



# SPOTLIGHT ON SCIENCE LEARNING

## EXPLORING PARENTAL INFLUENCE:

*Shaping teen decisions regarding science education*

**AMGEN**<sup>®</sup>

let's talk  science

# MISSION

Let's Talk Science is a national, charitable organization that motivates and empowers youth to fulfill their potential and prepare for their future careers and roles as citizens. Let's Talk Science supports learning and skill development using science, technology, engineering and mathematics (STEM).

Spotlight on Science Learning: Exploring Parental Influence is the latest research report from Let's Talk Science, made possible by Amgen Canada.

For more information about Let's Talk Science, please visit [www.letstalkscience.ca](http://www.letstalkscience.ca).

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Spotlight on Science Learning  
Exploring Parental Influence: Shaping teen decisions regarding science education

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*Let's Talk Science is pleased to contribute this Spotlight on Science Learning 2015 report, which examines parental attitudes and understanding of STEM skills and careers. Together with our previous reports, supported by Amgen Canada, our goal is to build collective understanding about the opportunities and challenges that face our youth in a global economy, which is increasingly underpinned by science and technology. With this information we can better align our efforts in support of all youth. Let's Talk Science has over twenty years of experience bringing meaningful programs and resources to youth and educators across Canada. For more information, please visit [www.letstalkscience.ca](http://www.letstalkscience.ca).*

**Rick Dobson**  
Chair, Let's Talk Science



*Rooted in discovery and innovation, Amgen Canada understands the importance of science education and is committed to raising awareness of the value of science literacy in Canada. Amgen is honoured to partner with Let's Talk Science for the fourth annual Spotlight on Science Learning Report. This year's report takes an in-depth look at the influence parents wield when it comes to their children's education and career choices, as well as how, and if, they are exerting their influence effectively. Recognizing the importance of STEM for the future of Canada's economy, Amgen firmly believes that we are all responsible – parents, teachers, government, industry, and the community – to encourage our children and future generations to explore the transformative power of science, and reinforce the value of science learning for any path they wish to pursue – through high school and beyond.*

**Karen Burke, PhD**  
Director, Regulatory Affairs, Amgen Canada



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# EXECUTIVE SUMMARY

When teens face academic and career decisions, it's their parents' opinions that matter most, according to research by the *Spotlight on Science Learning (SOSL)* project. Considering this influence, a new survey reveals that today's parents can do more to encourage their children to engage in and pursue STEM (science, technology, engineering and math) education throughout high school.

STEM courses are critical, especially at a time when a growing number of jobs require a background in these areas. Moreover, industry and academic leaders say virtually any job demands the skills and knowledge that exposure to STEM nurtures: problem-solving, critical thinking and experimentation.

This is the fourth SOSL report developed from a partnership between Let's Talk Science and Amgen Canada. The key findings:

1. Parents agree on the skills of the future. These include: problem-solving, critical thinking, understanding math and science, and synthesizing data and information – all of which benefit from effective STEM engagement.
2. Parents feel the importance of science education is growing. Seventy-five per cent say most jobs will need at least basic math and science, while 70 per cent say their children should have STEM education even if they aren't now interested in a job in those fields.
3. Parents want more resources for STEM. Given options for spending extra money on schools, 46 per cent of parents would improve math and science education.
4. Parents overestimate how much STEM their children get. While science is optional after Grade 10, half of parents agree all students can benefit from it. However, only 28 per cent *often* discuss the value of optional science, and 29 per cent *rarely or never* raise the subject. Many parents mistakenly think science (31 per cent say so) and math (59 per cent believe) is mandatory to the end of high school.
5. Parents walk the walk, not just talk the talk. Fifty-three per cent of parents say their jobs are related to STEM. Parents have a deeper understanding of the relationship between STEM jobs and what students are drawn to – things like designing, building, discovering or analyzing information, and problem-solving (source: 2014 SOSL youth survey).
6. Parents want information for the conversation. More parents might raise the importance of taking science if they knew: dropping it closes doors (89 per cent would be more likely to discuss it); most future jobs benefit from STEM experience (87 per cent); and STEM careers pay well (86 per cent).

Parents need to start having *the talk* with their kids to emphasize the importance of STEM education. It is essential that parents discuss how such education has value through high school, post-secondary plans and in any career. That will help shape the decisions made by their children – decisions that have far-reaching implications for the prospects of Canada's teens and the country's future prosperity.

# INTRODUCTION

## **For our students and our country, STEM education – science, technology, engineering and math – can increasingly unlock opportunities and open career doors.**

A background in STEM is a fundamental asset in many ways. A growing number of jobs either require a STEM background, or call on STEM skills and knowledge in some way. As the global economy continues to shift, Canada can enjoy a leadership position in technological advances, productivity and innovation. However, to do so we need STEM-literate graduates who can take advantage of and create new opportunities.

Today's youth and tomorrow's economy will succeed through greater capabilities in problem-solving, critical thinking and experimentation. Meaningful exposure to STEM engagement supports and encourages such talents, attitudes and ingenuity.

Are we nurturing enough students with these abilities? Indicators that measure global innovation and competitiveness show Canada slipping in international rankings as countries around the world rise to new challenges. Canada has a highly trained workforce; yet, compared to peer nations, Canada's rate of university degrees in science and engineering, and our employment levels in science and engineering occupations, is no better than middle of the pack.

### **We can and must do better.**

We need students who understand how science can help make sense of the world, and solve some of the world's challenges. We need students with a grounding in STEM literacy – the general and technical skills that will be drawn upon in life and in the workforce. And we need students in sufficient numbers who go on to graduate and postgraduate studies in STEM, to enable new research, technologies and discoveries.

This is more than an economic imperative. STEM-based skills are essential for making day-to-day decisions about the world around us, including critical areas like our health, food, housing, transportation, the environment and energy use. STEM offers ways to make informed choices, everywhere from the workplace to our personal lives.

Academics and think tanks, corporate executives and industry associations, and government officials alike have showcased the importance of STEM to our individual and collective prosperity. However, as teens face life-changing academic and career questions, one opinion leader matters above all: their parents.

A new survey commissioned by Let's Talk Science, made possible by Amgen Canada, reveals how parents understand and exercise their influence.

How can Canadians strengthen our ability to meet tomorrow's economic and societal challenges? It's not just about where we work but what we know and the skills we have and can apply. We need a balance. The Council of Canadian Academies has identified three types of STEM skills:

1. **Fundamental skills** – includes reasoning, mathematics, problem solving and technological literacy, all of which are important regardless of occupation.
2. **Practical skills** – developed through training in technologies, applied sciences and the trades.
3. **Advanced skills** – these enable engagement in discovery or applied research, including development of new technologies.

Source: Council of Canadian Academies (2015): Some Assembly Required: STEM Skills and Canada's Economic Productivity. The Expert Panel on STEM Skills for the Future.

## METHODOLOGY

The results presented here come from an online survey of 805 randomly-selected Canadian parents, whose children (aged 13-17) are entering Grades 7-12 in fall 2015. All parents surveyed are Angus Reid Forum panelists. The survey was conducted April 20-21, 2015. This sample was balanced on a 50/50 gender split and to regional data for the parents in proportion to the census. Discrepancies in or between totals are due to rounding.





## SPOTLIGHT ON SCIENCE LEARNING

Let's Talk Science is an award-winning, charitable education and outreach organization, and Amgen Canada is a leading biotechnology company. Each is committed to raising awareness about the growing importance of science literacy in Canada, and to encouraging youth to engage in STEM learning.

One example of this commitment is their partnership on the Spotlight on Science Learning (SOSL) series. Together, SOSL reports describe what is needed to spur STEM excitement and engagement, for the benefit of our young people and Canada's workforce. Each report has shed new light on a different facet of this challenge.

This is the fourth consecutive year that SOSL has produced a report. The first two reports examined the state of STEM learning across Canada. SOSL #1 in 2012 was a landmark report that identified and explored 11 key benchmarks of progress in STEM learning, from elementary and secondary school through to post-secondary education and into the workforce. SOSL #2 in 2013 looked at the impacts of dropping optional high school science and math.

With a better understanding of STEM learning across Canada, SOSL #3 in 2014 drilled down to how Canada's teenagers think about their futures: what motivates, interests and influences them around STEM, their broader education and careers? In that report, it became clear that parents, by far, have the greatest influence on students' educational direction, with teachers a distant second.

Now, SOSL #4 looks at parents and their role related to STEM education in high school and post-secondary pathways (i.e. university, college, apprenticeships). To effectively influence and encourage their teens to continue in STEM education, parents need to ask themselves some tough questions:

- Are they equipped to support their children in making choices that keep career opportunities open?
- Do they talk – and listen – to their children enough and in the most effective ways about those choices?
- Do parents understand the changing nature of work that is related to STEM?
- Do they have a sense of how a STEM foundation can support their children's goals?

Our survey shows that the majority of parents do often discuss education and career goals with their children. Yet, only a minority of parents (barely more than one-quarter) spend a lot of time talking about the importance of taking optional science courses.

Would parents be more likely to raise the importance of science if they knew dropping it closes doors to university, college and skilled trades? Having *the talk* is vital. Understanding parental perceptions will help the education and STEM communities support that conversation between parents and their teens. Ultimately, parents can use their influence, throughout schooling and at vital decision points, to help their children benefit from science education for life.

# SKILLS OF THE FUTURE

Any conversation begins with an understanding. What skills do today's children need to support their success tomorrow? There is near unanimity among parents.

SKILL	% OF PARENTS WHO CALL IT IMPORTANT
Problem-solving skills	100%
Being on time and respectful of others	99%
Work well as part of a team	99%
Ability to think critically	98%
Use electronic devices to find information	98%
Communicate in writing	97%
Understand math	95%
Be able to speak in front of a group	94%
Use electronic devices for presentations/computing	93%
Synthesize data and information	93%
Being able to lead a group	92%
Understanding science	88%
Play a sport/be physically fit	78%
Speak a foreign language	74%
Write software code	50%

While some of these are general skills, others relate to STEM directly, and still others benefit greatly from STEM engagement. With this insight into what's viewed as critical factors for the next generation's success, we looked deeper at parental attitudes on STEM education in building these skills.



# PARENTS BELIEVE THE IMPORTANCE OF SCIENCE EDUCATION IS INCREASING... AND SO SHOULD INVESTMENTS

Parents agree that a strong knowledge and understanding of STEM will give their children skills to succeed. Three-quarters of parents say most or all jobs of the future will in fact require at least a basic understanding of math and science. Furthermore, half of parents (51 per cent) say that in the next 15 years jobs in Canada will require even *more* science training and education than they already do today.

Why do parents feel so strongly? Three-quarters (76 per cent) say STEM can help prepare students to become the world's next innovators and entrepreneurs. Some 69 per cent of parents believe a stronger emphasis on STEM education is necessary to equip future generations with 21st-century skills, such as problem solving and critical thinking.

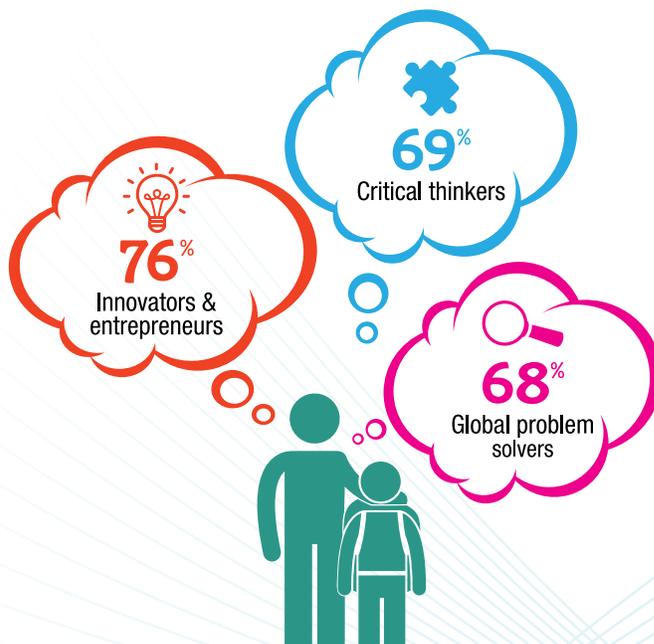
Many students take time to figure out their paths, and may not equate the STEM they are learning in school with long-term career implications. It's vital for parents to listen to and acknowledge those feelings. But parents also see connections that their children might not. Parents can be supportive too by reinforcing that a STEM foundation is essential regardless of their child's current career interests. Some 70 per cent of parents surveyed say it's important for children to have STEM education, even if they aren't currently interested in a job in those fields.

As the views of parents make clear, STEM engagement does more than just teach students numbers, facts and scientific equations; it helps prepare the next generation to make a positive difference in the world.

## Parents were asked, can STEM education prepare students to become...

### Today's students → tomorrow's leaders

Parents believe that STEM education prepares students to become...



Still, the STEM message has room to grow. It's true that virtually every parent surveyed recognizes critical thinking and problem-solving skills as essential building blocks for success – and two-thirds see how STEM nurtures those skills. That's an important conversation-starter between parents and children. **However, it still means that one-third of parents do not see the clear connection between STEM engagement and the development of these fundamental skills.**

## Devote more resources to STEM and career awareness

Supporting more robust and meaningful STEM education requires resources – for equipment and supplies, for educators’ professional development, and so on. Is that a priority for parents?

When presented with a list of options for spending extra money on schools, 46 per cent of parents responded that they would improve math and science education. That’s higher than the numbers of parents, *combined*, who would spend the money on improving language/English education and music/arts programs.

PRIORITY	AGREE
Add programs around job/career opportunities in the region	50%
Reduce class size	48%
Improve math and science education	46%
Improve language/English education	26%
Improve music/arts programs	18%
Buy new equipment	16%
Improve sports programs	14%
Pay teachers more	12%
Extend the school year	11%
Fund more field trips	10%

## How would you spend extra money on your children’s school?

And, if they could be minister of education for a day? One-quarter of parents (24 per cent) would bolster hands-on learning, which dovetails with effective STEM education.

Three-quarters of parents also say it’s important for schools to discuss career goals with students, showcase diverse career opportunities to all students, and counsel students on the course requirements for specific careers.

So how do parents feel Canadian schools are faring in teaching STEM and getting their children ready for their futures? A majority of parents responded that they just don’t know. What three-quarters of parents did say is that preparing students for STEM careers should be a top priority. One-third (32 per cent) agree (and only an additional 4 per cent strongly agree) that Canada is doing a good job teaching STEM compared to other countries.

*Note, while parents understand the importance of this education, they don’t typically use the acronym “STEM”; in fact 85 per cent are not at all or not very familiar with it.*

# PARENTS CAN HELP SET THE PATH, IF THEY UNDERSTAND IT

Parents are talking to their children about their future – but not always about ways to get there.

The majority of parents polled (57 per cent) discuss education goals or pathways often, and 51 per cent say they frequently talk to their kids about career goals. An even higher percentage of parents (75 per cent) say that STEM education is very important for today's youth; that's up from 64 per cent who said so in a 2011 survey conducted by Let's Talk Science and Amgen Canada.

In fact, two-thirds of parents (67 per cent) agree that it's important for all children to participate in STEM education until the end of high school. However, only 28 per cent of parents often discuss with their children the value of taking optional science courses. Furthermore, 29 per cent of parents admit they rarely or never raise the subject of taking optional science. That's in line with the 2014 SOSL survey of teens, which found that fewer than one-quarter of parents spoke to their children about the importance of science for their careers.

Why aren't more parents having these talks? Among the reluctant group in the parent survey (i.e. those who replied that they never discuss it with their children), about one-third figure there are plenty of careers that don't require science at all. Another third feel that science is too hard or that their children aren't interested.

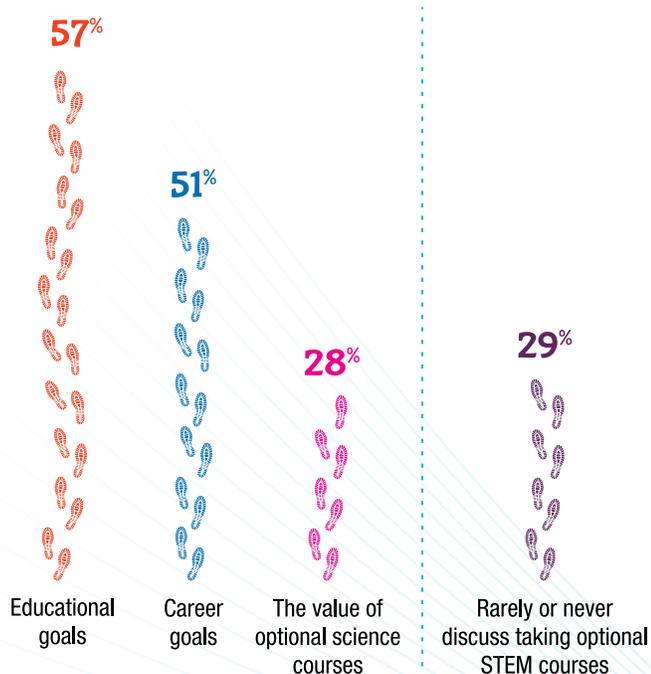
For high school students, getting the message from their parents that science is important matters. Past SOSL reports revealed that only one-quarter to one-third of Canadian youth want to take various STEM courses in their final year of high school. Interest in and engagement with STEM declines by grade; most teens say they don't understand where science education leads, and are not overly interested in careers in STEM fields (source: youth survey for SOSL report #3, 2014).

Even when teens grasp STEM's significance, the youth survey showed that these impressions do not always align with subsequent action.

What might prevent students from disengaging from science too early? Almost nine in 10 parents (88 per cent) believe they have a lot or some influence on their children's education – and their children agree. In the 2014 SOSL report, teens said that parents, by far, have the greatest influence on their educational direction, with teachers a distant second (76 per cent vs. 24 per cent). As students try to decide what to do after high school, parents also remain a highly useful source of information, according to youth (94 per cent agreed).

Given the influence of parents, their encouragement can help children pursue the grounding they need to open up academic and career choices. This would avoid the need to make up courses after high school (due to dropped science and math), and might prevent lost opportunities.

## What are parents talking to their kids about?



## Almost one-third of parents are mistaken about how much STEM education their children get

Not only do a strong majority of parents say that children should take part in STEM education all through high school, a fair number believe – wrongly – that it’s happening.

*Some 31 per cent of parents think science is a mandatory requirement to the end of high school, and 59 per cent of parents think the same about math. This could explain why parents aren’t discussing the value of taking optional science courses more often; they assume their children are already required to take them.*

In 2015, no province or territory mandates completing Grade 12 science for graduation. However, almost two-thirds of parents would change that. In the SOSL survey, 64 per cent of parents said science education should be mandatory until the end of high school.

If science is optional after Grade 10, which students should take it? Not just those pursuing certain paths, say parents. Half of parents agree that all students can and should benefit from these courses beyond the point that they’re compulsory.

## Parents were asked who should take math and science past Grade 10?

TYPE OF STUDENT	AGREE
All students	51%
Want careers in those fields	37%
Going to university	29%
Going to college	22%
Starting apprenticeship	10%

9/10 parents agree that a background in science is a foundation for success in any career:



## Parents believe that STEM is important regardless of the post-secondary pathway

What post-secondary path is thought to be of most value to their children in future career considerations? When asked, 41 per cent of parents say university, 17 per cent say a college diploma/certificate, and 15 per cent say a skilled trades apprenticeship.

*Interestingly, more than one-quarter of parents (27 per cent) say their children can benefit most from at least two of these options. This reflects a growing feeling that students need practical experience before entering the workforce.*

Just more than one-third of parents (36 per cent) feel a university degree is needed to secure a good job. Yet almost twice that many (70 per cent) feel that STEM education is important no matter if a student is going to university. Parents recognize the value of STEM quite separately from the educational pathways.

# EXERTING THEIR INFLUENCE



When it comes to the importance of science education, parents have influence, not just as mothers and fathers, but as members of the Canadian workforce.

Many parents have firsthand knowledge about the value of STEM education in opening career doors. Over half of parents surveyed (53 per cent) say their current jobs are very or somewhat related to STEM.

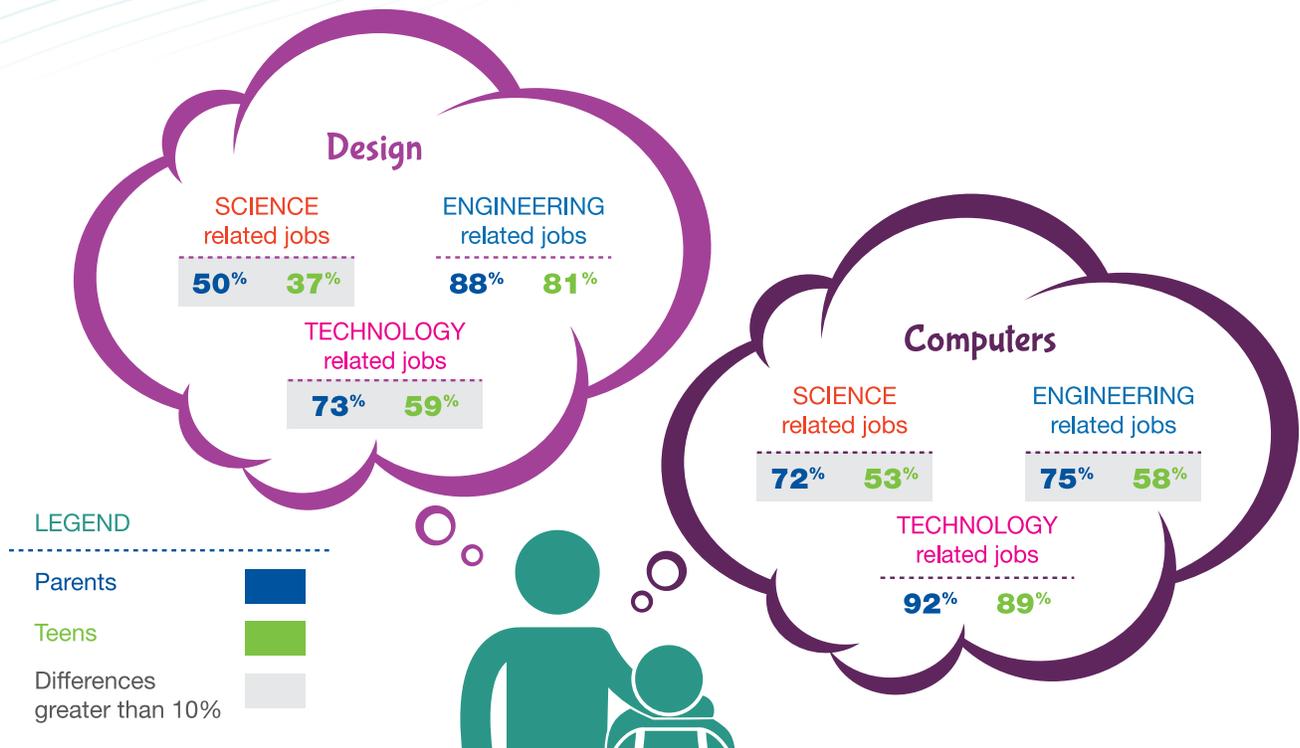
In addition, most parents surveyed took science beyond Grade 10; 34 per cent took optional science during their last two years of high school and another 39 per cent took science at the post-secondary level. Just one-quarter of parents took science to Grade 10 only.

Based on their exposure to various workplaces, and their life experience, parents appear to have a more realistic view of what work happens in certain jobs, including the type of work that youth value.

The 2014 SOSL survey found that in thinking about careers, students are drawn to a set of interests and values – more than to a set of discrete tasks. The vast majority want careers that use higher-order skills, like making a contribution, helping people, making decisions and solving problems. As reported last year, this speaks to overall ambition as opposed to the appeal of a certain sector or job. Given what motivates students, it's important to show them that what they like can apply in different settings – including STEM-based work settings.

Even when students are getting the message of where they can apply certain interests and skills – often in high numbers – parents still have a deeper understanding. Consider these perceptions, comparing results of the 2015 SOSL parent survey and the 2014 SOSL teen survey.

## We asked parents and teens which skills are needed for STEM-related jobs



### Here are other skills needed:

	SCIENCE related jobs	ENGINEERING related jobs	TECHNOLOGY related jobs
Discovering new facts & info	83% 79%	64% 44%	75% 58%
Saving lives	84% 79%	51% 31%	60% 41%
Interesting work environment	79% 64%	74% 53%	76% 56%
Working as a team	77% 69%	81% 73%	80% 69%
Problem solving	82% 72%	83% 71%	81% 69%
Building	47% 26%	88% 88%	68% 43%
Recording & analyzing data	73% 65%	66% 49%	84% 72%



## Information for the conversation

With their life and work experience, parents can understand and relate to what matters to their children, and make connections between those interests and STEM jobs and careers. Yet parents also yearn for more facts and information that can inform and shape these conversations with their children.

A strong majority of parents (75 per cent) would welcome information about STEM and career choices to pass onto their child. Parents also say they would be more likely to talk about the importance of taking science if they knew the following:

IF YOU KNEW THAT...	...WOULD YOU TALK ABOUT IT?
Dropping high school science closes doors to university, college and skilled trades	89%
The majority of future jobs benefit from STEM experience	87%
STEM careers offer high earning potential	86%
Canada's economy will be at risk if we can't fill STEM jobs	79%

Parents know that for their children's prospects and well-being – and Canada's – it's critical to have open discussions about where STEM education might lead.

## HAVING THE TALK

It's clear that Canadian parents have significant influence on their children when it comes to choices they make about education pathways in high school and beyond. Canadian parents also appreciate the importance of STEM education and investing in making it even better.

It's vital for parents to use that influence. That means having *the talk* with their children early and often – repeated and meaningful conversations about why science education matters so much, whether it's mandatory or optional.

Emphasizing that such an education can reap benefits all through high school, in post-secondary plans, and in any chosen career. (See page 20 for advice from parenting expert Alyson Schafer about how to listen during these conversations.) The encouragement of parents can play a significant role in helping students understand how to keep the doors open to their future.

By offering the right support around STEM, parents can help positively shape and support their children's decisions. That will improve the chance of students' future successes. Young people will be even more likely to become informed and responsible citizens, and grow into the careers they value – and that are of increasing value to our country.



## SPARKING AN INTEREST – HOW TO LISTEN

Exploring the academic and career choices of children, and helping them learn how STEM can play a part, isn't a one-time conversation. When it happens, listening can be as important as talking, says parenting expert Alyson Schafer.

Schafer is a therapist, columnist, educator and best-selling author of *Breaking the Good Mom Myth*, *Honey, I Wrecked the Kids* and *Ain't Misbehavin'*. She offered the SOSL team her take on how parents can best understand, support and spur their children's interests.

"While it may seem like they don't listen to us, we can be very powerful influencers in our children's lives if we have their respect," says Schafer. "We can only guide and direct them when we have a sense of their internal world and understand their thinking. That requires parents to focus first on the art of listening, rather than the art of persuasion."

What level of listening can you accomplish? Consider Schafer's three levels.

### Level One: Listening with an agenda

"This is the most superficial type of listening," she says. "We hear what the other person is saying, but we can't really pay attention because we're fixated on pushing our agenda." In other words, we know the outcome we want to accomplish and are just giving children airtime waiting for our turn to speak.

Example: "I don't care what you say – you are not dropping math!"

### Level Two: Listening from our own perspective

We're now hearing what our children are saying, but analyzing it through our own life experiences and personality. "We're still making the conversation about us, and our children will not feel understood," says Schafer.

Example: "I hear you. Chemistry doesn't interest you, but when I was in high school my parents forced me to take it and in the end I was happy I did."



### Level Three: Listening with an open mind

This is the deepest level of listening, where a child will feel that you actually understand and know them. "It requires you to suspend judgment and disregard your pre-formed ideas about your child or their past," Schafer says. "Listen in the present moment with a fresh sense of curiosity. Listen not only to the words and facts, but also for the feelings, attitudes and opinions."

Example: "Sounds like this is a tough decision for you, because it's more than just about course selections. You're feeling that if you take academic math and your friends all go for applied you won't be in the same classes – and that can throw your whole social world in a tail spin, right?"

In paraphrasing what their child has said, the parent is asking them "Have I heard and understood you correctly?" Validating what they are saying does not mean you agree, says Schafer.

"Instead, we simply confirm we have an accurate picture of the child's position. It's from that perspective that we're better able to guide them in positive directions with compassion and understanding. That keeps the relationship healthy, and allows our children to hear our opinions and thoughts with an open mind, too. We're more likely to be accepted as their sage council if we have earned their trust and respect through effective listening."

# APPENDIX I: A SHARED RESPONSIBILITY

Achieving greater success in STEM learning is a shared responsibility, requiring a collective call to action. As the SOSL series has reported before, this includes:

## Youth

Take responsibility for your learning, and actively seek connections between school science in everyday life. Ask your teachers and school leadership for the resources needed to do science effectively. Seek information about jobs that benefit from STEM learning.

## Parents

Participate in STEM activities with your children. Talk to them about the importance of pursuing STEM courses to the end of high school to keep their options open, and support them in those studies. Seek out information to help them realize the breadth of jobs that are available to people with STEM backgrounds.

## K-12 educators

Make STEM learning relevant to students by providing contexts that are meaningful to them. Increase the focus on the nature and processes of science to help students develop competencies needed for 21st-century academic and workplace success.

## Post-secondary educators

Make STEM learning more relevant for your students, too, and offer more interdisciplinary programs that link that learning with other non-STEM fields (e.g. business and public-policy studies). Help students make the connection between STEM learning and jobs. Support elementary and high school educators as they prepare students for post-secondary success.

## Non-profit STEM learning and outreach organizations

Offer engaging programs for all ages. Ensure that programs are available outside of formal education systems, as well as in partnership with schools. Provide ample opportunities for volunteers to participate.

## Industry

Clarify the connection between the outcomes of STEM learning and jobs. Support STEM learning throughout the full learning continuum. Offer co-op positions and support apprenticeships. As an investment in our future, support employees (with resources and time) who are making a difference to STEM learning.

## Governments

Support and scale effective STEM-learning practices. Review school curricula to ensure that programs match desired outcomes. Resource schools, universities, colleges and non-profit organizations appropriately to support STEM learning and outreach efforts.



What can we do to advance science learning, and have more students pursue STEM education in high school and beyond? The original eight recommendations from the first Spotlight on Science Learning report in 2012 remain valid:

1. Establish a national forum for ongoing multi-stakeholder discussion related to STEM talent development.
2. Support and scale effective STEM-teaching and learning programs, in and outside school, to: revitalize young people's love of science with compelling programming; and help youth see how science education is relevant (i.e. it will serve them well no matter what career they envision – and in life, too).
3. Establish or improve tracking and reporting systems required for effective data collection, around participation in high school STEM programs, and post-secondary applications, registrations and graduation in STEM programs.
4. Build better connections between job forecasts and STEM learning demands – and make this information available to schools in a relevant way – so youth and parents are more aware of future employment opportunities.
5. Build awareness about the breadth of career opportunities that are available with STEM learning.
6. Conduct a system-wide review of STEM curricula across Canada to develop programs that increase interest and participation in STEM studies (optional high-school courses and post-secondary programs).
7. Assess the factors that affect the capacity of universities and colleges to support and maintain STEM studies.
8. Determine a suite of benchmarks, with public input, that can be used to measure the state of the science culture in Canada. This would augment a 2014 report on the topic published by the Council of Canadian Academies (Science Culture: Where Canada Stands).

## APPENDIX II: SPOTLIGHT ON SCIENCE LEARNING: WHAT WE’VE ALREADY LEARNED

Each of the three previous Spotlight on Science Learning reports have expanded our understanding of the importance of and influences on STEM education, from classrooms to careers. The first report focused on the “what” (key benchmarks of STEM engagement), the second on the “why” (this matters because we all lose when STEM isn’t pursued), and the third on the “how” (the way teens think about their futures and decisions about it).

**SOSL #1:** “A Benchmark of Canadian Talent” (2012) drew on a national expert panel of members from STEM industries and education communities. The report identified 11 benchmarks that need to be tracked to monitor Canadian progress in STEM learning ([www.letstalkscience.ca/research-publications/spotlight-on-science-learning](http://www.letstalkscience.ca/research-publications/spotlight-on-science-learning)). Content explored opportunities of the future (where jobs are growing, and what proportion call for STEM skills); the talent-development pathway (how students fare in science and math, and whether those abilities/interests translate into post-secondary plans related to STEM); and the importance of supporting a science culture.

**SOSL #2:** Creating a large pool of STEM-based talent is crucial to keeping Canada competitive and Canadians employed. Failing to stick with STEM education is a choice, but it has costs – costs we all share. “The High Costs of Dropping Science and Math” (2013) looked at three areas of impact ([www.letstalkscience.ca/research-publications/spotlight-on-science-learning](http://www.letstalkscience.ca/research-publications/spotlight-on-science-learning)). There are the financial costs (making up lost courses); the opportunity costs (lost future earnings); and the societal costs (reduced innovation in Canada and unfilled jobs due to incompatible skills).

**SOSL #3:** Canadian teens face many decisions about what they want to do with their life and the paths to get there. Are the high schoolers of today preparing for tomorrow’s world? Do they grasp the importance of being educated in science and technology, to them and society? In “Shaping Tomorrow’s Workforce” ([www.letstalkscience.ca/research-publications/spotlight-on-science-learning/spotlight-2014](http://www.letstalkscience.ca/research-publications/spotlight-on-science-learning/spotlight-2014)), we surveyed Canadian youth about their interests and influences, the values that are important when considering career options, their appreciation for science, their view of STEM-related jobs and their belief in whether STEM education can serve many career options.

