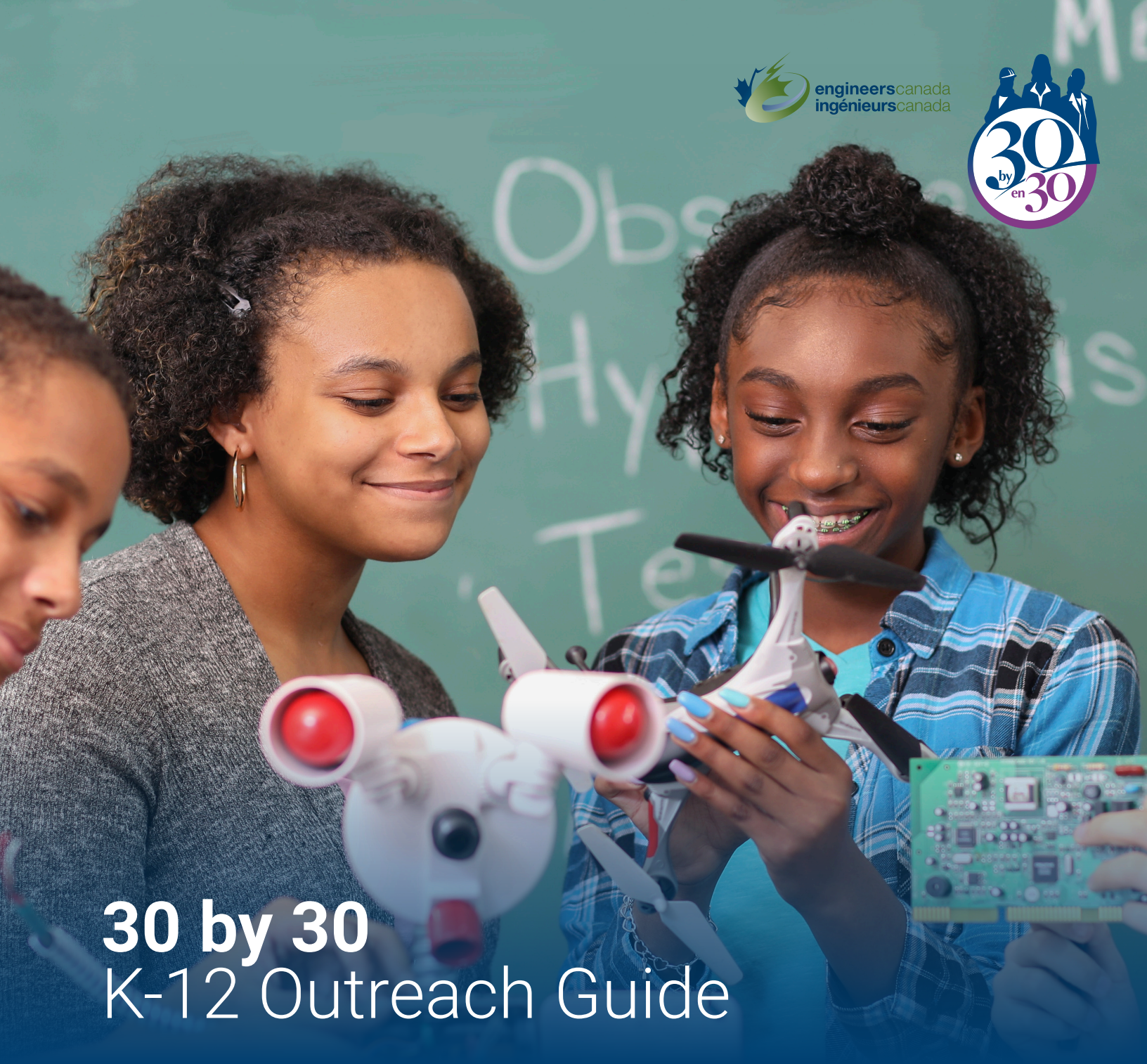


30 by 30
K-12 Outreach Guide

This guide is meant to set a path for engineering outreach programs that will help reach 30 by 30, address negative stereotypes, and promote inclusive practices for everyone, regardless of their gender, sexual orientation, race, class, or visible/invisible disability. It is intended for use in girl-only and mixed-gender outreach programs. This guide is a starter. Use it to build on your current program strengths and to challenge yourselves to make improvements in diversity, equity, and inclusion practices.

HOW TO USE THIS GUIDE:

Read each criterion with an open mind, explore suggested resources in the side bar, and use the rubric (4 highest score/0 lowest score) as an assessment tool to evaluate and help identify areas where your program can improve.

Breaking societal stereotypes

Stereotypes exist in every aspect of our lives and influence how children and youth engage with STEM activities. Negative stereotypes can keep children and youth—especially girls—from engaging in engineering activities, whether they are afraid of what others will think or because they do not think they are good enough in math. Outreach programs need to challenge the stereotype that women are not engineers or that women are not technically savvy. Consider whether or not your imagery and role models/ mentors depict engineers from various diversity dimensions (age, culture, race, gender, physical ability, etc.). It is important to create an environment where participants feel safe to be themselves and able to overcome the negative impact of stereotypes and performance expectations (i.e. girls' math performance compared to boys', boys' social sensitivity compared to girls', etc.). Focus on affirming participants' strengths, explore how failure is part of the design process to alleviate performance anxiety, and discuss stereotypes.

Check out:

'Bias Busting Strategies for Individuals'

Assessing your program:

4	Challenges multiple stereotypes (i.e. gender, culture, race, age, and physical abilities), discusses intersectionality, unconscious bias, and inclusion with images, language, and/or facilitation.
3	Highlights multiple diversity dimensions (i.e. queer woman of color engineer, a differently abled engineer).
2	Presents women/girls as math/science-capable in written content and images.
1	Encourages women/girls to participate in engineering activities.
0	Reinforces existing stereotypes (i.e. boys are engineers, examples of math/science are male-dominated).

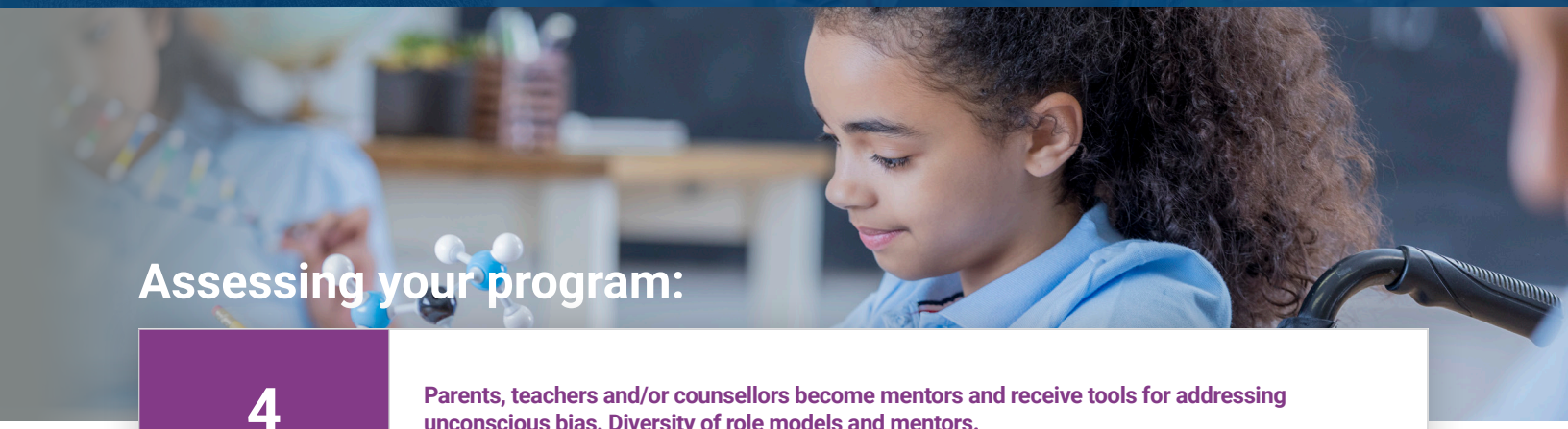
Influencing the influencers

Research shows parents and teachers with discouraging attitudes for girls pursuing engineering can be a significant barrier. Does the program have messaging or materials directed to parents, teachers, and/or counsellors to help them talk about the value of STEM to girls?

Role models and mentors also have a huge influence on children and youth's decision to pursue STEM. It is important for participants to interact with diverse role models and mentors through outreach programs (i.e. women, Indigenous peoples, Black and People of Colour, persons with visible and/or invisible disabilities, etc.), so that participants can relate and see themselves reflected.

Check out:

'Why STEM for Parents & Guardians'



Assessing your program:

4	Parents, teachers and/or counsellors become mentors and receive tools for addressing unconscious bias. Diversity of role models and mentors.
3	Active engagement/discussions are held with parents, teachers, and/or counsellors. Diversity of role models and mentors.
2	Parents, teachers, and/or counsellors are invited to attend events/workshops. Some diversity of mentors and role models.
1	Written materials are made available for parents, teachers, and/or counsellors. Some diversity of mentors and role models.
0	No engagement or materials are available for parents, teachers, and/or counsellors. No diversity.

Perception of engineering

There is a perception that engineers are all men who build bridges, or cars, and that engineering is either 'hard' or 'boring' for most children and youth. We need to be explicit in challenging these perceptions and presenting the ways engineering is creative, engaging, rewarding, and exciting. Make sure your program/activity/content challenges the stereotypical image of engineering (not just buildings and bridges) with examples of different engineering disciplines. Help participants understand how engineering is applicable to everyday life that they can relate to. Give examples of ways engineering is a 'helping profession' through the designing of solutions to help local and global problems. The fields that attract the most women are environmental and biomedical engineering, so think of ways to expose participants to traditionally male dominated disciplines in engineering (i.e. mechanical, electrical and civil, etc.) and how these disciplines have an impact on society.

Check out:

'Why STEM for Parents & Guardians'

Assessing your program:

4	**Participants interact first-hand with a local engineering project that impacts their community and solves community challenges.**
3	**Examples of local engineers making an impact on their own community.**
2	**Deeper exploration of a wide variety of engineering projects around the world.**
1	**Presents different types of engineering (i.e. list of disciplines, pictures of a different projects).**
0	**Reinforces the stereotype that engineers are only bridge-builders.**

Interactivity of the program

Learning that is hands-on has a higher chance of engaging girls and a broader audience. A higher ranking should be provided to programs that are using innovative and up-to-date outreach tools. Focus on using surveys to monitor and measure participants' experience and satisfaction. Feedback should be integrated into the program improvements at each iteration. Interactivity helps participants see themselves as engineers, and should provide, especially in co-ed environments, equal opportunity for all participants to participate. Active learning that also connects to the local community, nurtures relationship-building between instructors/engineers/volunteers and participants, reinforces the relevance of engineering and helps girls and boys see how they can be engineers themselves. Though relationships can take time to foster, they are very important for exploring new topics with participants and developing positive experiences. Mentors are important for young girls and underrepresented groups. Being able to see themselves in their role models, but also have mentors who are not the same gender, racial background, or religion can be impactful.

Check out:

EngineerGirl,
Design Squad
Global

Assessing your program:

4	**Full interactivity and engagements from start to finish for all, regardless of gender and backgrounds. Participants plan, design, and create an engineering project as a group. Connection to community-based examples make activity relevant. Training for providers on ensuring girls have equal time and role with boys throughout. Building long-lasting relationships between participants and mentors/role models. Alumni who return to the program add multi-generational connections.**
3	**Good interactivity. For example, workshop activity where participants do a hands-on activity and help design. Connecting to the community with an example or a site visit. Short-term engagement with mentor/role model and informal conversations are encouraged during the program.**
2	**Some interactivity, participants are given hand-on activities. No connection to the community. Short-term engagement with mentor/role model.**
1	**Minimal interactivity, traditional lecture style presentation where participants learn about engineering and can ask questions. No connection to the community and minimal engagement with mentor/role model.**
0	**Presentation on engineering with no reference to engineering design and planning, or interactivity in the session. No connection to the community and minimal engagement with mentor/role model.**

Participant equity

All children and youth can learn about STEM, however, there are opportunity and achievement gaps between low- and high-income backgrounds, and from dominant and underrepresented communities. To make our programs more effective, accessible, and meaningful, it is important that we look at who is opting in, who is left out, and what are the barriers to participation (ie. financial, transportation, social, etc.). In order to adequately address gender inequity, we must consider **which** girls/women are being reached and how programs might be creating barriers for girls/women from underrepresented backgrounds. First, consider the context of your participants, how do they identify themselves and what is important to them? Identify who is missing and design your promotion and structure to increase accessibility of your program to those underrepresented groups. Is participation targeted towards children and youth already interested in STEM or is program registration intentionally designed to target all (i.e. a school program for all grade 9 students vs. a fee-based weekend program that participants opt into)? A diversity of perspectives can lead to more creative solutions and will benefit the programs' relevance to local communities.

Check out:

'How to launch STEM investigations that build on student and community interests and expertise'

'Equity and diversity in science and engineering curriculum'

Intersectionality in STEM

Assessing your program:

4	All participants have adequate access, opportunities, and accommodations offered. Participants from low income and underrepresented groups are sponsored to participate and supports for parents are provided (i.e. extended program care, transportation to and from program to school, etc.). Connections are made with underrepresented groups and organizations within community.
3	Low barriers to entry and promotion reaches participants from underrepresented groups in the local community. Connections are made with underrepresented groups and organizations within community. Some understanding of participant demographics.
2	Low barriers to entry (ie. no fee, weekend schedule, transit accessible). Program targeting to children and youth who already have interest and access to STEM programs. Some understanding of participant demographics.
1	High barriers to entry exist (ie. difficult-to-access location, no transit available, difficult timeslot for working parents, high cost limits access). Some understanding of participant demographics.
0	High barriers to entry exist (ie. difficult-to-access location, no transit available, difficult timeslot for working parents, high cost limits access). No understanding of participant demographics.

Pathway to licensure

Reaching 30 by 30 requires efforts to inform girls/women on the specific skills, courses, and actions they need to take to become engineers. This is the next step to sparking participants' interest in engineering and the depth of information will depend on level or age group. Connect your program to your local engineering regulator and post-secondary engineering program, create links for your participants so that they know where to go after they complete your program. Find ways to integrate real-life examples of engineering practice. For example, have projects stamped by an engineer at the end of the program, or include community consultation. Highlight the courses that are needed to enter post-secondary engineering programs and connect program content to curriculum expectations in these courses. Make sure when participants leave your program, they understand the practical steps they can take to become an engineer (i.e. advanced math courses, physics courses, engineering programs in university, etc.).

Assessing your program:

4	Participants have the opportunity to hear about the full pathway to licensure from a variety of different perspectives including post-secondary students, engineer-in-training, and P.Eng. experiences and ask questions. Create connections with math/science curriculum and post-secondary programs.
3	Create connections between math/science curriculum. Connect to local post-secondary engineering programs and faculties. No information on becoming a P.Eng. after graduating from an accredited program.
2	Participants understand what the engineering profession is and the importance of math and science skills. No information on becoming a P.Eng. or connection with post-secondary program.
1	Engineering as a profession is discussed. No connections to skills or curriculum. No information on becoming a P.Eng. or connection of post-secondary program.
0	No mention is made of engineering as a profession. Focus is on math & science or STEM broadly, without specific engineering content. No information on becoming a P.Eng. or connection of post-secondary program.