let's talk science | parlons sciences

LET'S TALK SCIENCE OUTREACH
VOLUNTEER TRAINING HANDBOOK

let's talk science

Let's Talk Science is a national, charitable organization committed to inspiring and empowering Canadian youth to develop the skills they need to participate and thrive in an ever-changing world. To accomplish this, Let's Talk Science offers a comprehensive suite of science, technology, engineering and math (STEM) based programs to support youth, educators and volunteers across Canada.

OUR MISSION

Let's Talk Science 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).

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STRONGER COMMUNITIES TOGETHER™

Let's Talk Science also wishes to acknowledge the contributions from our Visionary supporters, Amgen, The Government of Canada, Hibernia Management and Development Co., Mitchell A. Baran, The Government of Ontario, and The Trottier Family Foundation for their ongoing commitment to improving STEM literacy in Canada.

For information on opportunities to get involved with Let's Talk Science or to make a donation, please call:

Toll Free: 1-877-474-4081 or 1-519-474-4081

or visit our website: www.letstalkscience.ca

Charitable Registration Number: 88540 0846RR0001

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MESSAGE FROM THE PRESIDENT, LET'S TALK SCIENCE

Let's Talk Science helps prepare youth to be creative, critical thinkers. These skills are needed to thrive as citizens in a world increasingly shaped by science, technology, engineering and math (STEM). We believe that by engaging children and youth in meaningful STEM learning experiences, we can help them build important skills and characteristics such as questioning, problem-solving, resiliency, and deep curiosity!

A key element of our work is enabling volunteers to work with youth. As powerful role models, Let's Talk Science volunteers inspire youth by sharing their own interests and experiences. Interaction with credible and realistic scientific role models can have very positive effects on youth attitudes towards STEM as well as on their career and course decisions. The importance of engaging people with STEM expertise in outreach has been publicly recognized by Canada's granting councils, governments and international stakeholders such as the Organization for Economic Cooperation and Development (OECD).

While simply being a guest can capture the attention of youth (at least for a short time), a talented educator can change lives! This resource was developed to enhance the teaching and facilitating capacity of Let's Talk Science volunteers and was developed with considerable input from educators and STEM professionals. Our contributors understand pedagogy (the practice of teaching) and have extensive experience sharing their passion for STEM with youth of all ages. The first edition was produced as "Science with Impact®" in 2006 with funding from Canadian Institutes of Health Research and Great-West Life, London Life, Canada Life. This updated version incorporates many lessons learned over the past decade and demonstrates our ongoing commitment to supporting volunteers.

Thank you for your interest in volunteering. We are confident that this resource will strengthen and support your outreach activities and we wish you great success. You will make a difference to the lives of the youth and educators you reach. We look forward to hearing about your experiences as a Let's Talk Science volunteer. We love to hear stories of the outreach being done, and I urge you to share them with us.

Sincerely,

Bonnie Schmidt

Bonnie Schmidt, C.M., Ph.D. President & Founder, Let's Talk Science

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OVERVIEW OF LET'S TALK SCIENCE PROGRAMS **AND VOLUNTEERING OPPORTUNITIES**

Let's Talk Science began when a graduate student (Bonnie Schmidt, now our president) gathered a group of graduate students to go into local classrooms to do activities and presentations related to their research, promoting an interest in STEM. As the program grew, the contributions made by volunteers diversified into classroom activities, lab tours, science fair judging, the Let's Talk Science Challenge, development of online resources, and more! Here is a bit more about the programs Let's Talk Science currently offers.

IdeaPark

(Early years – Grade 3)

IdeaPark (**exploreideapark.org**) is a collection of free educator resources, planning tools and professional learning opportunities to support a skills-based, co-constructed, learning environment through STEM for early years to Grade 3 classrooms. IdeaPark's resources are designed to support young children's development of language, problem-solving, critical thinking, numeracy and teamwork skills, while building on their natural curiosity about the world around them. As a volunteer, you are welcome to use the resources on IdeaPark, and we encourage you to recommend it as a resource to the early years to Grade 3 educators you work with.

Tomatosphere™

(Kindergarten – Grade 12)

Tomatosphere™ (**tomatosphere.letstalkscience.ca**) is a free program that uses the excitement of space exploration to teach Kindergarten to Grade 12 students the skills and processes of science experimentation and inquiry. Students plant tomato seeds that have traveled to space (or been exposed to simulated space conditions) and compare their germination rate to a control group of seeds. As a volunteer, you can help a class get their Tomatosphere™ investigation started (ask your coordinator(s) for more information). It's also a great program to recommend to teachers if they want to do more STEM in their classroom following your visit.

CurioCity
(Grades 8–12)

CurioCity (**explorecuriocity.org**) is an online program for secondary students and educators (Grades 8-12/Secondary 2-5). It provides free resources that highlight the relevance of STEM skills and knowledge to teens' lives and interests. Public resources available on CurioCity include articles, videos, and career profiles. There is also a range of educator resources, including learning strategies and curriculum connections, available to registered users. Registration is free. Outreach volunteers can use the same username and password as on the volunteer portal (**volunteer.letstalkscience.ca**) to access resources.

You can incorporate CurioCity into your Outreach activities! For example:

- Search for articles that highlight the subjects you'll be presenting. Send links in advance to the students to stimulate their interest!
- Provide links to relevant career and research profiles after an activity so students can continue to connect with the STEM community after you leave.
- Play CurioCity videos during your activities, and then use a learning strategy to structure student discussions.
- Contribute a career or research profile to CurioCity—that way, students can begin to get to know you before an activity or event.
- CurioCity hosts citizen science projects designed for teens. Help a class get started with an action project, or work with students as they analyze the data they have collected.

CurioCity also offers a range of flexible volunteering opportunities. They are a great way to deepen your involvement with Let's Talk Science, especially if your schedule prevents you from participating in Outreach activities.

- Write an article: CurioCity features short articles written by volunteers that highlight the relevance of STEM to teens, ages 13 to 17. The goal is to explain the science behind the headlines, urban myths, new technology, latest gadgets, and age-old teenage preoccupations. Once published, articles are freely available online. Our team of staff editors provides individualized support for you to develop your skills as a science communicator.
- Submit a career profile: Career profiles help teens understand how STEM skills and knowledge are important for a wide range of different careers. If you are a professional whose career path was shaped by STEM, please consider contributing a CurioCity career profile.
- Submit a research profile: Research profiles help teens better understand the work behind scientific discoveries. If you're engaged in scientific research as a student, faculty member, or professional, please consider contributing a CurioCity research profile.
- Review content: Educators and students see CurioCity as a reliable and accurate source of information. In order to help ensure content remains current and accurate, we rely on a team of volunteers to review already-published articles and videos. These volunteers identify issues and propose solutions and improvements. As a content reviewer, you can volunteer on a casual basis and work from anywhere there's an internet connection. You can choose content to review based on your area of expertise or your interests.
- Answer student questions and other opportunities: CurioCity regularly needs volunteer experts to answer student questions. Opportunities include answering questions submitted during online events like DNA Day and helping students preparing for the Let's Talk Science Challenge.

For more information about any of these volunteer opportunities and recent developments, contact volunteers@explorecuriocity.org.

Let's Talk Science Outreach

(Preschool – Grade 12)

let's talk science outreach

Let's Talk Science Outreach is a national, community-based program connecting educators and youth with outstanding volunteers to deliver a wide variety of meaningful STEM activities for children as young as three years old and youth up to Grade 12.

Let's Talk Science Outreach sites can be found at over 40 university and colleges across Canada. Available free of charge, more than 3,500 post-secondary student volunteers and a growing number of industry partners engage youth in hands-on STEM learning experiences in both school and community settings. As role models for young Canadians, Let's Talk Science volunteers share their knowledge to inspire and engage kids, helping them to discover the relevance of science in their own lives.

Let's Talk Science Outreach also provides professional training and invaluable experiences for volunteers, helping them to develop their own essential employability skills.

What subjects can we cover?

You can cover anything that includes: life sciences, physical sciences, earth and space sciences, computer science, engineering, mathematics, technology, history of science, ethics of science, science in the media, careers and studies in science, scientific method, experimental psychology. Topics related to education in general, including teaching, learning and assessment theory and practice, as well as social sciences, humanities, and the fine arts are, in general, outside the scope of our Outreach program.

Who can volunteer?

Post-secondary students (college, undergraduate or graduate), faculty and staff members can volunteer. STEM professionals can volunteer through the national office. Students can remain volunteers after graduation.

What types of activities can we do?

let's talk science CHALLENGE

Most activities should include a hands-on component or actively engage children and youth in another way. Examples of suitable activities include:

- Hands-on activities, such as experiments or making/building something
- Science fair judging
- On-campus lab tours or special events, for example the Let's Talk Science Challenge or a high school symposium highlighting a specific subject. (Note: It is the responsibility of the coordinator(s) to ensure that no students are brought into a university or college laboratory without the appropriate permissions, both of the post-secondary institution's personnel and the school personnel.)
- Activities with community groups (see the Community Outreach Guide, available on the volunteer portal)
- Engaging lectures to the public/adults
- Online outreach through CurioCity
- Trips to rural or remote communities (see the Rural Outreach Guide, available on the volunteer portal)
- Making kits for use by volunteers
- Mentoring (please ensure that mentoring occurs in a public space or in the presence of others – see volunteer policies for more details)

You can refer to our policy on Safe Presentations and Activities for information on creating safe outreach workshops in Appendix XI.

WHY VOLUNTEER?

DEVELOP LEADERSHIP AND EMPLOYABILITY SKILLS

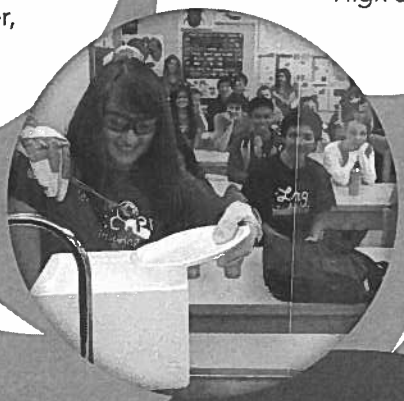
"I gained confidence and experience speaking to students and learned that I enjoyed teaching and science outreach very much. Every visit to a classroom was a very enjoyable and rewarding experience. My involvement with Let's Talk Science allowed me to gain experience that I would not have gained through my studies. It has motivated me to pursue science education as a potential career, or at least a part of one."

– Andrew Wigston, LTS Alumnus

MAKE A DIFFERENCE!

"It was AWESOME!! It prepared me to make a decision…that decision is university."

– High school student



DEVELOP TEACHING AND COMMUNICATION SKILLS

"I remember being very surprised at just how much I had to slow down my explanations for the kids – it taught me to not take even the most basic knowledge for granted."

- Let's Talk Science volunteer

SHARE YOUR PASSION FOR SCIENCE!

"The children's enthusiasm for science and knowledge makes you feel like you are doing something great. We experienced the "ahh" effect many times during our visit. It was great!"

– Let's Talk Science volunteer

PERSONAL SATISFACTION

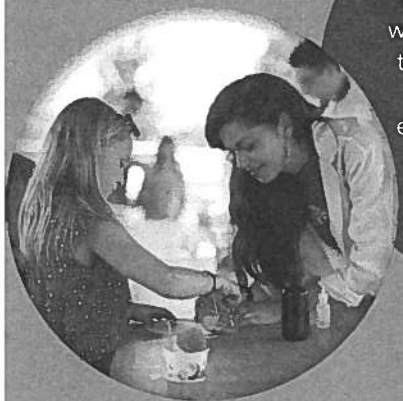
"I had a great time at the Regional Science Fair. The kids were really excited. It was nice to see kids so eager to talk about their experiments and to see that they are truly interested in the science! I'm looking forward to being able to do more events next year"

– Let's Talk Science volunteer

BE A ROLE MODEL

"Besides the excellent lesson, it was wonderful for the grade 11 students to see "young" university students that were excelling so far in their education. I think it may help them set goals for their futures."

– Elementary school teacher



EXERCISE 1

WHY OUTREACH?

GOAL: To establish the relevance – the "WHY" – for this workshop

Background: We all have different reasons for doing science outreach. The fact that you want to participate in science outreach is what makes this workshop relevant to you.

Task

1. **Think about, and respond to, the questions printed below individually.**
2. **Responses will then be discussed as a whole group.**

Responses

1. **Why do you believe that STEM (science, technology, engineering, mathematics) outreach is important?**

2. **Why are you interested in science outreach? Who do you want to reach with your efforts?**

3. **What do you consider to be the most important concept or social issue related to your field?**

EXERCISE 2

GETTING STARTED

GOAL: To develop and practice an age appropriate way to introduce yourself

Background: As a Let's Talk Science volunteer, you are a role model for children and youth. Helping students understand a bit about you, and your interest in STEM, can open them up to the variety of STEM careers and educational pathways that are available to them. As you work with different age groups, your vocabulary and the way in which you explain topics may differ.

Task

1. **Fill out the introduction template on this page.**
2. **At your facilitator's signal, find a partner and use the template to introduce yourself to them, adapting your words to the age group they represent.**
3. **When both you and your partner have finished your introduction, raise your hand. Your facilitator will assign you to another pairing as soon as one is available.**

Hi! My name is _____

I'm a student/faculty/staff member at _____

In my spare time I do fun science (STEM) activities with Let's Talk Science.

I study _____ at _____

I decided to study [this] because _____

_____

_____

_____

Once I finish my studies I hope to... OR Now that I'm in the workforce I... _____

_____

_____

_____

EXERCISE 3

HOW WE LEARN

GOAL: To develop an understanding of the constructivist theory of learning

Background: The constructivist theory of learning has arisen from the work of educational psychologists such as John Dewey, Jean Piaget and Lev Vygotsky among others. Essential components of this theory are:

- We learn by constructing our own understanding based on our experiences.
- Our experiences are unique—no two people experience the same event in exactly the same way.
- We learn best when the material is meaningful and relevant.
- We build knowledge by applying what we already know to a new situation.
- What we already know will influence what we will learn from a new experience.

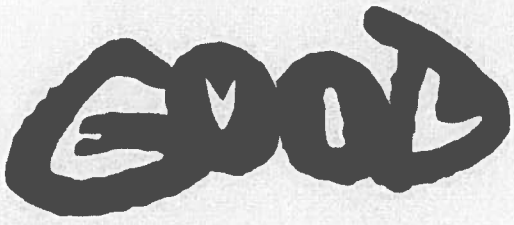
This theory applies to ALL learners, not just children and youth.

- Applying this theory to your own outreach activities means that you need to:
- Acknowledge prior learning. What does your audience already know about the topic? How will you find out what they know? What happens if they know nothing?
- Make your topic relevant to the learner. How can you relate your topic to some aspect of the learner's life? What authentic and relevant context could you use?
- Make your topic meaningful. Why should the learner know this? What is the purpose?
- Limit the amount of information given at one time. It takes time to assimilate new information. Give the learners time to think.
- Support the learners early on, but gradually step back as they develop the necessary skills.
- You are a guide, not a "dispenser of knowledge". Whenever possible, try to get the learners to give you the information rather than you giving it to them.
- Make sure their ideas about the subject are developing correctly by asking appropriate questions. Deal with any misconceptions as they occur.

Task 1

Read the word.

What do you see?



Key concept: _____

Tips on applying this during an outreach activity: _____

_____

_____

Task 2

Read the following text. What does this refer to?

The procedure is really quite simple. First, you arrange things into different groups. Of course, one group may be sufficient depending on how much there is to do. If you have to go somewhere else, due to lack of facilities that is the next step, otherwise you are pretty well set. It is important not to overdo things. That is, it is better to do a few things at once than too many.

Key concept: _____

Tips on applying this during an outreach activity: _____

_____

_____

_____

Task 3

Can you read the following text?

Olny srmat poelpe can raed tihs. Cdnuolt blveiee taht I cluod aulaclty uesdnatnrd waht I was rdanieg. The phaonmneal pweor of the hmuan mnid! Aoccdrnig to a rscheearch at Cmabrigde Uinervtisy, it deosn't mttaer in waht oredr the ltteers in a wrod are, tho olny iprmoatnt tihng is taht the frist and lsat ltteer be in the rghit pclae. The rset can bo a taotl mses and you can sitll raed it wouthit a porbelm.

Tihs is bcuseae the huamn mnid deos not raed ervey lteter by istlef, but the wrod as a wlohe. Amzanig huh? Yaeh and I awlyas tghuhot slpeling was ipmorantt!

Key concept: _____

Tips on applying this during an outreach activity: _____

_____

_____

_____

Task 4

While watching the video segments showing real life examples of Let's Talk Science volunteers doing outreach with youth, use the questions as a guideline to analyze the presentations.

In the video sequence, how does the presenter apply the constructivist theory of learning?

How did the presenter elicit the prior knowledge of the learners?	
How did the presenter make the activity relevant to the learners?	
How did the presenter encourage active learning?	
How did the presenter create a supportive environment for the learners?	
General notes:	

EXERCISE 4

FRAMES OF MIND

GOAL: To explore 'multiple intelligences' through hands-on activities related to a science concept

Background: In 1983, Dr. Howard Gardner, professor of education at Harvard University, proposed the Theory of Multiple Intelligences in his now classic work, Frames of Mind: The Theory of Multiple Intelligences. He suggested that the traditional notion of intelligence, based on I.Q. testing, is far too limited. Howard Gardner defines intelligence as "the ability to solve a problem or create a product that is valued within one or more cultures" and has proposed eight different intelligences to account for a broader range of human potential in children and adults. We can apply insight from this theory to the design of hands-on activities.

The multiple intelligences are:

- Linguistic intelligence ("word smart")
- Musical intelligence ("music smart")
- Logical-Mathematical intelligence ("number/reasoning smart")
- Visual-Spatial intelligence ("picture smart" or "art smart")
- Bodily-Kinesthetic intelligence ("body smart")
- Interpersonal intelligence ("people smart")
- Intrapersonal intelligence ("self smart")
- Naturalist intelligence ("nature smart")

For an intelligence to be characterized as such, rather than a talent, the intelligence had to meet a specific set of criteria:

- It can be isolated by brain damage
  - e.g. a stroke victim could lose the ability to understand language but could still play an instrument
- It can exist as an isolated intelligence
  - e.g. as in savants, prodigies or autistic individuals
- It has a growth pattern from beginner to master
  - e.g. professional athletes practice to hone their skills
- It has a core operation or set of operations (a basic information processing system)
  - music—pitch, rhythm and timbre
  - spatial—mental visualization, transformation of images
- It can be described using a symbol system such as equations, drawings, charts, etc.

Note: The theory of multiples intelligences has faced some criticism. For example, there is some disagreement about whether empirical evidence supports the way an intelligence was defined and whether the intelligences forming the model are independent from each other. However, in practice, in the educational community, recognizing that different people learn in different ways has been useful. The eight different ways of learning suggested by the theory of multiple intelligences provide a useful framework to challenge us as to how we can teach concepts in a variety of different ways. This leads to a richer and more engaging experience to the children and youth we interact with and what motivates us to present the theory here. However, be cautious about over applying this theory; for example, don't assume that these are the only eight ways in which people learn, or assume that the learning styles are mutually exclusive – one person can have many forms of intelligences or benefit from a variety of learning styles.

Abilities and Targeted Activities for the Eight Intelligences

THE INTELLIGENCE		THE ABILITY TO...	TARGETED ACTIVITIES
	Linguistic	communicate and make sense of their world through language.	debates, reports, case studies, speeches, pamphlets, brochures, poetry, story books, diaries
	Musical	create, communicate and understand meanings made out of sound.	commercials, songs or raps, background music, performances, rhythmic patterns
	Logical-Mathematical	use and appreciate abstract relationships.	problem solving, mapping, designing, schedules, essays, action plans, experiments, relationships, graphic organizers
	Visual-Spatial	perceive visual or spatial information, to recreate visual images from memory.	art works, murals, illustrations, advertising, mobiles, animations, building models or dioramas, slides, pictures, patterns, designs
	Bodily- Kinesthetic	use all or parts of their body to create products or solve problems.	role-plays, dances, mimes, dramatization, aerobics, physical games, working with hands
	Interpersonal	make distinctions about the feelings of others and their intentions, to react to the moods of the people around them.	small group work, co-operative learning environments, buddy systems, peer teaching
	Intrapersonal	build accurate mental models of themselves and draw on these models to make decisions about their lives. It is an understanding of one's own strengths and weaknesses.	logs, journals, diaries, autobiographies, resumés, portfolios
	Naturalist	distinguish among, classify and use features of the environment that are natural or created (e.g. knows every make and model of cars around them).	models, flowcharts, investigations, experiments, photo essays, exhibitions, documentaries

Task

How do the activities presented by your facilitator target the multiple intelligences?

Response:

ACTIVITY	MULTIPLE INTELLIGENCE(S) TARGETED

EXERCISE 5

CLASSROOM MANAGEMENT

GOAL: To learn proper ways to respond to common classroom management situations

Background: As a Let's Talk Science Outreach volunteer, you should never be left alone in charge of a student or a group of students. The educator should always be present and they are responsible for ensuring classroom management. Do not hesitate to remind them of this Let's Talk Science policy. If you find yourself in a situation where you will be left alone with children and/or youth, let the educator (or an administrator such as the principal) know that you cannot complete the activity in these circumstances and will make arrangements to come back another time, when proper supervision can be arranged.

This being said, it is useful for volunteers to be prepared to respond to common classroom management situations that arise when working with children and youth—to assist in ensuring a smooth experience for everyone.

For more information on Let's Talk Science's volunteer policies, see Appendix X and the volunteer portal (volunteer.letstalkscience.ca).

Task

Take a few moments to reflect on how you would handle the following situations. Then, watch the example and see how an experienced volunteer deals with each scenario.

SITUATION	PROPER RESPONSE / NOTES
Students need to be assigned to small groups.	
Students start to talk or play with materials while the volunteer is explaining the procedure to follow.	
A student replies to a question by telling an off-topic story.	
A student is disruptive or doesn't participate.	
The experiment or activity doesn't work as expected.	
The educator tries to leave the volunteer alone in the classroom.	

EXERCISE 6

CONCLUDING AND EXTENDING THE LEARNING

GOAL: To learn how to conclude the activity effectively

Background: As a presenter, you should ensure that some time is kept after the hands-on portion of the activity to help the students reflect on what they have learned and provide avenues for taking their learning further. Skills Canada maintains a website with examples of skilled trades that can be related to various domains, and the Canadian Apprenticeship Forum provides information about apprenticeships. You can consult local university, college, and polytechnic institute websites for more information about the programs they offer.

Task

Read through the below sample conclusion. This sample conclusion script is for an activity on electricity. You can modify this script to fit your own activity.

"I hope you had fun and learned a lot today during our workshop on circuits. Who wants to tell me their favorite part of the activity? (allow students to respond) Who can tell me one thing they learned today? (allow students to respond) Can anyone remind me of the difference between series and parallel connections? (allow students to respond)

If you are interested in electricity, there are a lot of different jobs that might be interesting to you.

For example:

- *Electrical engineers learn about electricity, how it's generated and how electrical machines work, so that they can design electrical machines. To become an electrical engineer, you need to go to university.*
- *Electricians learn about electricity so that they can install and repair electrical systems in buildings. To become an electrician you need to finish high school, take some additional classes and do an apprenticeship where you learn from other electricians on the job.*
- *Many skilled trades careers require that you understand electricity, such as a power line technician or wind turbine maintenance worker. To do these jobs you need a good high school math and science background, especially physics.*

To prepare for all these jobs, you will need to take the optional science and math classes all through high school."

EXERCISE 7

WHAT HAVE I LEARNED

GOAL: To reflect on the workshop training session

Background: You are now a step closer to getting out into the community to do STEM Outreach with Let's Talk Science! It is a good time to reflect on what you learned today and think about what you want to get out of this experience with Let's Talk Science.

Task

What did you learn during this workshop? Take a few moments to reflect on the following questions and be ready to share your answers with the group.

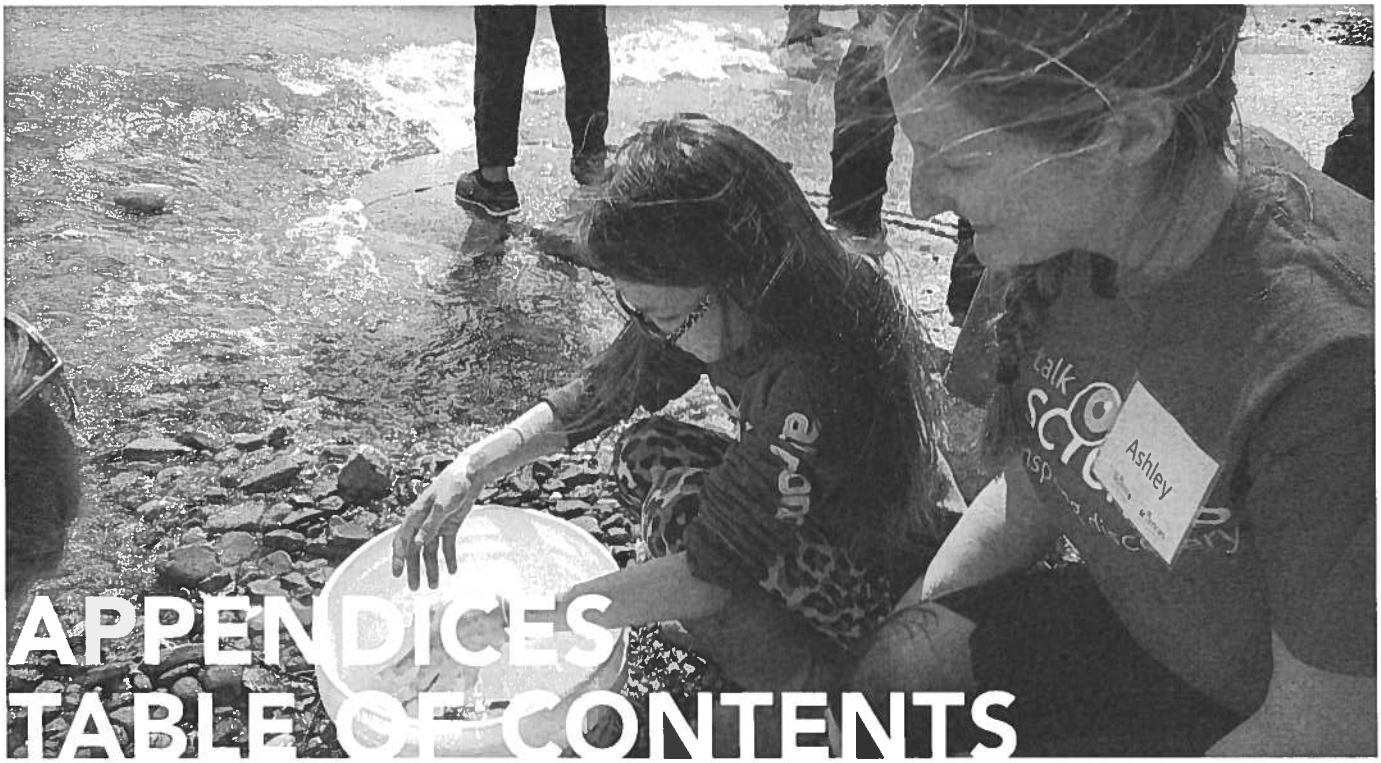
Responses

1. **Why do you believe that STEM (science, technology, engineering, mathematics) outreach is important?**

2. **Why are you interested in science outreach? Who do you want to reach with your efforts?**

3. **What do you consider to be the most important concept or social issue related to your field?**

NOTES



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APPENDIX I BEFORE AND AFTER AN ACTIVITY - CHECKLIST

Note: Your coordinator(s) or Let's Talk Science national office staff (outreach@letstalkscience.ca) may do some of these steps for you – when in doubt, check with them!

Before the activity

- ○ Agree on the date, time, and length of the activity with educator. If this changes later, or you have trouble communicating with the educator, keep your coordinator informed.
- ○ Ask the educator what the class has already covered in the subject area (to assess prior knowledge of the students), what concepts they would like you to focus on, and if there is anything additional you should know about their students.
- ○ Based on the concept, decide on activities. Tips:
  - ○ Check with your coordinator(s) to see if there are any pre-assembled activity kits that might work
  - ○ Check out the activity ideas database on the volunteer portal (volunteer.letstalkscience.ca)
  - ○ Do a web search for the activity topic, age or grade and "hands-on" – this will usually give you some ideas
  - ○ Get help from your coordinator(s) or fellow volunteers
  - ○ Search the IdeaPark, Tomatosphere and CurioCity websites for connections
- ○ Practice the activity to be sure it works as expected.
- ○ If possible, run a summary of the activity by the educator or your coordinator(s) for feedback.
- ○ Address any safety concerns with your activity.
- ○ Obtain materials (check with your coordinator(s) to see if they can provide the materials or reimburse your expenses).
- ○ Obtain a Let's Talk Science t-shirt from your coordinator(s).
- ○ Ask your coordinator(s) if there are any ongoing surveys that your classroom can complete (Note: Also check with the educator before handing out surveys to students).
- ○ Check with the educator to make sure they have any equipment that you are not bringing yourself (for example, not all classrooms have a projector).
- ○ Get directions to the school, including where to park and where to sign in.
- ○ Plan enough time to set up the activity and in case you encounter delays.

During the activity

- ○ Be professional and courteous. Remember that you are representing both Let's Talk Science and your post-secondary institution / place of work.
- ○ Do not be afraid to appear imperfect—it is acceptable for role models to be able to say 'I don't know'. Share yourself – the challenges you have overcome in STEM and education, as well as your enthusiasm. Have fun and enjoy all that young, curious minds have to offer.
- ○ Be flexible. Things do not always go as anticipated. Have extra material to engage the group if things finish earlier than planned. Think about what you will cut out if things take longer than expected.
- ○ Plan some time within your presentation to discuss STEM and STEM careers. Your unique perspective on these topics can really enrich the experience for youth, especially for older levels.
- ○ Keep in mind all of the tips and tools covered during this training workshop. Keep this workbook nearby so you can refer back to these resources when needed.

After the activity:

- ○ Record your activity in the volunteer portal—this helps your coordinator(s) track activities and obtain support. It's also the only way you can get a reference letter in the future. (see Appendix II)
- ○ Submit an expense report to your coordinator(s) within thirty days(if applicable).
- ○ Return borrowed materials to your coordinator(s).
- ○ Let your coordinator(s) know how the activity went.
- ○ Send a thank you note to the educator. Mention Let's Talk Science's other programs (IdeaPark for Grades K-3; CurioCity for Grades 8-12 and Tomatosphere™ for Grades K-12) as possible avenues for them to engage further with Let's Talk Science.

APPENDIX II

RESOURCES FOR VOLUNTEERS

As a volunteer for Let's Talk Science, you have a variety of resources available to you. Let's Talk Science staff are here to support your work in the best way we can.

At each Let's Talk Science Outreach site, volunteer outreach is managed by one or more coordinators, most of whom are students themselves. They will help ensure that your experience as a Let's Talk Science volunteer is meaningful to you and the youth. All coordinators are, in turn, supported by the administration at their campus, as well as a full-time team of Let's Talk Science staff.

In addition to providing a dedicated team of full-time staff to support Let's Talk Science Outreach sites across Canada, the national team also supports you by providing:

An outreach management system (Let's Talk Science volunteer portal)

Let's Talk Science provides a web-based outreach management system, a private portal, that coordinators and volunteers can access at volunteer.letstalkscience.ca.

Features include:

- ✔ **Volunteer Profile:** You must register and keep your information up-to-date
- ✔ **Activity Logging:** Record volunteer hours for Let's Talk Science Outreach, CurioCity, and other special projects
- ✔ **View feedback from educators you have worked with**
- ✔ **Activity Ideas Database:** Look up and share activities with fellow volunteers
- ✔ **Forum:** Connect directly with other volunteers across the country
- ✔ **Resources:** Many of the below resources are accessible to volunteers in this section

Throughout your time volunteering with Let's Talk Science – even if you move between various post-secondary institutions that partner with Let's Talk Science Outreach – a permanent record of all your activities and volunteer hours is maintained. The national office is happy to certify your involvement at any point for resumés and school/scholarship applications.

If you have any trouble registering for or accessing the Let's Talk Science volunteer portal, or would like a copy of the Volunteer Guide to the Portal sent to you, please contact the national office (outreach@letstalkscience.ca).

Pre-packaged workshop kits

The national office and each individual Outreach site offers a collection of modular hands-on workshops for all ages which can be tailored to the amount of time and the number of visits you are planning. Contact your coordinator(s) to see which kits are available to you.

Manuals and guides for volunteers

Not sure how to get started? We have a range of guides to support your efforts including using the volunteer portal, submitting expense claims, planning a community event, reaching out to rural communities, or taking part in Indigenous outreach. All guides can be found in the volunteer portal resources section.

Liability insurance coverage for all coordinators and volunteers while engaged in Let's Talk Science outreach activities

Please refer to Let's Talk Science's volunteer policies (Appendix X).

Promotional items, stationery and brochures for use at sites

We provide communications materials, such as brochures and flyers, as well as promotional items, such as branded pens, pencils, stickers, etc. Check with your coordinator(s) if you would like these for an event.

Funding for special initiatives

We strive to provide access to our programs to all Canadian youth. Each year, special funding is put towards rural and Indigenous outreach, as well as special events such as symposiums and the Let's Talk Science Challenge. Ask your coordinator(s) if you would like to help with these initiatives.

National volunteer awards

We truly appreciate all the hours of work and dedication from our volunteers each year. One way we celebrate your work is through the Let's Talk Science Volunteer Awards. Visit letstalkscience.ca to learn more about the awards available.

Surveys and feedback

It is important to gather feedback on the work we are doing. As a volunteer, we always welcome your feedback and work to gather it through our annual volunteer surveys. Results from our youth impact research and educator evaluations are also shared with volunteers. If you are interested in contributing to evaluation efforts through your own research, please contact the national office (outreach@letstalkscience.ca).

Professional development opportunities

Along with this volunteer training you take when you begin volunteering, Let's Talk Science also offers occasional professional development sessions both online and in-person.

This is also available in the form of professional advice and support in Let's Talk Science communications, media relations and fundraising. If you get the chance to take part in media events or helping with local fundraising, we can help get you started and guide you in the process as needed.

APPENDIX III

TIPS FOR WORKING WITH AGES 3 TO 6

- The key to working with young children is to be flexible. Consider multiple ways of presenting an activity to keep their interest up. Young children tend to have an attention span equal to their age; for example, a four year old has an average attention span of four minutes. Preschoolers will find it difficult to sit for more than 20 minutes; therefore, it is extremely important to vary the presentation. Try interspersing the workshop with topic-related songs, rhymes and stories—particularly those with actions to draw their attention back to the topic at hand. This is an easy way to transition from one activity to the next and to reinforce the learning.

- If children are unfamiliar with certain terms, for example 'measuring', introduce the terms to them. "This is called measuring." Give a simple explanation such as the following when measuring mixtures "People use tools like measuring cups and measuring spoons to make sure that each time they add an ingredient, it's the same amount."

- Try asking the children if they can tell you what they think is happening when doing the activity, so that you can determine if they have grasped the concept(s). If they don't appear to grasp what you are saying, you may need to rephrase your sentence in simpler terms or with more background information; for example, "The nest provides shelter for animals" could be repeated and rephrased as "Shelters are places that protect animals from weather and from predators. They keep the animals warm, dry and safe."

- At the beginning of the school year, do not expect children to know about raising their hand, sitting in a circle, etc. as they learn these skills throughout the year. The educator will be able to let you know which classroom skills the children have learned so far.

- Younger children will have a harder time taking turns. You may want to select each child in the order they are sitting to come up and have a turn, or tell them that if they are sitting quietly they can have a turn, and then select the quiet ones first.

- Give the children reasons for your requests; for example, "We need you to be quiet so that we can hear what Tommy is saying."

- The children may surprise you with answers to your questions that are completely off-topic. Simply respond by saying "That's an interesting story, thank you for sharing," and bring them back to focus.

- Repetition is key with this age group. Be sure to repeat new words several times, have them practice saying it, and then repeat it again at the end of the workshop.

- For larger groups of children (more than 15), consider dividing the children into two groups, and running the activities in two separate groups with two volunteers.

- Activities such as drawing and colouring do not fit in with all early year's education methods. It is suggested to check with the educator first before having the children colour as part of an activity.

APPENDIX IV WORKING WITH INDIGENOUS COMMUNITIES

Let's Talk Science seeks to build relationships with Indigenous communities that are reciprocal and sustained, to develop STEM learning experiences that are relevant and respectful. By involving Indigenous youth and their communities in positive and meaningful STEM learning experiences, Let's Talk Science hopes to play a role in reconciliation.

Interested in getting more involved? It is important to know that you do not need to have a background in Indigenous knowledge to have a great impact on Indigenous communities. Being respectful, aware, and being open to learning will carry you through your experience.

Important background information:

- Many Indigenous communities face significant challenges that have resulted in under-representation of Indigenous students in post-secondary studies, particularly STEM subjects. Indigenous communities often face a legacy of continuing under-funding, poverty and poor living conditions.
- Be aware that the legacy of residential schools still exist—this was an imposed system that sought to segregate Indigenous people from their communities, languages and worldviews and to assimilate them into the dominant culture. For more information about the history and the lasting effects of this system, see the Truth and Reconciliation Commission's Final Report and Calls to Action, found online.
- Some Indigenous communities have worldviews that may differ from yours. Indigenous Ways of Knowing are mainly place-based, relational, holistic and functional. Often what we teach (Eurocentric science) is abstract, compartmentalized, objective and explanatory. It can be challenging for Indigenous students to reconcile both of these worldviews. Children might feel alienated by the Eurocentric science taught in most schools when they feel they must change their ways of thinking, behaving and believing to succeed in it.

For more tips and information, consult the Guide for Reaching out to Indigenous Youth and Their Communities, available on the volunteer portal (**volunteer.letstalkscience.ca**). Contact your coordinator(s) or the national office (**outreach@letstalkscience.ca**) to learn about opportunities for further training and guidance.

Quick tips to help you make the most of your planning time and visits:

- Respect that the community/school might have different priorities (e.g. local language learning or improved attendance rates) and aim to work within these goals, without imposing your own.
- Always show respect during discussion, listen and be patient. Do not let your passion for outreach be misinterpreted as being pushy, aggressive or in opposition to the community's priorities (for example, by forcing a child to participate if they would prefer just to watch).
- When planning outreach with Indigenous groups and communities, it is important to remember that most of the methods, strategies and activities that are effective with any group of youth are also relevant for Indigenous youth.
- Making scientific topics relevant to their communities and everyday lives, using the power of story-telling and involving Indigenous scientists and/or community members, are powerful ways of engaging youth in your outreach workshop. Think carefully about the examples you will use on each visit to ensure the community members will be able to relate.
- As with any community unfamiliar to you, members might respond, listen or react in a different way than you are used to. For example, if youth are not as quick to volunteer an answer, don't assume that they don't know it.
- If you are unsure of something (e.g. questions about the most appropriate terminology to use in a certain situation, the culture of the community, what activities you should bring, etc.), the best thing to do is ask in a sincere and polite manor. Your honesty and willingness to learn will be appreciated.

APPENDIX V

REACHING OUT TO RURAL OR REMOTE COMMUNITIES

Since its beginning, Let's Talk Science has placed a heavy emphasis on delivering programming to children and youth who do not have the same access to STEM activities as those who live closer to major metropolitan areas or near a post-secondary institution. Often your visit will be a unique experience for students in underserved communities; to have a guest STEM role model in their classroom can open doors for youth in these communities who had not considered STEM as a career option. In addition, participating in a rural or remote trip can provide you with a unique and rewarding experience.

More information about these opportunities:

- Let's Talk Science has special funding to cover travel expenses and meals to rural and remote communities in Canada. Any community that does not have easy access to STEM enrichment qualifies for this funding.
- Your coordinator(s) is/are responsible for submitting trip proposals to the national office to secure a share of this funding. You must always confirm your travel and expenses with your coordinator(s) before the trip.
- If you have a connection to a rural or remote community, let your coordinator(s) know. There may even be funding to subsidize one of your trips home if you do some outreach while you are there!

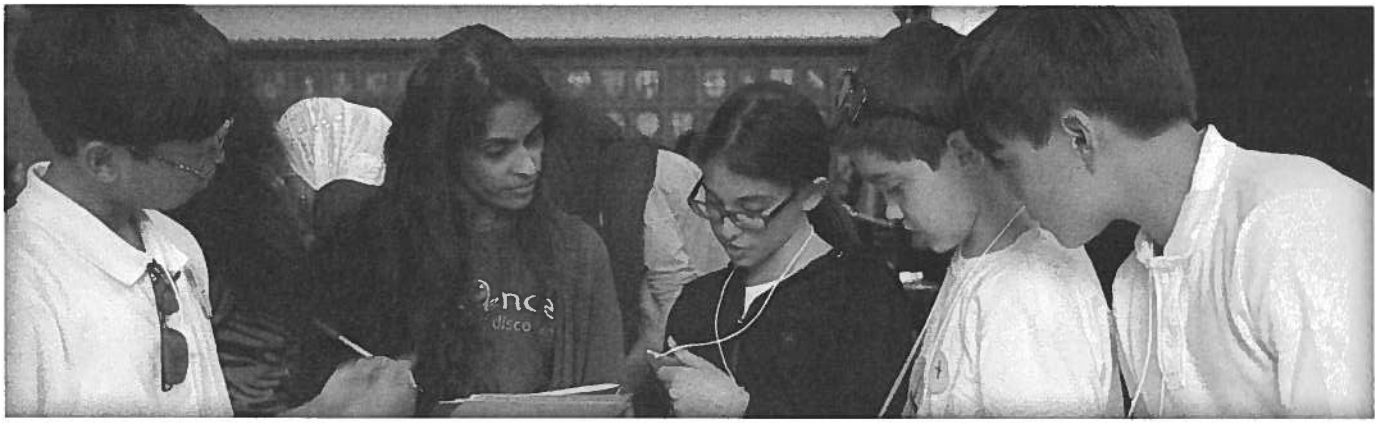
Tips for volunteers engaging in rural or remote outreach:

- To cut down on planning time and supplies, choose activities with few consumable supplies that can be adapted to a wide age range. This way you can repeat an activity with multiple classes/groups.
- Bring extra activities. As word of your visit spreads, you may have extra students or entire classes join in, or you may be asked to facilitate additional school or community activities.
- Think about the examples you will use and how relevant they will be to the youth. For example, urban youth are likely familiar with playgrounds as an example of simple machines (e.g., a slide is an incline plane, a teeter totter is a lever) but youth from an agricultural community may more readily make connections to agricultural equipment (e.g., an auger can be related to an inclined plane and a screw; to change gears on a tractor you use a lever).
- Use the web to research your community and keep an eye on the community or school's website or Facebook group before your trip. Be mindful of recent news and events that may be relevant at the time of your visit.
- Most communities will have convenience or grocery stores, but in more remote communities, the selection may be limited and prices can be high. Restaurants may be limited or non-existent. Consider bringing food, toiletries, and necessary medication with you.
- Purchasing additional materials is not always possible — store locations and hours may be sparse, they may not carry the materials you need, or the cost may be prohibitive. Planning at least a few activities that require few consumables can help with this.
- In more remote areas internet access may also be limited. Be sure to pre-download videos, slideshow presentations, activity write-ups, or any other information that would require the use of internet onto a USB.

The Rural Outreach Guide and the Visiting Northern and/or Remote Communities: Supplemental Tips and Information guides provide more information and can help you plan a trip. They can be found in the resources section of the volunteer portal (**volunteer.letstalkscience.ca**), or contact the national office (**outreach@letstalkscience.ca**).

APPENDIX VI

JUDGING SCIENCE FAIRS



If you want to ease into volunteering with youth, science fair judging might be for you! It requires minimal time commitment, is planned in advance, and you will be with fellow STEM volunteers.

- ✔ **Ensure that you are able to meet your commitment.** Once judging is scheduled, it is extremely difficult to find replacements, especially on short notice.
- ✔ **Be prepared.** Check to see if the science fair with which you are involved has a web site that includes criteria or questions for judges. These may be provided to you at the fair.
- ✔ **Put the student at ease.** Being judged is a big deal. If time permits, introduce yourself and talk a little about your background. Use appropriate body language such as bending down to eye level and smiling. Remember to compliment the students on some aspect of their project that draws your attention. Before asking difficult questions, begin the conversation with simple questions that are easily answered–such as their age, their school, how they constructed their display or model and how much time it took, etc.
- ✔ **Be positive.** Participating in a science fair should be a positive experience for everyone, regardless of whether the student's project is a winning one or not. Show praise, frame questions in an open, positive way (e.g. "What do you think would happen if you ...." instead of "Why didn't you...."). Avoid using a skeptical tone of voice.
- ✔ **Be a role model.** You are an authority figure for the youth presenting their projects and their perception of your attitude toward them could have a profound impact on their confidence. Be careful to demonstrate through body language, tone and words that you are listening attentively. Be careful to frame suggestions in a positive way and open and close with compliments to the student.
- ✔ **Be fair.** Try to spend equal amounts of time with each student, and spend that time listening to the student's explanations rather than giving your own. Ask questions that are designed to probe what the student does know, rather than what they do not. When discussing a topic, try to match the language that the students are using, instead of summarizing in more scientific terms. If you are very knowledgeable about the subject of a student project, be careful not to expound too much. This might give the student an unfair advantage if your words were to be repeated by the student to the next judge!
- ✔ **Get it clear.** If you are not familiar with the topic a student is working in or if you do not understand something a student is telling you, keep asking questions until it does make sense. If you still cannot understand, make a note of the project and speak with the other judges.

APPENDIX VII

FAQ'S

What do I do if I have a problem?

→ Your coordinator(s) are responsible for managing your experience with Let's Talk Science. Feel free to contact them at any time or contact the Let's Talk Science Outreach program manager at the national office (outreach@letstalkscience.ca).

How can I be more involved?

→ You can always put forward your new ideas to your coordinator(s). Let's Talk Science Outreach is a very flexible program and it has grown through the grassroots ideas and efforts of thousands of volunteers. You can also consider taking on more leadership as a coordinator or an assistant coordinator – ask your coordinator(s) for opportunities.

What if I can't reach or don't hear back from my educator partner?

→ If you have tried various ways to get a hold of your educator (e.g., email and phone) and haven't heard from them, let your coordinator(s) know right away.

What should I do if the educator leaves me alone with the class/group?

→ When doing any activity, the teacher or the adult responsible for the children's well-being must be in the class/room at all times. If they want to leave at any time please remind them that they (or another responsible adult from the school or group) must stay in the room. Remember that you are there as a guest and are not responsible for the youth. If the educator insists on leaving, contact the school office or terminate the activity.

Do I teach the class by myself?

→ You will not be expected to manage the group on your own. You are a guest of the educator, and not a replacement. You are not expected to have extensive training about formal education, curriculum, or assessment strategies. Educators have this expertise – you are there as a STEM content expert. Use your volunteer training to help guide you with your presentation. It is your unique experiences with STEM that will impact the youth you meet.

Can I volunteer in the evenings and on weekends?

→ Yes! Many sites have requests from community groups and these take place at different times. Ask your coordinator(s) to notify you of these opportunities.

Can I still volunteer if I'm not (or no longer) a student?

→ Yes! Anyone with a background in STEM can apply to be a volunteer. You can still be a part of the volunteer group at the closest partnered post-secondary institution. If you find that volunteering through that group doesn't suit your lifestyle, contact the national office (outreach@letstalkscience.ca) and we will work directly with you to find opportunities.

Can I get a reference letter?

→ Yes! Your coordinator(s) can write a reference letter for you. If the coordinator(s) who knew you have moved on, the national office can write a letter for you. We will base it on the activities you have logged in the volunteer portal (volunteer.letstalkscience.ca), so make sure you always submit an activity report after each outreach event!

APPENDIX VIII CURRICULUM TOPICS

In Canada, provinces are responsible for setting curriculum expectations in terms of which science topics are covered in each grade. Often (but not always), educators seek outreach activities that support the curriculum topics they are expected to cover. At the high school level in particular, it may be difficult to be invited into a classroom if the material being presented doesn't contribute directly to reaching curriculum objectives. The chart below lays out curriculum topics by grade and by category. This chart is a good starting point if you want to develop a new activity and want to know which grade to target, or if an educator wants you to suggest an activity that is tied to the curriculum covered in their grade. For more information, you can consult each province's web resource relating to the curriculum.

CHART NOTES:

- Grade 11 and 12 curriculum can vary widely based on the variety of optional classes available; therefore it is best to work directly with a school or educator when determining what type of activity to offer.
- Curriculum varies by province; topics that are specific to one province are indicated in the chart by having that province in brackets following the topic.
- Generally, schools in the Northwest Territories and Nunavut follow the Alberta curriculum, and schools in the Yukon follow the British Columbia curriculum.

GRADE	LIFE SYSTEMS	STRUCTURES AND MECHANISMS	MATTER AND ENERGY	EARTH AND SPACE SYSTEMS
Grade 1	Needs and Characteristics of Living Things Senses	Materials, Objects, and Everyday Structures Colour (AB)	Energy in Our Lives Light and Sound (BC)	Daily and Seasonal Changes
Grade 2	Animal Growth and Changes Healthy Lifestyles (NB)	Movement/Motion	Properties of Liquids/ Solids/Gases Also: Magnets (AB), Temperature (AB)	Air and Water in the Environment
Grade 3	Plant Growth and Changes Animal Life Cycles (AB) Biodiversity (BC)	Materials and Structures Building (AB)	Forces Causing Movement Magnets/Invisible forces Hearing and Sound (AB)	Soils in the Environment Rocks and Minerals (AB) Weathering and Erosion (BC)
Grade 4	Habitats and Communities Waste (AB) Plant Growth and Changes (AB)	Pulleys and Gears Wheels & Levers, Vehicles (AB)	Light and Sound Matter (BC) Energy transformations (BC)	Rocks/Minerals/ Erosion Earth/Moon (BC)

GRADE	LIFE SYSTEMS	STRUCTURES AND MECHANISMS	MATTER AND ENERGY	EARTH AND SPACE SYSTEMS
Grade 5	Human Organ Systems Wetlands (AB) Healthy Body (Atlantic Canada)	Forces Acting on Structures and Mechanisms Machines (BC)	Properties of and Changes in Materials/ Substances/Matter Magnetism (AB)	Weather Rock Cycle (BC) Conservation (ON)
Grade 6	Biodiversity Trees and Forests (AB)	Flight/Aerodynamics Newton's Laws (BC)	Electricity Mixtures (BC)	Space
Grade 7	Interactions in the Environment Plants for Food and Fibre (AB) Evolution (BC)	Forces and Structures Form and Function	Pure Substances and Mixtures, Solutions Particle theory Electromagnetism (BC)	Heat in the Environment Earth's Crust
Grade 8	Cells & Organ Systems	Fluids Mechanical Systems (AB)	Optics	Water Systems Plate tectonics
Grade 9	Reproduction Sustainable Ecosystems (ON) Cells (BC)	Atoms, Elements, and Compounds	The Characteristics of Electricity	Space Exploration and The Study of the Universe
Grade 10	Climate and Ecosystems Tissues, Organs, and Systems Cycling of Matter and Energy (AB) Heredity (BC)	Motion Energy in Tech systems (AB) Light and Optics (ON)	Chemical Reactions Properties of Matter (AB)	Weather and Climate Change Energy in Global Systems (AB) Big Bang (BC) Terrestrial Systems (NT)

APPENDIX IX

MULTIPLE INTELLIGENCES SURVEY

Task

1. **Complete the following Multiple Intelligences Survey by placing a "1" beside each statement you feel accurately describes you. If you do not identify with a statement, leave the space blank.**
2. **Total the column for each section and calculate your score.**
3. **Plot your scores on the bar graph to create your multiple intelligences profile.**

Multiple Intelligences Survey

SECTION 1

- ◯ I enjoy categorizing things by common traits
- ◯ Ecological issues are important to me
- ◯ Hiking and camping are enjoyable activities
- ◯ I enjoy working on a garden
- ◯ Preserving our National Parks is important
- ◯ Hierarchies make sense me
- ◯ Animals are important in my life
- ◯ My home has a recycling system in place
- ◯ I enjoy studying biology, botany, zoology
- ◯ I spend a great deal of time outdoors

_____ **TOTAL for Section 1**

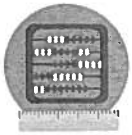
Score for section 1 (TOTAL x 10) = _____

SECTION 2

- ◯ I easily pick up on patterns
- ◯ I focus in on noise and sounds
- ◯ Moving to a beat is easy for me
- ◯ I've always been interested in playing an instrument
- ◯ The cadence of poetry intrigues me
- ◯ I remember things by putting them in a rhyme
- ◯ Concentration is difficult while listening to a radio or television
- ◯ I enjoy many kinds of music
- ◯ Musicals are more interesting than dramatic plays
- ◯ Remembering song lyrics is easy for me

_____ **TOTAL for Section 2**

Score for section 2 (TOTAL x 10) = _____



SECTION 3

- ◯ I keep my things neat and orderly
- ◯ Step-by-step directions are a big help
- ◯ Solving problems comes easily to me
- ◯ I get easily frustrated with disorganized people
- ◯ I can complete calculations quickly in my head
- ◯ Puzzles requiring reasoning are fun
- ◯ I can't begin an assignment until all my questions are answered
- ◯ Structure helps me be successful
- ◯ I find working on a computer spreadsheet of database rewarding
- ◯ Things have to make sense to me or I am dissatisfied

_____ **TOTAL for Section 3**

Score for section 3 (TOTAL x 10) = _____

SECTION 4

- ◯ I learn best interacting with others
- ◯ The more the merrier
- ◯ Study groups are very productive for me
- ◯ I enjoy chat rooms
- ◯ Participating in politics is important
- ◯ Television and radio talk shows are enjoyable
- ◯ I am a "team player"
- ◯ I dislike working alone
- ◯ Clubs and extracurricular activities are fun
- ◯ I pay attention to social issues and causes

_____ **TOTAL for Section 4**

Score for section 4 (TOTAL x 10) = _____

SECTION 5

- ◯ I enjoy making things with my hands
- ◯ Sitting still for long periods of time is difficult for me
- ◯ I enjoy outdoor games and sports
- ◯ I value non-verbal communication such as sign language
- ◯ A fit body is important for a fit mind
- ◯ Arts and crafts are enjoyable pastimes
- ◯ Expression through dance is beautiful
- ◯ I like working with tools
- ◯ I live an active lifestyle
- ◯ I learn by doing

_____ **TOTAL for Section 5**

Score for section 5 (TOTAL x 10) = _____

SECTION 6

- ◯ I enjoy reading all kinds of materials
- ◯ Taking notes helps me remember and understand
- ◯ I faithfully contact friends through letters and/or e-mail
- ◯ It is easy for me to explain my ideas to others
- ◯ I keep a journal
- ◯ Word puzzles like crosswords and jumbles are fun
- ◯ I write for pleasure
- ◯ I enjoy playing with words like puns, anagrams and spoonerisms
- ◯ Foreign languages interest me
- ◯ I like to participate in debates and public speaking activities

_____ **TOTAL for Section 6**

Score for section 6 (TOTAL x 10) = _____

SECTION 7

- ◯ I am keenly aware of my moral beliefs
- ◯ I learn best when I have an emotional attachment to the subject
- ◯ Fairness is important to me
- ◯ My attitude affects how I learn
- ◯ Social justice issues concern me
- ◯ Working alone can be just as productive as working in a group
- ◯ I need to know why I should do something before I agree to do it
- ◯ When I believe in something I will give 100% effort to it
- ◯ I like to be involved in causes that help others
- ◯ I am willing to protest or sign a petition to right a wrong

_____ **TOTAL for Section 7**

Score for section 7 (TOTAL x 10) = _____

SECTION 8

- ◯ I can imagine ideas in my mind
- ◯ Rearranging a room is fun for me
- ◯ I enjoy creating art using varied media
- ◯ I remember well using graphic organizers
- ◯ Performance art can be very gratifying
- ◯ Spreadsheets are great for making charts, graphs and tables
- ◯ Three dimensional puzzles bring me much enjoyment
- ◯ Music videos are very stimulating
- ◯ I can recall things in mental pictures
- ◯ I am good at reading maps and blueprints

_____ **TOTAL for Section 8**

Score for section 8 (TOTAL x 10) = _____

Plot your scores on the bar graph to create your multiple intelligences profile.

100								
90								
80								
70								
60								
50								
40								
30								
20								
10								
0	Section 1	Section 2	Section 3	Section 4	Section 5	Section 6	Section 7	Section8
	Naturalist	Musical	Logical/ Math	Inter- personal	Bodily/ Kinesthetic	Verbal/ Linguistic	Intra- personal	Visual/ Spatial

APPENDIX X

LET'S TALK SCIENCE VOLUNTEER POLICIES

Let's Talk Science volunteer policies exist to provide guidelines within which volunteers are expected to operate and conduct themselves. All volunteers are expected to represent Let's Talk Science with the highest level of professionalism and treat everyone in a fair, courteous and respectful manner. Volunteers are expected to use sound and prudent judgment in all circumstances and, within the law, place the organization first in all decisions and actions concerning Let's Talk Science.

Please refer to our policies on the volunteer portal (volunteer.letstalkscience.ca). We expect you to read them carefully and refer to them as needed. If you have any questions, please contact the Let's Talk Science national office (outreach@letstalkscience.ca).

IN PARTICULAR, PLEASE ENSURE THAT YOU ARE FAMILIAR WITH THE FOLLOWING POLICIES:

Safety

Consult the "Safe presentations and activities" policy (Appendix XI) for guidelines for demos/activities including using safety gear when necessary, assessing risk factors, ensuring external policies are followed (post-secondary institution, school).

Interactions with minors

- Volunteers are never to be left alone with children and should be treated as a 'guest'. If the teacher/guardian tries to leave during your activity, remind them of this policy.
- Face-to-Face Mentoring: There should always be another person present during mentorship, and there should never be a volunteer behind a closed door with a minor. Criminal record checks are required for one-on-one situations.
- Online Mentoring: Over email – the coordinator(s), teacher, or parent should be copied on correspondence. Other online mentoring should be through Let's Talk Science vehicles (i.e. CurioCity).

Insurance

- Let's Talk Science liability insurance policies apply to most Let's Talk Science activities. There might be exceptions in unusual circumstances, so check with your coordinator(s).
- Coverage should not be assumed, as the details will vary depending on the circumstances, and incidents that arise due to unlawful acts are excluded in all cases. Volunteers who drive their own cars must ensure that their personal insurance provides for the amount of travel being undertaken. Any claim resulting from an incident would go through their personal car insurance. If a car is rented, there is specific insurance coverage from the rental company that should be taken. Check with a coordinator for details.

There are a number of legislations, both nationally and regionally that Let's Talk Science staff and volunteers are required to follow. Please ensure you familiarize yourself with the following Let's Talk Science policies.

Human Rights legislation

Human Rights legislation protects human rights in employment and in the provision of services. It prohibits discrimination and harassment and supports the individual's right to be treated fairly, equitably and respectfully. Discrimination, harassment or retaliation towards staff and volunteers, while on business, by anyone will not be tolerated. This is essential not only to individual and group effectiveness but also to the quality of work life of all employees and volunteers. If you encounter or witness discrimination, harassment or retaliation you should inform your coordinator(s) or the national office immediately. For full details, see our Human Rights policy.

Workplace Harassment and Workplace Sexual Harassment

Workplace Harassment and Workplace Sexual Harassment imposed on any Let's Talk Science representative in the course of their work by anyone, including a person who is not affiliated with Let's Talk Science (e.g. customer, supplier, or program participant) is not acceptable and will not be tolerated. Harassment is generally repeated conduct that is inappropriate, offensive, hostile or unwanted and can be in the form of words, gestures or actions. As a volunteer you are required to: 1) Treat individuals in the work environment with respect. 2) Report any incidents of harassment in the workplace, experienced or observed, to your coordinator(s) or the national office. 3) Co-operate in the investigation and resolution of matters involving harassment in the workplace.

Let's Talk Science is committed to building and preserving a safe working environment for its employees and volunteers and **strictly prohibits violence in the workplace, including on volunteer assignments**. As a volunteer of Let's Talk Science, you have the following responsibilities to our working environment:

1) Help us eliminate the threat of violence from our workplace.
2) Prevent and report acts of violence that threaten or perceive to threaten a safe work environment. This includes reporting any violent incident the employee or volunteer has been involved in that may come into the workplace.
3) As all volunteers have the right and responsibility to refuse unsafe work, this shall include circumstances where the volunteer believes workplace violence is likely to endanger them.

Let's Talk Science is committed to **accessibility**, and aims to offer its products, programs, and services to all interested stakeholders, regardless of their abilities; in some provinces and territories it is the law. Volunteers should review the Let's Talk Science Accessibility Training Guide available on the volunteer portal for requirements and guidance on ensuring their outreach activities (in-person or online) are accessible to all regardless of their abilities.

Let's Talk Science is committed to ensuring the health, safety and welfare of employees, volunteers and participants in the workplace and in other places where our programs may be delivered. Commitment to health and safety must form an integral part of this organization, embraced by every employee and volunteer. No job is so urgent that time cannot be taken to do it in a safe manner. Volunteers are responsible for taking all reasonable precautions to ensure their own health and safety as well as that of their fellow volunteers and others present at, or near, the workplace.
This includes:

- Following the policies and procedures established by Let's Talk Science, coordinators and other institutions, where relevant.
- Using or wearing appropriate personal protective equipment, devices or clothing, as outlined in the Safe Presentation and Activity Policy.
- Reporting any health and safety concerns or unsafe conditions they witness to their coordinator(s) as outlined in the Volunteer Health and Safety policy so that they can be dealt with promptly. If they are not dealt with, report these concerns to the national office.
- Reporting any incident, injury or illness to their coordinator(s).Reporting any acts of violence or harassment while engaged in Let's Talk Science activities as outlined in the Violence and Workplace Harassment and Workplace Sexual Harassment policies.

APPENDIX XI

SAFE PRESENTATIONS AND ACTIVITIES

Given the nature of Let's Talk Science's programming, it is recognized that there will be certain health and safety risks for both our audience members and representatives (volunteers and staff). Whether the activity is done in person or is being recorded for online public viewing, safety must be foremost in the minds of every representative. Planning activities always requires careful judgement by trained and experienced individuals.

Every person who does demonstrations or uses equipment, chemicals or other materials should be trained and knowledgeable about the safe use, handling and disposal of any and all equipment and materials used. Representatives should be aware of any hazards associated with the materials and/or equipment and plan carefully to provide a safe environment for their audience and themselves. It is recommended to consult with a trained and experienced scientist when assessing the hazards of the presentation, such as ranking the level of exposure of the hazard (both by representatives and audience members), probability of occurrence and consequences of exposure.

A safety checklist should be available to all representatives if the activity involves demonstrations as described above. Please contact a staff member at the Let's Talk Science national office if you are unsure or would like to submit a request for an exception to the guidelines below. This checklist should include the following precautions:

- ✔ Emphasize and demonstrate appropriate safety procedures throughout the presentation.
- ✔ Do not use demonstrations in which parts of the human body are placed in danger such as placing dry ice in the mouth or dipping hands in liquid nitrogen.
- ✔ Do not use live vertebrate animals in demonstrations for experimental purposes (see Canadian Council of Animal Care guidelines website http://www.ccac.ca/).
- ✔ Do not use plants with poisonous oils (e.g., poison ivy), allergens (e.g., peanut plant), or other plants known to be generally toxic to humans.
- ✔ Always check with schools/groups to identify other allergens specific to that location (e.g. strawberries, bananas, latex balloons) and adjust demonstration and materials accordingly.
- ✔ Any food used or consumed as part of activity should comply with food safety guidelines for storage, preparation and cooking. For details see your jurisdiction's Ministry/Department of Health and Health Canada (http://www.hc-sc.gc.ca/fn-an/securit/kitchen-cuisine/index-eng.php).
- ✔ Do not conduct experiments or demonstrations with human blood/bodily fluids or other bio-hazardous materials. Some exceptions may be approved such as using saliva for DNA extraction.
- ✔ Use appropriate gloves when working with hazardous products including cryogenic materials or very hot materials. This includes spectators or participants if placed at risk of injury.
- ✔ Wear eye protection for all demonstrations where hazardous products are in use or where other risks might exist (i.e. objects potentially flying up accidently, when liquid transfers are expected to take place). This includes spectators and participants.
- ✔ Use safety shield protection whenever there is any possibility that a container or its contents could explode or implode with sufficient force to cause personal injury to observers.

- ✔ Warn members of the audience to place their open hands in front of each ear to act as a barrier to the shock waves whenever a loud explosion is anticipated.
- ✔ Secure pressurized gas cylinders (e.g., a helium tank for balloons) by strapping or chaining them in place or by using properly secured supports.
- ✔ Plan demonstrations so that harmful quantities of noxious gases (i.e. nitrogen dioxide, sulphur dioxide, hydrogen sulfide) do not enter the local air supply by using a properly vented system.
- ✔ Do not use highly toxic substances (i.e., benzene, carbon tetrachloride, ammonium dichromate, mercury) or acutely dangerous explosive substances (i.e. benzoyl peroxide, ether, picric acid) or any substances that are banned by the institution where the demonstration is taking place.
- ✔ If an activity involves flame production/explosion, you may need to have an up-to-date fire permit outlining what will be taking place. You should ensure the institution is aware that you will be using flames/explosion and seek approval. The institution is responsible for informing you if you will need a fire permit. The activity can only be performed by the individual whose name appears on this permit and the individual should be trained and confident with the materials they are using. It is also very important to notify on-location personnel in advance in case of fire alarms being set off unnecessarily.
- ✔ Ensure that demonstrations involving the use of strobe lights, lasers, UV radiation, IR radiation, X-rays, microwaves or sound sources are all controlled such that the participants and audience are not subjected to any harmful exposures and make audience aware that strobe lights will be used.
- ✔ Provide adequate shielding and containment for all radioactive sources and ensure that radioactive isotopes are used in accordance with the regulations of the Atomic Energy Control Board.
- ✔ Provide adequate isolation for high-voltage circuits such that participants may not come in contact with any high voltage parts of circuits.
- ✔ Dispose of waste materials that are hazardous to the environment in appropriate waste containers and remove them from the demonstration site if the venue does not have appropriate disposal available.
- ✔ Always provide written procedure, hazard and disposal information for each demonstration whenever the audience is encouraged to repeat the demonstration. Many institutions have hazard assessment forms that are provided by the risk and safety office which must be approved.

Some items have been adapted from the Science Teachers' Association of Ontario Safety Policy for Demonstrations at Conferences appearing in the Crucible, Volume 30, Issue 3, page 40.

Representatives should also follow the policies as outlined in the WHMIS policy. It should be noted that school boards/districts, community venues and/or post-secondary institutions may also have their own health and safety rules or risk management offices. Let's Talk Science representatives should check the appropriate guidelines and follow these rules in addition to what is included here.

For an up to date version of the Safe presentations and activities policy, please consult the volunteer portal.

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