughout the day.
- Share the attendance numbers and the set-up of the room. Discuss how best to arrange groups for activities.
- Review audio/visual and technology needs.
- Exchange contact information for the event day.
- Invite the role models to ask questions and share any concerns they have.

## Follow Up

It's important to follow up with role models to thank them for their work and share feedback and evaluation results. This also provides the opportunity to get feedback from role models and discuss future opportunities.

## Debriefing

Many STEM Programs, regardless of their structure, have benefited from the feedback they get from their Volunteers. It is a good idea to set the president for debriefing on a regular basis. Ask students, STEM volunteers and mentors, and any other participants about the progress of STEM activities on a regular basis. Ending each session with a debrief with the whole group, and then taking a few minutes with mentors in private to discuss how they're doing. The ongoing feedback is invaluable, even if your STEM volunteer participates for only one session.

## Thanking Role Models

A nice thank you to role models can set the stage for future partnerships. Volunteers, like anyone else, appreciate thank you notes, particularly those that describe the impact they make through their visits.

- Reinforce the importance of role models in helping youths understand what it's like to be an engineer, computer scientist, or physicist.
- Include quotes from the youths. Role models love to hear how they've made an impact.
- Send a photo as a lasting reminder of their positive experience with the youths.
- If they were effective role models, invite them to future events.

**Encourage youths to thank role models and inspire them to get creative. Your group may need guidance on how to write an expressive thank you note. You can teach them the art of showing appreciation.**

## Giving Recognition

We encourage you to reach out to supervisors or faculty advisors and publicly recognize role models through their workplace or school. Not everyone understands the value of outreach. By writing a letter, sending an email, or making a call, you can help inform a manager or supervisor of the value of their employee's or student's participation.

Does a corporate partner or university department recognize volunteers? Try to find ways to publicly acknowledge role models who really do make a difference through their outreach. You can highlight their efforts through profiles in your organization's newsletter or the media coverage of your event. Not only will these efforts keep role models coming back, but they will encourage others to join in.

A quick and easy way to thank your role model is to write a thank you or recommendation through social media site such as LinkedIn.

## Evaluating Outreach

It's good practice to assess and adapt volunteer activities and events so that they are effective. Reviewing the information you collect allows you to better communicate your program's impact to stakeholders, which can help attract and retain support from community and funders.

**There are several ways to evaluate events.**

- Ask youths to complete a survey. In the STEM Volunteer Toolkit you can find surveys to collect data on how youth's interests, knowledge of STEM careers are role models have been impacted by STEM volunteer engagement
- Invite role models to complete a survey to find out how the experience has impacted them and how the training impacted their work with youth.
- Evaluation is a two-way street so be sure to give your partners and role models feedback on the event. Quality feedback makes partnerships.

## Tracking Role Models and Partner Organizations

Keep a record of contacts, employees, and students who are interested in outreach and write-ups on programs or fieldtrips. With detailed records of events and role models you are better able to match events and role models for an impactful outreach event.

**Databases may include:**

- Notes about role models including schooling, professional background, gender, and ethnicity.
- Notes about outreach visits to remember for future planning.
- Contact information.
- Training history.

## The Power of Collaboration



Introducing a youth to a role model can have a powerful impact on his or her life. By introducing role models and engaging in STEM activities, you can excite youths' curiosity and give them a glimpse of what their futures can hold. Creating these opportunities takes careful planning and support. We encourage you to utilize the partnerships and resources of your Collaborative to recruit and train role models to bring them to STEM programs for youths. We hope that this guide will help you prepare and support role models so that together you can inspire the youths in your community to change the world through STEM.