

STEM and the student's role in learning

Conversation Guide



**Let's Talk About
the Future of STEM
Education in Canada**

This guide has everything you need to start a conversation about the future of STEM education in Canada and help young people's voices be heard. So... let's talk!

WHY THIS IS IMPORTANT...

Have you heard of STEM? It stands for Science, Technology, Engineering and Math. STEM related subjects are where you study or use knowledge and skills related to these topics.

You probably know that you need STEM in order to be a doctor, engineer, web developer or architect, but did you know that a background in STEM will be essential for high demand jobs in the next few years? Careers in business and banking, in trades like welding or electrician, in the arts, helping people in the community, and even in government, all need some STEM background. In fact, **over 70% of jobs in Canada will need STEM-based knowledge or expertise** – and this number will only continue to grow in the future.

Despite this fact, **less than 50% of students graduate high school with the STEM background** needed to pursue post-secondary STEM

education and jobs. This means that today's students may not have the knowledge and skills needed to get top jobs (top refers to a combination of factors including personal job satisfaction, high starting salary, most respected professions, recession proof and job of the future).

Given the increasing pace of technologically-driven change, now is a great time to rethink STEM in schools. Today we're hoping you can help us design a better way to teach and learn STEM by hosting a conversation that captures the opinions and experiences of young people. We will use your opinions and experiences to **help shape the future of STEM education in Canada** as part of the **Canada 2067** initiative.

HOW TO USE THIS CONVERSATION GUIDE

This guide is meant to help you, as a facilitator, host a conversation with young people (primarily between ages 14-18) about the future of STEM education in Canada. It's meant to be flexible and adaptable to fit your circumstances. Be sure to read through it before you host your conversation.

First off, think of this as a guide, not a script! You know your day-to-day experiences more than anyone else, so if you need to adapt the guide to report on your particular circumstances, then go for it. While this guide was written primarily for use with students in secondary school careers, civics or STEM-related classes, you may wish to use it in other ways with other groups, such as after-school clubs, or in non-STEM related classes.

The most important thing is to capture the main ideas from your conversation and share them with us. Choose at least one dedicated note taker to help you during the conversation. This could be a

volunteer/ student /participant, or another colleague. We've provided a workbook that can be used either for taking notes during your session or for consolidating insights afterwards. You may wish to make copies of it for participants to look at and use during the conversation, though this is not necessary.

Share your conversation notes with us **as quickly as you can** (the deadline for submissions is the end of the 2016-2017 school year, but the sooner you submit the more opportunities there will be to get involved). **Your note taker can take notes directly into an online form at canada2067.ca/youthvoice** or you can submit them later on the website, or by sending us back the workbooks in the mail. We're listening - we want to hear what young people are thinking, feeling and saying so capture as much detail as you can. It will all help inform the future of STEM education in Canada.

WHAT HAPPENS TO YOUR RETURNED CONVERSATION NOTES

We'll read all the conversation notes from across Canada looking for themes and patterns to inform the Canada 2067 Learning Framework: a knowledge-based list of priorities for action for education that will shape and prioritize science, technology, engineering and math (STEM) learning over the next fifty years. The collaboratively developed Framework will be shared at the Canada 2067 Conference in December 2017 and will inform the implementation of a consensus-based action plan to bring the participants' wisdom to life.

While excerpts of conversations submitted may be shared publicly, and statistics based on the data gathered from certain questions may be released, anything shared will not be attributed to individuals or institutions.

P.S. : If you enjoy this guide, there are two others that cover different topics related to the future of STEM education in Canada. Find them on Canada2067.ca and have your say as many times as you like!

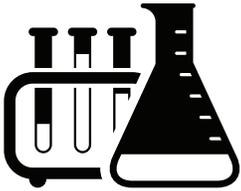
CONVERSATION PLAN

Time needed : 50-70 min

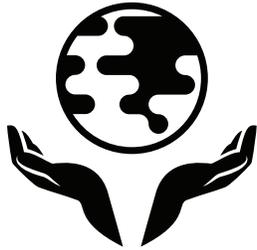
Details	Minutes	Resources
Introduction to topic <ul style="list-style-type: none">• What we'll be doing today• What is STEM• Why is STEM important• Why is this conversation important	5	Use the Conversation Guide for key information to share p. 1 <i>Why this is important</i> & p. 4 <i>Explain this exercise to participants</i>
Discussion questions on Learning and STEM <ul style="list-style-type: none">• Yes/No questions on STEM• Yes/No questions on youth opinions• Brief discussion on questions that piqued interest of participants	10 – 15	p. 5 & 6 of Conversation Guide for facilitator notes p. 2 of Workbook to record answers
Passion <ul style="list-style-type: none">• Introduce topic• Discussion as large group, small groups, or <i>think-pair-share</i>	10	p. 8 of Conversation Guide for facilitator notes p. 4 of Workbook to record answers
Self-directed learning <ul style="list-style-type: none">• Introduce topic• Discussion as large group, small groups, or <i>think-pair-share</i>	10	p. 8 of Conversation Guide for facilitator notes p. 5 of Workbook to record answers
Resilience <ul style="list-style-type: none">• Introduce topic• Discussion as large group, small groups, or <i>think-pair-share</i>	10	p. 9 of Conversation Guide for facilitator notes p. 6 of Workbook to record answers
Youth-led Initiatives <ul style="list-style-type: none">• Introduce topic• Discussion as large group, small groups, or <i>think-pair-share</i>	10	p. 9 of Conversation Guide for facilitator notes p. 7 of Workbook to record answers
Let's Wrap it up <ul style="list-style-type: none">• Final set of Yes/No questions• Discuss any of interest• Discuss next steps & importance of initiative	5	p. 10 of Conversation Guide for facilitator notes and p.8 of Workbook to record answers

EXPLAIN

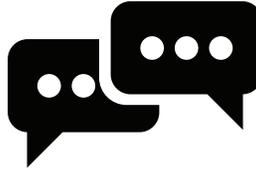
THIS EXERCISE TO PARTICIPANTS:



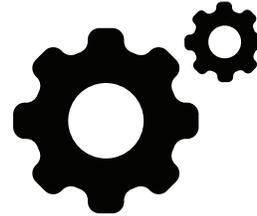
STEM stands for Science, Technology, Engineering and Math. STEM related subjects are where you study or use knowledge and skills related to these topics.



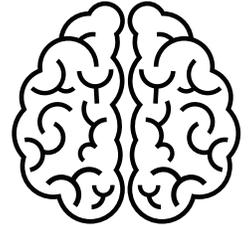
Thousands of other young people just like you across Canada from coast to coast to coast are sharing their ideas in similar conversations about the future of STEM.



Together, your voices and ideas will help change how students learn STEM. If enough people like you share their ideas, things can and will change for the better.



This is your chance to have your say on what you think is important to learn in school. Your voice can help shape how, when, where and what young people learn.



We're going to work through a series of exercises and discussions together. Don't be shy to tell us what you really think; we're listening!

During these discussions, encourage participants to:

1

Be open, honest and imaginative when thinking about the questions and their answers.

There are no right or wrong answers, although be polite and respectful.

2

Forget about today's reality and dream big!

Think about how much things have changed recently and imagine how much they will continue to change in the future.

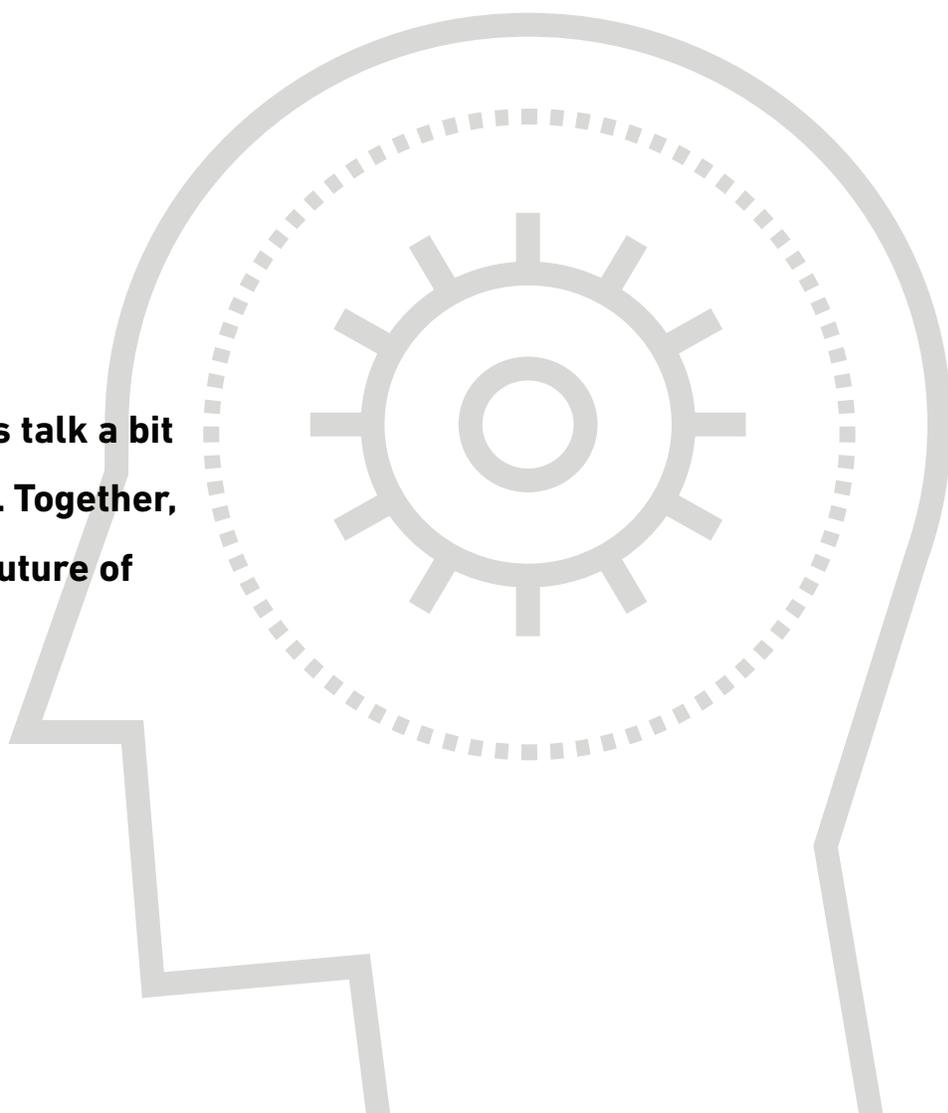
3

Take it to heart.

This is an opportunity to influence the next generations in a positive way. It's not often you're asked to contribute to a brighter future for Canada's youth, be thoughtful.

LEARNING AND STEM

Let's get warmed up! First, let's talk a bit about learning and STEM today. Together, our voices can help shape the future of STEM education in Canada.



Learning Goal

- These questions are designed to give us some basic information about young people's knowledge of STEM in the work world, as well as their experience of being asked about school and learning.

Instructions

- You may wish to couple this section with additional warm-up discussions or activities as appropriate, such as an icebreaker for a group that does not yet know each other, some general STEM careers information, etc.
- Make sure you've designated a note taker to capture and submit their notes online during the conversation. If you don't have a computer and connection to the internet during the conversation, use our workbook (available at canada2067.ca) to collect the insights. You can also submit them online later or mail them in. Either way, don't forget to submit your results by the end of the 2016-2017 school year!

Note to facilitator:

Ask participants to raise their hands for 'yes' / 'no' and have the notetaker record the number of hands raised for each question in the workbook. If time allows, **you may wish to encourage some discussion of questions of interest afterwards.**

Did you know that over 70% of all future jobs in Canada will need STEM-based knowledge or expertise?

Yes/No

Did you know that less than half of students graduate high school with the STEM background needed to pursue post-secondary STEM education and jobs?

Yes/No

Does that fact surprise you?

Yes/No

Do you think there could be changes made to the way STEM is taught and experienced in school that would increase the number of students who choose to stick with STEM?

Yes/No

Note to facilitator:

As a lead-in to the next two questions, remind participants that the purpose of today's discussion is to gather young people's opinions and experiences to help shape the future of STEM education.

Has anyone ever asked you what you think is important to learn in school?

Yes/No

Do you wish you would be asked about what you think of school more often?

Yes/No

Let's talk ... about STEM & the student's role in learning

Let's talk about what role students play in learning. Better understanding the part that individuals themselves play in education will help design more effective, engaging and inspiring learning opportunities for both STEM and non-STEM subjects. If we can learn more about students' interest in learning and leading, we can work to unlock the potential within all young people.

Learning Goal

Gather examples of:

- Times when students have felt inspired and excited by school
- Ways that young people; participate in self-directed learning, including using the internet;
- Moments of resiliency that young people experience;
- Youth-led initiatives that have created positive change.

Instructions

- Introduce the four discussion topics: passion, self-directed learning, resiliency and youth-led initiatives;
- Each topic should take about 10 minutes.

Let's talk about passion



Note to facilitator:

As you move into the next section, you may wish to use different structures to support the discussion depending on the size of the group, room layout, etc. Potential options might include:

- Think-pair-share (participants take a moment to think alone, share with another person in a pair, then share as a pair with the group)
- Small group (3-4 people) discussions, with or without a note taker in each group, with or without sharing with the overall group
- Open large group discussion

For more detailed facilitation tips, check out our hosting guide at canada2067.ca/youthvoice Whatever structures you use, be sure to include note taking on the key points of the discussion so that your participants' ideas and thoughts can be shared with us. All recorded conversations will influence the future of STEM education in Canada.

Think about a day where you were really pumped and excited to go to school (for school-related activities!). Maybe it was because of something you were going to learn, or an activity you were going to participate in, or something else in one of your classes.

- 1 Try to remember as much detail as you can: what was the subject? When and where did this happen? Who was involved? Describe what happened.
- 2 Why did it make you feel pumped to go to school?
- 3 Are you doing anything differently today because of what happened? If so, what?

Let's talk about self-directed learning



Note to facilitator:

This is an opportunity to discuss examples of self-directed learning (times when the students have taken the initiative to learn into their own hands, with or without the help of others, and chosen what their own learning process and outcomes will be). We've purposefully split out 'learning from the internet' as a direct question so please be mindful not to focus there on the first question. You may wish to transition to a different facilitation structure as you move into this section, depending on group dynamics, room layout, etc.

Think about a time that you learned something you wanted to know about outside of school. The example could be anything from interviewing someone, learning from a book, to getting out of the classroom and learning hands-on, or signing up for a course. Try to think about a specific time and topic.

- 1 What were you learning? When and where was the learning happening? Who encouraged you? Describe what happened.
- 2 What parts of this experience did you particularly enjoy?
- 3 How did that learning experience make you feel?

Think about the Internet and how you use it in your day-to-day life as well as what you've seen elsewhere, such as in movies or TV shows. Think about some ways you use, or could use, the Internet in school.

- 1 Describe some possible ways the Internet could enhance your learning in school.

Let's talk about resiliency



Note to facilitator:

This is a great opportunity to introduce some new ways of thinking about the topic at hand to your participants by engaging in a brief opening discussion about resilience more generally. You could discuss what obstacles or barriers they or people they know have experienced in their lives (at school, at home, at work, etc.), and how they overcame them. This can help expand students' mental models of these concepts and make for richer discussion of the questions.

Think back to a time when you worked very hard to accomplish something in school, and despite your fears, or what other people said or did that might have otherwise gotten in your way, your dedication paid off.

- 1 What were you working on? When and where was the learning happening? Who encouraged you? Who was involved? Describe what happened.
- 2 What surprised you about that experience?
- 3 How were you able to stay motivated?

Let's talk about youth-led initiatives



Note to facilitator:

This is an opportunity for students to discuss youth-led change with their peers, and get inspired about possibilities and creating change.

Think about a student or youth-led initiative that led to positive change. This could be in or outside of your school, all that really matters is that it led to change of some kind. Perhaps it was something that created some positive social, environmental or political change, or more generally something that influenced people for the better.

- 1 Describe an example of a youth led initiative that brought about change.
- 2 Who was involved, what happened and what changed?
- 3 Why do you think it was so successful?

Let's Wrap It Up!



Note to facilitator:

You may wish to have participants put up their hands for each answer and have the notetaker record the number of hands raised in the workbook. If time allows, **you may wish to encourage some discussion of questions of interest afterwards.**

- 1 How many days, over the last four weeks of school, were you excited to come to school because of what you were learning in STEM?

Read the following list out loud, or write it out so it's visible. Then ask participants to vote by raising their hand. Record the number of hands per question. Options are: None / Once or twice / A couple times / At least once a week / Between 50% and 100% of the days

- 2 Do you think students should be allowed to use the Internet to learn about STEM concepts in school?

Yes / No

- 3 At school, would you like to learn how to be more resilient by overcoming obstacles, barriers or other setbacks?

Yes / No

- 4 Have you ever experienced a youth-led initiative in your school?

Yes / No

- 5 Do you feel youth-led initiatives can be a powerful tool for change?

Yes / No

NEXT STEPS

How to close out the discussion with participants:

You did it! Thanks for taking the time to be a part of this conversation. Be proud that your voice is making a difference and helping build a bright future for Canada's young people. Submit your conversation online at: canada2067.ca/youthvoice or mail your workbook to:

Canada2067 Research Team
H&K Strategies
55 Metcalfe St #1100
Ottawa ON K1P 6L5

WHAT HAPPENS NEXT:

If you and your students found this conversation and topic interesting, you can stay involved in a number of ways:

- Host another conversation (there are 3 subject areas). Details at: canada2067.ca/youthvoice
- Apply to join us at the Canada 2067 Conference, or live stream some events with your class: canada2067.ca/conference
- Suggest others have conversations and share hosting details with colleagues
- Stay involved through social media at :



facebook.com/Canada2067



[@Can2067STEM](https://twitter.com/Can2067STEM)

HOW YOUR CONVERSATION WILL HELP CHANGE HAPPEN:

Gather ideas about STEM learning from: Students, Teachers, Parents, Government, Industry

Develop a vision and framework for innovation in STEM learning

Canada 2067 conference to share vision and launch initiatives to get there

People across Canada join together and make STEM accessible and relevant to all students

TALK



THINK



SHARE



DO



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