

A photograph of three students in a chemistry laboratory. They are wearing white lab coats and safety goggles. The student in the foreground is using a pipette to transfer liquid into a beaker on a stand. The student in the middle is looking at a microscope. The student in the background is holding a test tube. There are various pieces of laboratory glassware, including test tubes in a rack and beakers on stands, on the lab bench.

**CANADA
SCIENCE
AND
TECHNOLOGY
MUSEUM**

**SCHOOL
PROGRAMS
2009-2010**

Canada

Updated Curriculum Connections

Our programs meet many learning objectives for students from pre-K through Grade 11. They profile how science and technology impact society and the environment and link to curriculae in history, the social sciences, and math in addition to science and technology. With our unique Canadian perspective, our programs offer students rich opportunities to explore, discover, and appreciate science and technology.

K	Earth's Daily and Seasonal Cycles	Pushing and Pulling Forces	Exploring Objects and Materials	Liquids and Solids
Grade	Structures and Mechanisms	Matter and Energy	Earth and Space Systems	
1	Material Objects and Everyday Structures Exploring Objects and Materials Structures and Shapes Curriculum Days	Energy in Our Lives Energy from the Sun, Wind, and Water Curriculum Days	Daily and Seasonal Changes Earth's Daily and Seasonal Cycles	
2	Movement Science Seesaw and Simple Machines	Properties of Liquids and Solids Liquids and Solids Curriculum Days Summer Fun Days	Air and Water in the Environment Energy from the Sun, Wind, and Water Liquids and Solids	
3	Strong and Stable Structures Structures and Shapes Curriculum Days Summer Fun Days	Forces Causing Movement Pushing and Pulling Forces Curriculum Days	Soils in the Environment	
4	Pulleys and Gears Pulleys and Gears: Wonderful Machines Curriculum Days Summer Fun Days	Light and Sound Looking at Light Sound Connexions Curriculum Days Summer Fun Days	Rocks and Minerals	
5	Forces Acting on Structures and Mechanisms Forces Acting on Structures Toying with Science and Technology Show Curriculum Days Summer Fun Days	Properties of and Changes in Matter Toying with Science and Technology Show Properties of and Changes in Matter Summer Fun Days Science Surprises	Conservation of Energy and Resources Introduction to Electricity Workshop The Many Faces of Energy Curriculum Days Summer Fun Days Science Surprises	
6	Electricity and Electrical Devices Introduction to Electricity Workshop The Many Faces of Energy Curriculum Days Science Surprises	Properties of Air and Principles of Flight	Space Toying with Science and Technology Show Probing the Skies Canadian Inventions and Innovations Space Exploration Workshop Curriculum Days Summer Fun Days	
7	Form and Function Forces Acting on Structures Toying with Science and Technology Show Canadian Inventions and Innovations Science and Engineering Olympics Summer Fun Days	Pure Substances and Mixtures Substances, Mixtures, and Heat Toying with Science and Technology Show Summer Fun Days	Heat in the Environment Substances, Mixtures, and Heat	
8	Systems in Action Toying with Science and Technology Show Canadian Inventions and Innovations	Fluids Toying with Science and Technology Show Amazing Fluids Science and Engineering Olympics	Water Systems Amazing Fluids	
Grade	Chemistry	Physics	Biology	Earth and Space Science
9	Criminal Science Investigation Science and Engineering Olympics	Electricity: Characteristics and Applications Science and Engineering Olympics	Biotechnology Days	Studying the Universe Canada in Space
10	Criminal Science Investigation Biotechnology Days Science and Engineering Olympics	Science and Engineering Olympics	Biotechnology Days	

An exciting adventure in hands-on learning!

Our programs and workshops bring your curriculum to life and inspire students. Support materials, available upon reservation, will help you make the most of this unique educational experience.



Pre-School Programs

Young audiences investigate and discover the marvels of science and technology in these specially adapted programs. Pre-school programs are generally 60 minutes in length.



An Invisible Attraction — Junior

Explore the wonderful world of magnets in this hands-on workshop. Learn about the properties of magnets. Discover which materials are magnetic and which are not. Investigate the strengths of different magnets. Discover how to move an object using magnetic force, and learn the many ways in which magnets are used in our daily lives. (ST2)

Steamin' — Junior

All aboard! Climb onto a real caboose or steam locomotive for a personal experience of railway life. What are the jobs of the fireman, engineer, brakeman, and conductor? Discover the answers to these and many other questions through puzzles and hands-on activities. (ST1)

Junior Builders

Discover what is required for a strong and stable structure and try your hand at building. Use a variety of building kits to construct bridges and towers to learn what makes for good building practices. Explore concepts of stability and strength by building a tower of blocks in a guided group setting. (ST50)

Grades K to 3



Steamin'

Grades K to 1

All aboard! Climb onto a real caboose or steam locomotive for a personal experience of railway life. What are the jobs of the fireman, engineer, brakeman, and conductor? Discover the answers to these and many other questions through puzzles and hands-on activities. (ST1)

Earth's Daily and Seasonal Cycles

Grades K to 3

What is our primary source of heat and light? How do Earth's daily and seasonal cycles affect everyday life? Giant Sun and Earth globes, and various activities, introduce concepts of heat, light, day, and night. Investigate the changing seasons through hands-on activities in the Museum's inflatable planetarium. (ST37)

Pushing and Pulling Forces

Grades K to 3

What happens when you push or pull an object? Hands-on activity stations illustrate how gravity, static, magnetic, and muscular forces cause objects to move. Apply different levels of force on objects and see them move, attract, repel, or change direction. Find out which forces are applied through direct contact and which interact at a distance. (ST51)

Exploring Objects and Materials

Grades K to 3

Can objects be made of more than one material? Use your senses to identify objects by how they look and feel. How do you make paper, plastic, and glass? Where do they come from? Hands-on activities illustrate how materials are produced, recycled, and how they can be fastened together to form objects. Various exhibits reinforce the “function determines the material” concept as you discover the objects and materials of everyday life. (ST4)

Liquids and Solids

Grades K to 3

Investigate the properties of materials through an exploration of liquids and solids. Probe the differences between the three states of matter, interactions between liquids of different densities, solids that dissolve in liquids, and buoyancy. Design a boat and see how much weight it can support. (ST5)



Energy from the Sun, Wind, and Water

Grades 1 to 3

Look at the world of energy, and discover how the Sun works to power all living things, in this interactive hands-on exploration of the world’s natural sources of energy. See how a strong wind has more energy than a light breeze, and discover responsible uses of energy. (ST8)

Science Seesaw and Simple Machines

Grades 1 to 3

Explore the principles of force and movement with this introduction to simple machines and the effects of friction. Explore the terms “work” and “load” as you look at the basic principles of levers and inclined planes. Investigate a multitude of mechanical devices that have changed the way we live, including a visit to the **Science Zone** gallery. (ST7)

Structures and Shapes

Grades 1 to 3

Experiment to discover the characteristics of different structures and how they are designed to meet specific needs. Try building a tower or bridging a river to learn which geometric shapes are the sturdiest. This workshop encourages students to use their problem-solving skills while exploring mechanical devices and building structures. (ST9)

Grades 4 to 8

Probing the Skies

Grades 4 to 6

Explore the components of the solar system — touch real meteorites and compare the relative size of planets and minor planets. See the motions of the planets, Sun, Moon, and constellations in the Museum’s **inflatable planetarium** and discover their effects on cycles of day, night, seasons, and on eclipses. See the tools of space exploration in the **Helen Sawyer Hogg Observatory** and **Canada in Space** exhibition. Identify Canadian contributions in the fields of space technology and learn about the International Year of Astronomy 2009. (ST10)

Introduction to Electricity Workshop

Grades 4 to 6

What are current and static electricity? Discover which materials are good conductors and which are good insulators. Learn the role of simple circuit components and draw circuit diagrams. Use hands-on circuit boards to see how series and parallel circuits work and how each is used. Measure the amount of electricity various types of light bulbs consume, and use devices that produce electricity. (ST13)

Looking at Light Workshop

Grades 4 to 6

Discover how light is produced and transmitted as you move through activity stations. Experiment with different materials to study reflection, refraction, and absorption. View the world through instruments such as microscopes, telescopes, periscopes, and kaleidoscopes, and use special filters to explore the world of colour. (ST12)

Science Surprises

Grades 4 to 6

Whet your scientific appetite with a series of unique experiments and demonstrations. Experience colourful chemistry, and watch a solution change from liquid to solid before your eyes! Experience the realm of the super-cold, and discover how energy changes from one form to another. (ST14)



Properties of and Changes in Matter

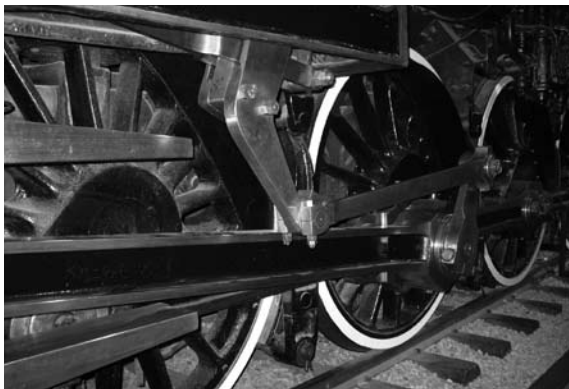
Grades 4 to 6

Explore the properties and explain the changes in the three basic states of matter through hands-on experimentation. Amusing scientific experiments and demonstrations illustrate the differences between reversible physical changes and non-reversible chemical reactions. (ST15)

Sound Connexions

Grades 4 to 6

Through hands-on activity stations, see, hear, and feel how sound is produced and how it travels through different materials. Use an oscilloscope and musical instruments to explore the relationships between wavelength, frequency, and amplitude. With a sound generator, investigate the range of sounds that humans can hear, then learn about the telegraph, the telephone, and the television during a fact-finding tour of the **Connexions** exhibition. (ST16)



Pulleys and Gears: Wonderful Machines

Grades 4 to 6

Discover why pulleys, gears, the wheel, and the axle are such clever inventions, and how they reduce the force required to do work. Build gear trains using hands-on activity boards. With our model cranes, create a block and tackle to lift a heavy weight with minimal effort. Examine various applications of these devices as you discover pulleys and gears in action throughout the Museum. (ST17)



The Many Faces of Energy

Grades 4 to 6

Discover the principle of energy conservation in this hands-on program. Experiment with devices that produce light, sound, and wind energy to identify energy transformations. Measure electrical energy consumption and discuss ways to consume less. What impact do renewable and non-renewable sources of energy have on our natural resources? What impact have developments in technology had on energy use in the home? (ST19)

Forces Acting on Structures

Grades 5 to 7

Explore the concept of force in this hands-on workshop. Learn the difference between tension and compression and the ways that simple machines can reduce the force necessary to move an object. Build load-bearing cantilever, suspension, and arch bridges, and test your construction using different loads. See our crushing machine in action as it tests different materials to spectacular failure! (ST38)



Space Exploration Workshop

Grades 4 to 8

What's up with the International Space Station? Do you feel the effects of gravity there? How do astronauts adapt to the rigours of space flight? Explore these concepts and test your skills in the Museum's hands-on activity stations. Find out if you would qualify for Canada's astronaut training program! Discover and see technological tools that have helped us explore space, including a full-sized Canadarm and the satellites *Alouette*, *Hermes*, and *Anik*. (ST11)

Toying with Science and Technology Show

Grades 5 to 8

This exciting one-hour show has something for everyone! Explore the properties of polymers, discover why substances and mixtures become pure in space, and learn about pogo stick science. Discover what snowshoes and our bed of nails have in common, and see how science is used to contain an environmental spill. The show culminates by testing the strength and stability of one of the world's strongest structures: the egg! For groups of 50 to 250. (ST47)

Canadian Inventions and Innovations

to Discover

Grades 5 to 8

Take pride in your heritage as you learn about Canadian inventions, discoveries, and innovations. Take part in our challenging Museum treasure hunt, in which small groups explore, in depth, one of the many contributions made by Canadians in the field of international science and technology. Follow up by designing a new product or service, and discover the steps involved in becoming an inventor. (ST45)

Substances, Mixtures, and Heat

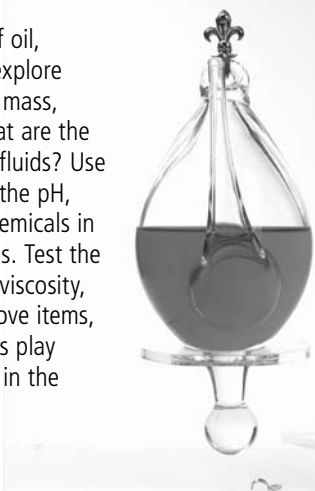
Grade 7

Explore concepts relating to substances, mixtures, and heat in the environment. Measure heat transfer through different materials such as plastic and metal. Identify the role of radiation in the heating and cooling of the Earth through experiments. Learn how to super-saturate a solution, and use a variety of techniques such as filtration, evaporation, and magnetism to separate materials from one another. (ST52)

Amazing Fluids

Grade 8

Discover the properties of oil, water, and alcohol, and explore the relationship between mass, volume, and density. What are the industrial applications of fluids? Use water tests to determine the pH, hardness, or dissolved chemicals in a variety of water samples. Test the effect of temperature on viscosity, use a hydraulic arm to move items, and explore the role fluids play in technologies exhibited in the Museum. (ST53)



Available free online — virtual programs for teachers!

sciencetech.technomuses.ca/english/schoolzone/index.cfm

Astronomy

NEW

Classroom Resource for Teachers

Activities for Grades 2 to 12

Discover the wonders of the night sky, observing how the movement of our planet influences our daily rituals, the changing of seasons, and the environment as a whole. With downloadable activity sheets and exercises, and the use of the Internet, students will learn about the technological tools that make modern astronomy possible.

Cycle-ology

Classroom Resource for Teachers

Activities for Grades 4 to 6

Study a variety of scientific concepts through a single common object — the bicycle. Discover how this wheeled device has been modified over time in response to consumer demand as well as new technologies. See how bicycle use has evolved from simple recreation to effective mode of transportation and ultimate fitness machine.

Weather Wise

Classroom Resource for Teachers

Activities for Grades 4 to 7

With downloadable activity sheets and exercises, and the use of the Internet, students increase their awareness of the consequences of global warming by exploring common elements of weather, the greenhouse effect, and climate change. Emphasis is placed on what we can all do to slow down the production of greenhouse gases and the resulting environmental damage.

Canadian Science and Engineering

Hall of Fame

Classroom Resource for Teachers

Activities for Grades 4 to 10

Get to know talented Canadians who helped shape Canada — and the world! Discover the stories of remarkable men and women who rose above challenges and obstacles to make great strides in science and engineering. See how Canada's environment, culture, and heritage have spurred technological and scientific achievements.

Grades 9 and Up



Electricity: Characteristics and Applications

Grade 9 to 10

A hands-on introduction to electrostatics, circuits, and measuring devices. Use our custom-designed activity boards to design, draw, and construct serial and parallel circuits. Use voltmeters and ammeters to learn about the various SI units of measurement, and to collect measurements at various points on our circuit boards. Explore electrical applications through an introduction to fuses, circuit-breakers, and Canadian safety procedures and codes, as they apply to household wiring and the Museum's exhibitions. (ST35)

Criminal Science Investigation

Grades 9 to 10

One of the conservators at the Museum has disappeared! Follow a trail of clues to determine what has happened. Discover how forensic science is used in real police investigations. Narrow the list of suspects through the use of fingerprinting, DNA testing, blood splatter analysis, and more. (ST49)

Studying the Universe

Grades 9 to 11

Explore our solar system and the Universe, and learn about the formation and characteristics of different stars. Probe the structure of the Universe, from stars to galaxies. Explore celestial motion in our **inflatable planetarium**, and visit the **Helen Sawyer Hogg Observatory** and the **Sudbury Neutrino Observatory** exhibit. (ST32)

Canada in Space

Grades 9 to 11

Explore some of Canada's greatest achievements in space exploration, including our leading role in the development of space technology. Visit the Museum's **Canada in Space** exhibition and learn about our first satellite (*Alouette I*), communications satellites, the Canadarm, and the Canadian Astronaut Program as well as Canada's contribution to the International Space Station. (ST33)

Browsing

Coming of Age: Canada and the 1950s **NEW**

Grade 7 and up

Why was the 1950s such a transformative period for Canada? Canadians experienced dramatic change — nuclear technology gained momentum, and television forever changed news and entertainment. Purchasing power skyrocketed, as thousands of new products hit the market. This program combines social, historical, and technological perspectives to examine life in 1950s Canada. Explore a variety of 1950s artifacts — household items, nuclear equipment, medical advancements, and even space satellites! Learn about Canada's unique approach to "going nuclear" in a time of Cold War anxiety. Discover what each of these contributions to science and technology reveals about Canadian society and Canada's place in the world. (ST55)

Browsing the Museum

All ages

Join Museum Staff to explore the exhibitions and discover treasures from the collection. Marvel at fascinating technologies from past and present that have enabled communication over this large country. Climb aboard a steam locomotive, visit the International Space Station, and try using a turn-of-the-century telephone. You'll be amazed at what Canada has brought the world! (ST24)

Simulator

Virtual Voyages Simulator

Climb aboard our Virtual Voyages simulator with your students and feel the excitement! Tickets available in advance or at the Museum admission desk.

Special group rate: \$2 per person; the simulator can accommodate a maximum of 12 people per ride, plus 4 stationary seats; minimum student height: 92 cm

Special School Programs and Events



What Museums Do: Behind the Scenes **NEW**

Grade 5 and up

October 20, 21, 22, 2009, in celebration of National Science and Technology Week

May 18, 19, 2010, in celebration of International Museums Day

Did you know that less than 2% of our collection is on display at any one time? There's more to museums than meets the eye! Go behind the scenes and find out what exciting work is being done. Discover how we collect, restore, preserve, and store artifacts as you visit our collection facilities and meet the people who work there. See some of over 40,000 artifacts and discover how they reveal insights about the transformation of Canada. Reserve early as spaces are limited. Due to the special nature of this program, groups must have a minimum of one adult supervisor per 10 students. For groups of 15 to 20 participants (larger groups can be split to accommodate). Special fee of \$7 per student. (ST54)

National Science and Technology Week

Grade 9 and up

October 20 and 21, 2009

Enjoy one of the Museum's exciting lectures celebrating science and technology in Canada. The perfect opportunity for students in grade 9 and up to explore potential careers in science and to supplement the science curricula! (The full schedule will be available online in September 2009.) While at the Museum, take part in the "Science Trail Challenge," a scavenger hunt that tests students' knowledge of Canadian inventions and innovations.

Curriculum Days

Grades 1 to 6

November 3-6, 10, 12, 13, 17-20, 2009;

March 23-26 and March 30 to April 1, 2010

Curriculum Days workshops complement and extend our regular school programs; they are the perfect way to introduce or review your science units. Students take part in two 45-minute hands-on workshops geared specifically to their grade level. Each workshop includes a 15-minute introduction on a specific topic, followed by 30 minutes of hands-on exploration. (ST26)

Science and Engineering Olympics

Grades 7 and up

February 26, 2010

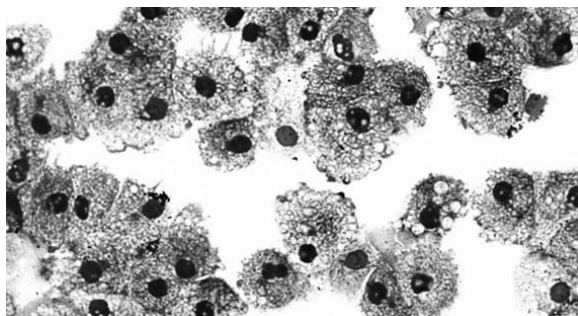
Be a part of this fun, hands-on cross-curricular competition, designed to inspire students to consider careers in various science and engineering disciplines. Students work in teams, in one of six events, to conceptualize, create, design, build, and test their projects. On Olympics Day, teams bring their entries for testing before a panel of judges.

Engineering Challenge 2010

Grades 4 to 6

February 26, 2010

With the assistance of an engineer in the classroom, students work in teams to engage in a problem-solving challenge. Student teams apply engineering principles to design and build a structure that will be tested in a final competition held at the Museum during National Engineering Week. This activity is closely linked to the science and technology curriculum. For further information on how your class can enter the Engineering Challenge, please contact the National Research Council at 613-991-6349. Registration is limited!



Biotechnology Days

Grade 9 and up

April 29 and 30, 2010

Don't miss our popular Biotechnology Lecture Series, featuring two days of dynamic presentations by Canadian researchers and scientists. (The full lecture schedule will be available in February 2010). This annual lecture series is an opportunity for high school students to engage with prominent researchers and explore science, technology, and their impact on society.

Summer Fun Days

Grades 1 to 8

June 7-11, 14-18, 2010

Back by popular demand! End your school year at the Museum, and have your students participate in a range of hands-on activities and dynamic presentations. From experiments with movie-making, chromatography, crime-solving, roller coaster building, rocket-launching and more, there's no better way to end the school year! (ST28)

Self-Guided Packages

Self-guided programs enable students to explore highlights of designated exhibitions, and encourage observation, exploration, problem-solving, and interaction with Museum displays. Choose from one of the following packages to help plan your visit:



Canada in Space: Teacher's Guide

Grades 4 to 8

Come and explore **Canada In Space: Destination Earth**, an important exhibition that recognizes and celebrates Canada's active participation in space exploration. This educational guide provides enterprising educators with ideas for integrated studies that support educational objectives in science and technology, mathematics, geography, language, and more. (ST46)

Exploring Connexions: Teacher's Guide

Grades 7 to 9

Plug into the world of communications! Explore the ways in which people communicate over long distances, and search for answers to questions posed in the activity sheets. The guide's interactive modules encourage students to explore the evolution of communications from the telegraph and telephone to radio, broadcasting, and multimedia systems. (ST30)

For Teachers

In search of a professional development opportunity? Here's what the Museum offers:

Discover the Museum Days

Superintendents, Co-ordinators, Principals, and Faculties of Education: help your staff rediscover the Museum as a teaching resource. **Free** one-day sessions at the Museum are available for groups of **20** or more teachers. Become familiar with the range of exhibitions, programs, and educational services that the Museum offers.

Curriculum-Based Workshops

Need help with your science and technology curriculum? Looking for resources, strategies, and fun ideas? Our curriculum-based workshops just for teachers are offered on a variety of topics.



Iron Science

NEW

Under the spotlight and in front of a cheering crowd, talented science educators from across Canada will show their stuff in pursuit of the 2010 "Iron Science" teacher title. Should you be one of them? Four-person teams prepare spectacular and imaginative feats of science and engineering built around a "secret ingredient" or concept (you will find out what it is when you are accepted into the playoffs and will have three weeks to prepare your show). With a combination of theatre, entertainment, demonstrations, and storytelling, the competing teams bring their presentations to life before a live audience at one of five science centres across the country.

Winners of the science centre competitions will go on to compete in the finals, hosted by Jay Ingram of *Daily Planet*, at the University of Calgary, and streamed live over the internet by Discovery Channel.

Enter now! Regional finalists must apply by December 21, 2009

Playoff date January 28, 2010

For details on the call for entries, visit: ironscience.ca

Teachers' Browsing Challenge

NEW

What types of artifacts interest you most? Big artifacts? Round artifacts? Green artifacts? Every artifact tells a unique story about science, technology, and society. We challenge you to chart your own path — create your own unique "Browsing the Museum" tour (see p. 5) based on a curriculum-linked theme of your choice. Email your tour ideas and artifact choices to virt_prog@technomusues.ca. We will be selecting one tour for future development, and the contributor will receive a prize package including \$500 to be used to enhance learning tools and opportunities at their school. Deadline February 28, 2010.

CANADA SCIENCE AND TECHNOLOGY MUSEUM

Program Information

Programs are available weekdays from October 6, 2009, to June 18, 2010, and are scheduled between 9 a.m. and 5 p.m. Duration is generally 90 minutes, but can be modified to suit your requirements. Please note that the Museum will be closed September 14 to 18, 2009.

Program Fees (All fees are per student, taxes included)

Regular Programs	\$5
Special Programs	\$6
Curriculum Days	
Summer Fun Days	
Biotechnology Days	
What Museums Do:	
Behind the Scenes	\$7
Self-Guided Programs	\$3
Virtual Voyages Simulator	\$2

Minimum Fees

Please note that all programs have minimum and maximum requirements. Enquire about your particular program at the time of reservation.

A minimum fee of \$100 per group will be charged for all regular programs, \$120 per group for Curriculum Days and Summer Fun Days, \$48 per group for Self-Guided Programs.

Method of Payment

Fees may be prepaid or paid upon arrival, by cash, credit card, or cheque made payable to the *Canada Science and Technology Museum*.

Cancellation fees

\$20 for programs cancelled within two weeks of the program date; refunds not applicable for programs cancelled with less than 48 hours notice.

What Museums Do: Behind the Scenes

Due to the special nature of this program, groups must have a minimum of one adult supervisor per 10 students. For groups of 15 to 20 participants (larger groups can be split to accommodate). Special fee of \$7 per student.

Planning Your Visit

We strongly recommend the following ratios for student supervision (by adults) when visiting the Museum.

Grade	Ratio
Elementary (K to 8)	10:1
Secondary (9 and up)	15:1

During a Guided Program, Museum Educators encourage teachers and accompanying adults to participate and assist with programs. Proper supervision during free time or with a Self-Guided Program is also essential in creating a safe and fun atmosphere at the Museum. **Teachers and supervisors are expected to remain with their students at all times.** Teachers may preview the Museum at any time at no cost by presenting proof of their teaching status at the Admission desk.

Reservations

Reserve as early as possible to avoid disappointment — we recommend a minimum of one month in advance.

There are four ways to request a program:

by phone: 613-991-3053, 1-866-442-4416

by fax: 613-993-7923

by Internet:
sciencetech.technomuses.ca
"School Zone"

by mail:
School Programs
Canada Science and Technology Museum
P.O. Box 9724, Station T
Ottawa, Ontario K1G 5A3

Confirmation of your scheduled program will be sent to you. **If you choose a Guided Program,** a Museum Educator will call to help plan your visit, arrange any schedule requirements, and identify special student needs. Prepare your students for the program using the pre-visit package that will be mailed to you.

Space is limited — please reserve early!

Visit our website at sciencetech.technomuses.ca.

Canada Science and Technology Museum

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