# Hydro-Québec SCENCE FRR

THE SCIENCE FAIR EXPERIENCE BEGINS IN YOUR SCIENCE CLASS!

# SCIENCE



**SECONDARY & CEGEP** 

# **TEACHER GUIDE**

A program of



Presenting partner



## INDEX

Everything you need to Dare Science with your secondary and CEGEP students!

1.	The full kit! (list of complementary documents)
2.	Why bring the Science Fair into my classroom? $\ldots \ldots 4$
3.	Pedagogical program components 5
4.	The teacher's role
5.	The various competition levels
6.	Project types, classifications and categories 12
7.	Academic integrity, regulations and ethics 15
8.	Science Fair timelines 17
9.	Suggested in-class activities to inspire student projects 24
10.	Student support tools
11.	Guidelines for running a local final at your school 26
12.	Moving from local final to regional finals
13.	Useful information on regional finals
14.	A school trip to the Science Fair finals?



### DARE SCIENCE WITH OUR SCIENCE FAIR PROGRAM!

The Réseau Technoscience is pleased to present this secondary school and CEGEP kit for students participating in the Science Fair. In addition to this Teacher Guide, the full documentation provided includes a range of support tools for both teachers and exhibitors. The following items are part of the full kit and can be downloaded for free from the Réseau Technoscience website at: technoscience.ca

- Student Handbook
- Report Writing Guide for STUDY Projects
- Report Writing Guide for EXPERIMENT Projects
- Report Writing Guide for DESIGN Projects
- Evaluation Grids Local final
- Ready-to-use promotional materials for local finals

Visit the <u>technoscience.ca</u> regularly, new content can be added!



### GET SUPPORT FROM THE RÉSEAU TECHNOSCIENCE

Réseau Technoscience and its regional member organizations across Quebec are ready to support you! Contact us! We want your Science Fair experience to be enjoyable and enriching. We have a lot to offer, including competitions, prizes, certificates, people who can help you, and much more!

### WHY BRING THE SCIENCE FAIR INTO MY CLASSROOM?

#### THE SCIENCE FAIR: AN OPPORTUNITY TO DARE SCIENCE IN

#### YOUR VERY OWN CLASSROOM!

The Science Fair program organized by Réseau Technoscience and its regional member organizations gives secondary school and CEGEP students an opportunity to learn about science, scientific inquiry and scientific processes in a structured way. The Science Fair allows students to:

- > build a science project on a topic or subject that excites them.
- > be empowered to enjoy have an exciting, educational experience.
- use a systematic scientific approach.
- develop expertise on a subject and learn how to explain and make it comprehensible to others. All Science Fair projects are presented publicly in visual, oral and written presentation form.

«The Science Fair was the initial foundation upon which I built a career in science. It's where I first discovered my passion for scientific research and exploration a passion that continues to inspire me. Today, as a university professor and head judge for the Super Expo-sciences Hydro-Québec, Quebec Final, I strive to spark a similar interest and passion in others.».

Simon Girard, member of the Science Fair Alumni Community, professor at the Université du Québec à Chicoutimi (UQAC) and head judge for the Super Expo-sciences Hydro-Québec, Quebec Final.

> Simon Girard with winners of the Super Expo-sciences Hydro-Québec, Quebec Final in 2017 in the City of Saint-Hubert (Montérégie).



# DIRECTLY LINKED TO QUEBEC'S EDUCATIONAL PROGRAM!

By bringing the Science Fair program into their classroom as a learning and assessment activity, teachers can assess students and also help them progress with respect to the three primary competencies stipulated in the Science and Technology program.

## COMPETENCY 1

## SEEK ANSWERS AND SOLUTIONS TO PROBLEMS OF A SCIENTIFIC OR TECHNOLOGICAL NATURE

When building a Science Fair project, students are responsible for identifying a scientific approach and methodically conducting the investigation that follows. They begin by asking a question or raising an issue and choosing a subject or topic to research. They formulate different hypotheses, and develop an investigative approach and methodologies in order to seek an answer or come up with a solution to the issue at hand. Students may have to modify their approach when building their projects as their investigations evolve and new facts and data come to light.

The project, which the student will present to the general public, is the result of the findings and conclusions he or she draws after following the scientific approach and investigative methodologies chosen. With assistance from teachers, students must look at their project plan, and draw links between the approach or protocols used by professional researchers and the ones they chose to adopt in order to address the concrete scientific or technological issue they chose to resolve or



# **COMPETENCY 2**

# TO PUT KNOWLEDGE OF SCIENCE AND TECHNOLOGY TO USE

Students use their existing knowledge and skills to build their Science Fair projects. With assistance from their teacher, they acquire new insights and expertise. Students will think about their projects in terms of what they know and continue to learn. When discussing their projects with judges and members of the public, they will apply their knowledge and learn to answer questions, including those they may not have foreseen or imagined. For subjects linked to current events or recent developments, students are expected to make the connection between information reported by the media and empirical, scientific facts.

Some students will choose to investigate or explore the underlying scientific phenomena related to a basic fact or object from everyday life. Irrespective of the topic's complexity, the effort needed to successfully build a Science Fair project requires degrees of thought and reflection that are integral to the advancement of scientific knowledge.

## **COMPETENCY 3**

#### TO COMMUNICATE USING APPROPRIATE SCIENTIFIC AND TECHNOLOGY TERMS

When building a Science Fair project, students will consult written materials and other sources that are more specialized than those found in school textbooks. Students will learn – and learn to adopt – terms and expressions used by professional scientists and researchers.

While working on their projects, students will assimilate and synthesize

new ideas and research findings: initially, by writing the written report they must prepare for the judges and, then, by preparing the oral presentation they must make to these same judges and to members of the public. In their presentations, students are expected to adapt sophisticated scientific language and terminology in order to make themselves and their project understandable to different audiences.

## DEVELOPING MULTI-DISCIPLINARY SKILLS

THESE COMPETENCIES ARE LISTED FOR GENERAL INFORMATION PURPOSES ONLY; THEY ARE EXPLAINED IN GREATER DETAIL IN THE QUÉBEC EDUCATION PROGRAM (QEP) .

# RESEARCHING AND USING INFORMATION APPROPRIATELY

The diligence and methodology required to successfully complete a project will require students to gather information from a variety of sources. Science Fair organizers strongly suggest students consult a wide range of sources in order to validate their investigation and analysis, to corroborate facts and data and to mitigate any risk of plagiarism. Students are responsible for research and for synthesizing the information they use in their projects, and then presenting it coherently in their written report and oral presentation.

### SOLVING PROBLEMS

During all stages of the Science Fair, students will have to face and take measures to overcome obstacles and resolve problems of varying types and degrees, that might be scientific, logistical and/or social in

In essence, a Science Fair is trying to solve a problem by a scientific method..

#### USING CREATIVITY

Students must investigate and assess their research topics from different angles and, despite various constraints, propose appropriate solutions or answers. To distinguish themselves from other exhibitors, they must also present their ideas and projects in an interesting and original manner.

# ACQUIRING EFFECTIVE STUDY AND WORK HABITS

Due to the size, scale and overall magnitude of their projects, students must adopt appropriate work methodologies. As the Science Fair competition lasts several months, students will have opportunities to adjust or fine tune their work approach and methodologies as their

## DISCOVERING OWN POTENTIAL

Students participating the Science Fair work hard for several months on a topic they are passionate about, as they discover new interests, gain a deeper understanding of them, work collaboratively and perseveringly, and contribute as members of a team. Throughout this process, they gain personal insights - especially in terms of their own strengths and weaknesses - which will benefit them both at school and in their future careers.

THE TEACHER'S ROLE

Teachers assume multiple roles during the Science Fair. Their primary responsibility is to serve as a guide. They bring up the Science Fair in class, help students select research topics and work with them as they build their projects through to completion. They serve as a coach to assist, stimulate learning and encourage students. They also help students develop a timetable for handling their projects and ensure they stick to it!

#### THE TEACHER PLAYS A KEY ROLE FOR STUDENTS IN:

- incorporating the building of Science Fair projects into the existing pedagogical plan for the year.
- organizing activities to launch the project in class time.
- supporting students throughout the competition.
- demonstrating the importance of academic integrity and ethics in the field of science and technology.
- assisting students with their scientific research and investigations.
- > helping students to find and select a science supervisor or mentor.
- O directing students to the various online tools available on technoscience.ca
- > organizing and/or coordinating a local final.
- S giving recognition and credit to all students who put together a project.
- representing his or her school at the Quebec regional final, and at the Quebec provincial, Canadian and international finals.
- o contacting Réseau Technoscience and its regional member organizations, when necessary.



(( The Science Fair is an excellent way to stimulate the natural curiosity of students. It allows them to explore science in new and creative ways. It also empowers them. Students are responsible for building their own projects. They chose the subject they want to investigate and the research approach to take. They find this really interesting. They think it's super cool. ))

Mary Zarif, teacher at St-Luc Secondary School in Montreal and volunteer delegate at the 2017 Science Fair Canadian final in Regina.

TEACHER'S GUIDE HYDRO-QUÉBEC SCIENCE FAIR THE TEACHER'S ROLE

## NEW! IN-CLASS SUPPORT OPTION FOR TEACHERS!

## Réseau Technoscience and its regional member organizations can provide extra support!

Réseau Technoscience inaugurated its new "Youth Ambassadors" program in 2017 to make additional teacher support available. Ambassadors are past Expo-sciences exhibitors and members of the Science Fair alumni community who are happy to share their knowhow with your class. They might be studying at the secondary, CEGEP or university level, or else working as researchers, science professionals, engineers and mathematicians.

While an Ambassador's core mandate is to kindle students' passion for scientific endeavours, they can also help students come up with ideas, fashion thoughts into clear projects and lay out step-by-step work plans.

#### Why the Ambassador Program?

- It's a wonderful opportunity for your budding scientists to converse about science with those studying and working in the field.
- The chance to meet passionate mentors will foster a positive association with future science and engineering career opportunities.
- Teachers receive valuable tools, support and assistance from Ambassadors

Ambassadors are available to children aged 6 to 17 years at no cost – whether it be for a single day or scheduled support over several weeks – and they can even help in preparation for your final local.

If you'd like to have an Ambassador visit, your Réseau Technoscience member organizations will match your class with a suitable Ambassador and coordinate the visits.

Get in touch with your regional member organization to book it!



## Our new mentoring system!

Your students have project ideas, but you do not have all the resources to guide them in their efforts?

They can enroll in the S.O.S. Mentor Mentoring System to be paired with professionals in a variety of scientific fields who can work with them in the lab, in person, via email, telephone or video conference.

mentorat.technoscience.ca

THE VARIOUS LEVELS WITHIN THE COMPETITION

The Science Fair truly gets underway in schools and classrooms throughout Quebec in large part due to the efforts of dedicated teachers and school administrators. Réseau Technoscience then becomes involved and oversees the competition so exhibitors can take the science adventure further! There are varying levels of the competition for students who produce remarkable projects. Those are:

#### LOCAL FINALS

A Local Final is organised by a particular school or school board when enough teams or individuals wish to present in a given territory. The purpose of a local final is generally to select the best science projects to subsequently enter in the Regional Final.

The great adventure and purpose behind the Science Fairs is all about getting a chance to present your project publicly!

#### **REGIONAL FINALS**

The Hydro-Québec regional science fairs take place throughout Quebec annually in late March and early April. The regional finals highlight the work submitted by science students at the secondary school and CEGEP levels. They are held over a two- or three-day period. In some cases, additional time is added for inauguration ceremonies as well as student booth set-up/dismantling.

The Hydro-Québec Science Fair provides students with an opportunity to view other projects submitted in the competition. It is also an opportunity to meet peers – other young scientists – and science professionals, and a chance to make contacts. The competition gives literally thousands of students an opportunity to explore their ideas, express their passions and have a truly unique experience! It is a learning experience that will benefit you at school and later in life.

Winning projects from each regional final then form a regional delegation that travels to the Quebec provincial final. A list of all regional projects is available on the technosciences.ca website.

A successful science project does not necessarily depend on how much money is spent nor the prior academic achievements of those behind it. It's all about the ideas and process!.

Hydro-Québec Science Fair, Montreal regional final, 2016.



TEACHER'S GUIDE HYDRO-QUÉBEC SCIENCE FAIR

### SUPER EXPO-SCIENCES HYDRO-QUÉBEC, QUEBEC FINAL

The Quebec final takes place annually in April. It features the winning Science Fair projects from the 12 regional, province-wide finals.

The Quebec final attracts a large audience and provides another opportunity for students to meet and build relationships with like-minded students and experienced science professionals. A unique opportunity indeed!



#### **CANADIAN FINAL**

The Canada Wide Science Fair final takes place annually in mid-May and is attended by more than 500 exhibitors from across the country.

The winning projects at Super Expo-sciences Hydro-Québec, Quebec Final form a delegation to represent Quebec at the Canadian final.



#### **INTERNATIONAL FINALS**

The Réseau Technoscience has developed and maintains relationships with a variety of international organizations in order to offer Quebec students an opportunity to exhibit their science projects internationally. The projects chosen for international competitions are selected at the Super Expo-sciences Hydro-Québec, Quebec final.

Registration fees apply to the Regional Final, Quebec Final, Canadian and International Finals. Your regional Réseau Technoscience member organisation can provide further information on applicable fees.

For further details on anything related to finals, visit the Réseau Technoscience website.



#### **CLASSIFICATIONS - NEW IN 2019!**

- JUNIOR Secondary 1
- INTERMEDIATE Secondary 2 and 3
- SENIOR Secondary 4 and 5
- OLLEGIAL 1 first and second year of Cegep
- COLLEGIAL 2 from first to third year of Cegep (technical college program) or third-year double DEC students

Note: Collegiate classes 1 & 2 are grouped into one class for judging and prices.

Note that College 2 - Technical Students and 3rd Year of the Double DEC are not eligible to participate in the Canada-Wide Science Fair. However, they are eligible for the International Science Fair.

#### **PROJET TYPES**

#### **EXPERIMENT**

An experiment project aims to prove or disprove an idea or seek a better understanding of why something happens. It is also about applying rigorous scientific techniques to deepen your understanding of a particular subject.

An experiment can use alternative or complementary techniques to validate or invalidate the results of another researcher.

#### DESIGN

A design project attempts to create by relying on our imaginations. Design is about responding to a need to invent a new product or service, or to improve an existing one, and which is applicable to the fields of technology, engineering, computer science and health.

#### STUDY

A study project examines a subject in depth by consulting and comparing a wide variety of sources. The scientific and technical knowledge thus acquired is then shared and made accessible to an audience.

Θ

### **NEW SCIENCE CATEGORIES**

All Science Fair projects are presented according to a science category defined by the Science Fair program.

As of 2018-2019, there are now five categories.

For each category, a non-exhaustive list was drawn up below to guide you in determining which category best represents your project and its field of science expertise.

- Biological and Health Sciences
  - Living organisms
  - Nature and properties of living organisms
  - Biomedical sciences
  - Human biology and physiology
  - Microbiology and immunology
  - Pharmaceutical sciences and drug development
  - Genetics
  - Biotechnology
- Pure Sciences
  - Physics
  - Mathematics and statistics
  - Chemistry and chemical engineering
  - Astronomy
  - Geology and geomorphology
  - Geography



- Environment and Ecosystems
  - Environmental resources
  - Ecosystems
  - Habitat biodiversity
  - Natural resources and sustainable development (e.g.: agribusiness, energy, etc.)
  - Energy sources and forms
- Engineering, Computer Science, Robotics Applications
  - Computer engineering and software
  - Mechanical engineering
  - Electrical engineering
  - Civil engineering
  - Aerospace engineering
  - Building engineering
  - Industrial engineering
  - Construction engineering
  - Software development
  - Electronic and computer system development
  - WEB development
  - Programming
  - Computer security
  - Video games
  - Artificial intelligence
  - Robotics (design, manufacture and use of robots)
- Social Sciences and Social Networks
  - Sociology
  - Culture
  - Information and communications technologies (e.g. social media)
  - Human behaviour (psychology, psychoeducation, industrial relations, etc.)
  - Demographics
  - Education and behavioral studies

## ACADEMIC INTEGRITY, REGULATIONS AND ETHICS IN THE FIELD OF SCIENCE ARE A RÉSEAU TECHNOSCIENCE PRIORITY. .

The Réseau Technoscience Science Fair instituted a Provincial Ethics & Rules Committees in 2015, followed by a Provincial Judging Committee in 2016 to oversee the mandate and work carried in conjunction with the ethics and regulations committee. Alltogether, they work to harmonize the judging process and decision-making for regional and Quebec finals.

#### Provincial Judging Committee

Set up by Réseau Technoscience, the Provincial Judging Committee oversees the work of the Provincial Ethics & Rules Committees. Committee members are volunteers who are recognized for their scientific expertise and for their support of Quebec's future generations of young scientists and researchers. The volunteers who sit on the Provincial Ethics Committee are Science Fair alumni (past exhibitors) and science professionals, such as doctors, researchers, professors/teachers. They ensure the code of ethics is practised by all exhibitors and is applied to all Science Fair projects equally.



### ACADEMIC INTEGRITY, REGULATIONS AND ETHICS

#### **ACADEMIC INTEGRITY**

Science Fair exhibitors must acknowledge the importance of intellectual property and avoid plagiarism. Students arae expected to understand that:

- throughout the regional and Quebec finals, written reports may be reviewed using anti-plagiarism software.
- <u>all sources</u> must be cited and any assistance from a scientific supervisor, mentor, parent or acquaintance must also be cited or recognized.
- a bibliography <u>must</u> be included along with the written report.
- if a Science Fair project was inspired by an existing original idea or hypothesis, credit must be given to the initiator of the idea or hypothesis.

#### **REGULATIONS AND ETHICS**

The Science Fair is a science competition whose regulations must be read and followed by all participating exhibitors. These regulations are updated annually by Réseau Technoscience's Provincial Regulation Committee and can be found on the technoscience.ca website.

#### Important items to note:

Experiment projects involving animals, biological and/or chemical matter must be conducted in a recognized institution and supervised by qualified personnel affiliated with the recognized institution. You must fill out Form A if you plan to work with a recognized institution.

# FORM A IS ACCESSIBLE ON THE TECHNOSCIENCE.CA WEBSITE AND MUST BE COMPLETED ON LINE.

You must also fill out Form A if you plan to use humans as research subjects in your project, including the exhibitor himself (questionnaires, physical involvement, tests). Note that you cannot begin your research until the Réseau Technoscience's Provincial Ethics Committee approves your project.





#### A HELPFUL GUIDE FOR TEACHERS!

TIME FRAME	STAGES FOR ALL PROJECT TYPES	RESOURCE AVAILABLE FROM
Back to school - End of August	Visit the Réseau Technoscience website	
	Like and follow the official Science Fair Facebook page; follow the Science Fair on Instagram and Twitter.	
September	Plan out your class or school involvement in the Science Fair.	
September	Schedule a date for an in-class presentation by a Youth Ambassador	Regional Réseau Technoscience member organization see page 9 for details
September	Introduce the program in class with the PowerPoint presentation.	The presentation can be led by the teacher or by a Youth Ambassador La présentation est disponible gratuitement au <b>technoscience.ca</b>
Beginning of September to mid-October	Receipt of promotional materials requested for the regional final (via email and/or postal service).	Regional Réseau Technoscience member organization
	Check the online registration deadline for the regional finals, including the number of projects allowed for your area and associated registration costs.	



TIME FRAME	STAGES FOR ALL PROJECT TYPES	RESOURCE AVAILABLE FROM
September	<ul> <li>Take note of the various stages and deadlines for putting together a Science Fair project in class.</li> <li>Get started on various elements for these different preparatory stages.</li> </ul>	By the teacher or Youth Ambassador Upon the teacher's request, the Youth Ambassador may be present on an occasional basis or for a period of several weeks to assist students.
October	<ul> <li>Outline all of the different tools available for building a Science Fair project and discuss with students:</li> <li>Student handbook</li> <li>S.O.S. Mentor</li> <li>Report (and bibliography) Writing Guides</li> <li>Rules and forms.</li> <li>1001 ideas</li> </ul>	Free download at technoscience.ca and Section 9 of the Teacher Guide to activities to help choose student project ideas. Note: Experiment-based projects envisaging the use of human beings for research purposes MUST be approved by the Réseau Technoscience's Provincial Ethics Committee BEFORE research can begin. For more information, please consult the rules.
October	Verify receipt of all promotional materials and other information for the reginal final, such as registration deadlines and dates for school visits.	Regional Réseau Technoscience member organization
October	Place an order for participation certificates for the local final.	Regional Réseau Technoscience member organization



TIME FRAME	STAGES FOR ALL PROJECT TYPES	RESOURCE AVAILABLE FROM
October	Set a date for your local final.	
November to January	Plan a (free) class visit to a regional final.	Regional Réseau Technoscience member organization
	Collect any necessary releases and travel authorizations, and reserve transportation.	
	Complete the necessary forms to reserve a spot for your class visit to the regional final.	
November to December	Schedule time with students to help them fine tune their project ideas and to encourage them to persist in their research endeavours.	Contact the regional <b>Réseau</b> <b>Technoscience member</b> <b>organization</b> to check whether a Youth ambassador is available to provide support.
	Ensure that Form A is completed for any experiment projects for which this is required.	
	Meet with student teams to discuss project feasibility and conformity to Science Fair rules.	
	Direct teams towards any key contacts and organizations for the appropriate support.	



TIME FRAME	STAGES FOR ALL PROJECT TYPES	RESOURCE AVAILABLE FROM
November	Organize (or help organize) the local final.	See planning guide on pages 26-29.
November - December	Remind students of local final dates.	
	A local final may be held in December, January or February. Students should understand that it is not necessary for a project to be fully completed for it to be entered into the local final.	
	Send dates and venue for the local final to info@technoscience.ca so they can be uploaded onto the technosience website.	
	Ensure that student participation certificates have arrived (from member organization).	
	Prior to Christmas and New Year's holidays, schedule a meeting with students to discuss their individual projects. Many students work on their projects during the holidays.	
	Schedule follow-up meetings with students, as required.	



# SCIENCE FAIR TIMELINES

TIME FRAME	STAGES FOR ALL PROJECT TYPES	RESOURCE AVAILABLE FROM
December	Period for submitting an application to serve as chaperone at the following events:	Regional Réseau Technoscience member organization
	Quebec final (5 days in mid-April).	
	Canadian final (8 days in mid-May).	
	International final (anytime from May to September, depending on the year).	
January	After the holiday season, schedule time to meet with each team and review how their projects are progressing.	
	Ensure ongoing support and follow-up.	
	Participate in the local final, (if in Jan). Give a certificate to every participating student. Select the projects to be entered into regional finals.	
February	Participate in the local final, (if in Feb). Give a certificate to every participating student. Select the projects to be entered into regional finals.	technosciene.ca For online registration
	Meet with team members entered in the regional finals. Follow-up to ensure teams are officially registered using the online registration system.	



TIME FRAME	STAGES FOR ALL PROJECT TYPES	RESOURCE AVAILABLE FROM
February	Do not miss the registration deadline for the regional final (individuals, teams or the teacher can complete the online registration).	Regional Réseau Technoscience member organization Use online registration system
	<ul> <li>Support students participating in the regional final; have them practise their oral presentations and offer feedback on their written reports before uploading them along with all the required forms to the Réseau Technoscience website.</li> <li>Prior to the Spring break,</li> </ul>	
	confirm payment and prepare projects selected for the regional finals.	
March	Ensure support for students whose projects have been selected for the regional final.	
	Schedule a class visit to the regional final.	
April	Congratulate all student exhibitors who participated in the regional finals. Congratulations are important because students are rightly proud to represent their school.	



# ÉCHÉANCIER POUR RÉALISER L'EXPO-SCIENCES

TIME FRAME	STAGES FOR ALL PROJECT TYPES	RESOURCE AVAILABLE FROM
April	School administrators may issue a press release if a student(s) is awarded a prize(s) at the Regionals.	Regional Réseau Technoscience member organization
	Support students whose projects are selected for the Quebec final. The Quebec final is held annually in April for secondary school and Cegep students between the ages of 12 and 20.	
Мау	Support students whose projects are selected for the Canadian finals. The Canadian final is held annually in May.	
June	Before the end of the school year, highlight the students' participation in the Science Fair.	



TEACHER'S GUIDE HYDRO-QUÉBEC SCIENCE FAIR

### SUGGESTED IN-CLASS ACTIVITIES TO INSPIRE STUDENT PROJECTS

Settling on a idea for a project is often the most difficult step. The following suggestions might help you guide your students through this all-important, first stage.

- Consider surveying all your students to figure out how we might come up with ideas? Exactly how and where might someone find inspiration?
- You can write a test or quiz to assess students' interest in different aspects of science. What aspects of science do they find the most appealing? Réseau Technoscience recommends the RIASEC test as it is designed for this type of self-examination and is available online at monemploi.com/riasec. The test assesses how a student's general interests can be applied to scientific endeavours.
- Teachers can encourage a general discussion between students wherein they might talk about their likes and dislikes, favourite sports or activities and which science field appeals to them most. Ask students about everyday problems or situations they currently face or have recently overcome. This exercise will stimulate their innovative and creative impulses: how do we resolve different types of problems? How can we improve our quality of life? Enhance our favourite activities? The objective is to have students develop a querying process which can lead to a personal passion idea for a project.
- Divide your class into five stations and explore various Science Fair categories. Each of these stations will showcase five inspirational scientists or researchers in that field:
  - Station 1 Ideas drawn from biological and health sciences
  - Station 2 Ideas drawn from pure sciences
  - Station 3 Ideas drawn from environment and ecosystems sciences
  - Station 4 Ideas drawn from engineering, computer science and robotics
  - Station 5 Ideas drawn from human and social science and social networks

In addition to the above suggestions, you can propose that students:

- > Watch documentaries, surf the internet, read newspapers, magazines and books.
- > Talk with their parents, friends and acquaintances.
- Look at the 1001 Ideas available on the Technoscience website.

Once a research topic or subject has been chosen, the student must decide if it will fit in the design, experiment or study project category. The student must take note of Science Fair rules. Some projects may have to conducted under the auspices of a professional scientists working with a recognized institution. Often, teachers find Science Fair activities professionally and intellectually stimulating too. Nonetheless, teachers should not act as subject matter experts on the research topics students chose to investigate. The Science Fair is designed to engage students and promote their learning beyond school walls. Teachers should also view the mentoring that students receive from other scientific partners as part of this learning process. When collaborating with mentors, students develop a aluable professional network outside of the school network. Th

# THE STUDENT HANDBOOK

Science Fair students must become familiar with the Student Handbook as their essential reference guide. Teachers should also read the handbook so they can better guide and assist students. The subjects covered in the Student Handbook include:

- Am I eligible to participate in the Science Fair? Why build a project? Why submit a science project?
- What type of support will I receive from: My teacher? My scientific
- What is my project idea? How do I choose?
- Academic integrity Rules Ethics
- Project categories
- Choosing a type of project Experiment, Study, Design
- Logbook
- Oral presentation
- Visual presentation
- Formatting: Written Report Bibliography Report Writing Guide for
- After the Quebec regional finals, what are the next levels I can compete in at the Réseau Technoscience Science Fair

## MODELS AND TEMPLATES TO **GUIDE STUDENTS**

Report Writing Guides available to help produce a written report and bibliography, whether for a Study Project OR an Experiment Project OR a Design Project.

These guides explain how to write a report and are adapted to Science Fair presentation standards and evaluation criteria.

# AND EVEN MORE TOOLS!

- Ø
- PowerPoint presentation introducing the Program Ø
- S.O.S. Mentor, our online mentoring site Ø
- Video capsules

Document on experiment Quand experimenter rime avec Expo-sciences (available only in French)

- A Youth Ambassador Ø Ø
  - 1001 ideas (available only in french)

When putting together a Science Fair project, students get acquainted with different forms of science, learn how to explore ideas different ways and have a memorable educational and personal experience. It's a chance to discover new passions and is open to all! Dare science by participating in the Science Fair.

Holding a local final at your school fosters a sense of pride, belonging and accomplishment – and is a great way to bring a dynamic shareable activity into your corridors. For teachers, this is the opportunity to select projects for the regional finals. This type of event can serve as an important event to brand your school and positively influence its image in the community!

✓ To be at the Science Fair with a lot of other students who aren't afraid to show how passionate they are about science is really motivating! It helped me make some good friends. ≫

Olivier Cloutier, Rimouski, First prize Super Expo-sciences Hydro-Québec, Quebec Final 2015

At the different stages of the Science Fair, I learned how to talk about complex subjects and make them understandable to a different people.

Simarjit Bilkhu, Secondary 5, Laval

At the Science Fair, you'll discover many new perspectives in science: new facets of chemistry that you've not yet come across or new ways to apply physics to everyday life.

Blanche Mongeon, Secondary 5, Montreal





Thomas Imbeault-Nepton, Secondary 3, Ville de Saguenay



 $\gg$ 

Q. Hydro Quel

Réseau

# • GUIDELINES FOR RUNNING A LOCAL FINAL AT YOUR SCHOOL

At the local level, teachers and school administrators can organize the competition process according to their own needs. However, when a school decides to select projects for the regional final, planning a local final event with formal judging or decision making is highly recommended.

The number of projects from a local final that are eligible for entry into the regional final is decided and set by the regional member organization. The teacher should contact the regional Réseau Technoscience member organization for the specifics – those contacts can be found on the Réseau Technoscience website.

A local final can be organized so that it is held during a regular school day. It can also be organized along with other schools from the same school board district and judged together. Planning a local final does not have to be complicated or time consuming: simply reserve a date for it to be held (either during or after class), pick some judges to assess the projects and invite parents and members of the general public to attend.

The local final provides teachers with an opportunity to assist students with their formal presentation skills and to offer feedback in preparation for eventual entry into the regional and Quebec finals.

ALL SCIENCE FAIR PARTICIPANTS HAVE THE SAME COMPETITIVE ADVANTAGE. ONE NEVER KNOWS HOW FAR A PROJECT WILL GO! OFTEN, THE FINALS OFFER SOME BIG SURPRISES!



#### JUDGING THE PROJECTS

Judging for a local final may take place while the public is still in attendance or perhaps after they have left, at your discretion. Evaluation grids for local finals are available on the Réseau Technoscience website. Although local final evaluation grids contain the same information as those used during the regional and Quebec finals, the formatting differs. This was done to simplify the judging process at the local level and due to the fact that the number of judges evaluating local finals may vary from one school to another.

#### **New Scoring Compliation Tool for Local Finals!**

To consolidate data from your local evaluation grids, visit technoscience.ca for our Scoring Compilation Tool in Excel format!

Judging of projects at the regional and Quebec finals follows Réseau Technoscience's strict judging standards and processes. Exhibitors will present their project to 5 different judges 20 minutes per judge.

Be sure to prepare your students to:

- Effectively manage stress
- React appropriately to an unexpected or surprise question
- Se OK with saying you do not know an answer and avoid falling into the trap of making one up!
- Practice presenting and talking about their projects with other teams

#### ORAL PRESENTATION

An important part of a Science Fair project is presenting the findings to an audience. So how do students prepare for a local final?

Prior to the local final, teachers should divide the class into small groups and have students practice presenting their projects to each other. Teachers might also have students visit other classes to present their work. By practising their oral presentations, students will improve their delivery and confidence. It's important not to be monotone and not to just memorize a speech robotically.

#### VISUAL PRESENTATION

Teachers can talk with students about how to best showcase their projects, offering practical tips about optimal font sizes and language choices (legibility, grammar and vocabulary count!). All bibliographic sources for texts, images and illustrations, must be properly cited.

For further details and official norms on poster layout, see your regional member organization.

• GUIDELINES FOR RUNNING A LOCAL FINAL AT YOUR SCHOOL

### AFTER YOUR LOCAL FINAL

Why not conduct a post mortem exercise to present and discuss judges' comments as to the scientific validity of all your students' projects? This is a great way to show interest and support while furthering the students' learning process.

## YOU'RE DOING A LOCAL FINAL? THE RÉSEAU TECHNOSCIENCE HAS TOOLS TO HELP YOU!

Download our free tools online or contact a regional Réseau Technoscience member organization to take advantage of all the available support options!

- > Printable, customizable promotion tools
- > Evaluation Grids and Scoring Compliation Tool
- Participation medals
- Participation certificates (available online or by phone order)
- In-class support from Youth Ambassadors (ex-Science Fair alumni)

## **VISIT TECHNOSCIENCE.CA**



MOVING FROM A LOCAL FINAL TO REGIONAL FINALS

Student exhibitors MUST officially register their projects for a regional final using Réseau Technoscience's online registration system. To facilitate this process, explanatory guides are available – one for teachers, another for students.

Registration must be made prior to registration deadlines. Each regional final has a specific registration deadline. Details are available on the technoscience.ca website. The system shuts down at midnight on the day of each deadline. Over and above registration deadlines, there are also additional deadlines for uploading any forms (if required) and for uploading written reports.

It is possible that the three above-mentioned deadlines fall on the very same date or that three separate dealines will be given. Certain documents must be printed and signed in order to confirm your registration for a regional final. These documents must be signed and sent to the regional member organization by the prescribed deadline.

If a deadline is missed, students can no longer upload important project documents to the website.



# REGIONAL FINALS: EXHIBITOR GUIDE, SCHEDULE, ACTIVITIES AND The regional member organization will provide the above information.

#### **REGISTRATION FEES**

Exhibitors must pay a registration fee to participate in the regional finals. Your regional member organization is responsible for sending you this information.

#### ATTENDANCE

As outlined in the Science Fair rules, all exhibitors must be present at each stage of the competition. For more information, contact your regional member

## WITHDRAWAL, CHANGE OF STATUS

When a student or team of students, for whatever reason, cannot fulfill their commitments as outlined in Section 3 of the Science Fair rules, and wishes to withdraw from the competition, the individual(s) must communicate with their regional member organization in order to obtain the proper forms to do so.

#### LODGING

Depending on the geographical location and the venue for the regional final, lodging may or may not be required. Details will be provided by your regional member organization.

### FOOD AND BEVERAGES

When registering online, student exhibitors should provide information about their nutritional requirements, dietary needs and allergies. The organizing committee from your region may or may not offer meals during a regional final

#### TRANSPORTATION

For travel to the regional finals, each participating school will be responsible for all logistics pertaining to the transportation of both their students and projects.

## STRICT JUDGING STANDARDS

The Réseau Technoscience oversees the Provincial Judging Committee whose mandate is to uphold and monitor the proper judging standards and processes during the regional and Quebec finals. The committee ensures that the same high standards of transparency and scoring apply to all Science Fair exhibitors. There are six judging periods. Each project is assessed five times by 5 different judges for a period of no more than 20 minutes each. There is a 10-minute break between each judge. Exhibitors must not exceed the 20 minutes allotted for their presentations. They will be asked to stop talking if they take longer.



### AN EXCELLENT WAY TO DARE SCIENCE!

Visit a regional final with your students to generate interest in your school's projects and expose them to new science topics.

Take advantage of your visit to plan in-class preparatory or follow-up activities.

- Play "journalist-for-a-day" write up a report when back in class.
- Discover new scientific concepts plan a theme-based class discussion.
- Play the role of an expert project evaluator or appraiser for a day Prior to your visit, prepare questions to ask of project exhibitors.
- Select your top projects present them in class and have students discuss and judge the scientific reasoning and foundations.
- Judge the graphic design pay attention and keep your eyes peeled during the visit to later discuss the strongest (or weakest) visual impact.

#### CONTACT YOUR REGIONAL RÉSEAU TECHNOSCIENCE MEMBER ORGANIZATION TO BOOK YOUR SCHOOL TRIP!



#### CREDITS

#### Writer and Supervisor

Marthe Poirier - Réseau Technoscience

#### Contributors

Anne-Claude Brochu - Member of the Science Fair Alumni Community Laurie-Anne Roy - Member of the Science Fair Alumni Community Patrick Frappier - Teacher **Graphic Design** 

Maxime Lacasse-Germain - Réseau Technoscience Xavier Trudeau – Réseau Technoscience

#### Editing

Maude Péloquin - Réseau Technoscience Carole St-Cyr - Réseau Technoscience Bénédicte Cléroux – Réseau Technoscience Kenz Zaghib - Member of the Science Fair Alumni Community

#### **Photos**

Jacinthe-Lory Bazinet

#### Translation

Traduction Lingo

© Réseau Technoscience - 2019