CANADA SCIENCE TECHNOLOGY MUSEUM

SCHOOL PROGRAMS 2007-2008

Canada

CHECK OUT OUR EARLY-BIRD SPECIAL! PAGE 8

Curriculum Connections The chart below indicates the many cross-curricular learning opportunities for students across Canada.

Upon reservation a pre-visit information package is available for the teacher, in addition to the rich information found on the Museum's website at sciencetech.technomuses.ca, available at any time.

K	Earth's Daily and Seasonal Cycles	An Invisible Attraction	Exploring Objects and Materials	Liquids and Solids
Grade	Earth and Space Systems	Energy and Control	Structures and Mechanisms	Matter and Materials
1	Daily and Seasonal Cycles Earth's Daily and Seasonal Cycles Skies and Seasons	Energy in Our Lives Energy from the Sun, Wind and Water Curriculum Days	Everyday Structures Structures and Shapes Curriculum Days	Characteristics of Objects and Properties of Materials Exploring Objects and Materials Summer Fun Days Curriculum Days
2	Air and Water in the Environment	Energy from Wind and Moving Water Energy from the Sun, Wind and Water Curriculum Days Summer Fun Days	Movement Science Seesaw and Simple Machines	Properties of Liquids and Solids Liquids and Solids Summer Fun Days Curriculum Days
3	Soils in the Environment	Forces and Movement An Invisible Attraction Science Seesaw and Simple Machines Curriculum Days	Stability Structures and Shapes Summer Fun Days Curriculum Days	Magnetic and Charged Materials An Invisible Attraction Curriculum Days
4	Rocks, Minerals and Erosion	Light and Sound Energy Looking at Light Sound Connexions Curriculum Days	Pulleys and Gears Pulleys and Gears Curriculum Days	Materials that Transmit, Reflect or Absorb Light or Sound Looking at Light Sound Connexions Curriculum Days
5	Weather How's the Weather? Curriculum Days	Conservation of Energy The Many Faces of Energy	Forces Acting on Structures and Mechanisms Forces Acting on Structures Summer Fun Days Curriculum Days	Properties of, and Changes in, Matter Science Surprises Properties of, and Changes in, Matter
6	Space Probing the Skies Space Exploration Curriculum Days	Electricity Introduction to Electricity Workshop The Many Faces of Energy Toying with Science and Technology Curriculum Days	Motion Pulleys and Gears: Wonderful Machines Toying with Science and Technology Curriculum Days	Properties of Air and Characteristics of Flight
7	The Earth's Crust Earth and Mars Revealed	Heat Exciting Physics!	Structural Strength and Stability Toying with Science and Technology Exciting Physics! Science and Engineering Olympics	Pure Substances and Mixtures Toying with Science and Technology Summer Fun Days
8	Water Systems Earth and Mars Revealed	Optics Exciting Physics!	Mechanical Efficiency Toying with Science and Technology Exciting Physics! Science and Engineering Olympics	Fluids Science and Engineering Olympics Summer Fun Days
Grade	Earth and Space Science	Chemistry	Physics	Biology
9	Studying the Universe Canada in Space Solstices, Equinoxes, and Astronomy	Criminal Science Investigation (CSI) Science and Engineering Olympics	Electricity: Characteristics and Applications Science and Engineering Olympics	Biotechnology Days
10		Criminal Science Investigation (CSI) Science and Engineering Olympics		Biotechnology Days

An exciting adventure in hands-on learning!

Students discover and marvel at science and technology in programs designed to complement school curricula in math, science and technology, and social studies. A wealth of information is shared in the Museum's pre- and post-visit activities package, which accompanies each School Program.

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)

Energy from the Sun, Wind and Water — Junior

Discover some of our natural sources of energy in an interactive workshop and learn how the Sun works to power all living things. In this hands-on exploration, participants learn how the movement of wind and water can be used to generate energy. (ST8)

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)



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

Planetarium

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)

Skies and Seasons

Grades K to 3

Limited time

December 18–21, 2007, and March 18–20, 2008

What is a solstice? What is an equinox? Find out how astronomers use the Sun's position in the sky to determine our seasons. Use the inflatable planetarium to learn how days get longer and shorter as the seasons change, and discover the Winter and Summer constellations. (ST40)

An Invisible Attraction

Grades K to 3

Explore the effects of magnetic fields with this hands-on workshop. Discover which materials are magnetic and which are not, and find out why only certain materials can be magnetized. Investigate the strengths of different magnets and learn about magnetic polarity. Discover how to move an object using magnetic force, and learn the many ways in which magnets and electromagnets are used in our daily lives. (ST2)

Exploring Objects and Materials

(Grades K to 3)

Explore the concept of materials in everyday objects. Hands-on activities illustrate how different materials are transformed. Experiment and use your senses to identify materials by how they look and feel. Various exhibits reinforce the "function determines 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 learn why factories used to be built near waterfalls and rivers. (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 physical characteristics of the solar system and compare the relative size of planets through handson activities. Touch real meteorites and identify cycles of day, night, and the seasons. Learn to recognize the major constellations in the Museum's inflatable planetarium. Visit the **Helen Sawyer Hogg Observatory** and the **Canada in Space** exhibition to identify Canadian contributions in the fields of space technology and allied sciences. (ST10)

Introduction to Electricity Workshop

(Grades 4 to 6)

Build an electromagnet with different core materials and record your observations on tables. Design, build, and test simple circuits, and create circuit diagrams using actual electrical symbols with the Museum's hands-on activity boards. Learn about the applications of electrical energy with a look at motors and generators as they relate to the production of electricity in Canada. (ST13)

Looking at Light

(Grades 4 to 6)

Discover how light is produced and transmitted, as you experiment with different materials to study light 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 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 activities, see, hear and feel how sound is produced by vibration, and how it travels through a substance. Use an oscilloscope 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 our Nortel 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 compare them to other simple machines. Build gear trains using hands-on activity boards. Examine various applications of these devices as you discover simple machines 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 4 to 6)

Explore the concept of force in this hands-on workshop. Learn the difference between tension and compression, and the wavs in which simple machines can reduce the force necessary to move an object. Practise what you have learned by building load-bearing cantilever, suspension, and arch bridges. (ST38)

How's the Weather?

(Grades 4 to 6)

Hands-on activity centres encourage students to discover the wonders of meteorology. Investigate how clouds are formed, and how wind, rain, and tornadoes are produced. Use various measuring devices such as



barometers, anemometers and psychrometers, and find out how they are used in weather forecasting. Explore how acid rain is produced, and its impact on the environment. The workshop ends with a visit to our Canada in Space exhibition, where students will discover how advances in technology and science have enabled humans to predict the weather. (ST43)

UPDATED 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 satellites Alouette, Hermes, and Anik. (ST11)

Equinox and Solstice: The Sun and the Seasons (Grades 4 to 8) Limited time

December 18-21, 2007, and March 18-20, 2008

How are the first days of Spring, Summer, Fall, and Winter decided? This seasonal program is a great way to learn about the meanings of solstices and equinoxes. View the surface of our own star! Use our telescope, equipped with a solar filter, to observe the Sun safely (weather permitting). In our inflatable planetarium, investigate and plot the Sun's annual progression in the sky, and see why days are shorter in Winter. (ST41)

Toying with Science and Technology

(Grades 5 to 8)

Explore the properties of polymers. Discover how and why substances and mixtures become pure in Space, and what benefits this brings us. Learn about pogostick science and why the Canadarm was tested using "hovercraft." Make static electricity with a Van De Graaff generator and discover what snowshoes and our real bed of nails have in common! This one-hour show culminates by testing the strength and stability of one of the world's strongest structures: the egg! (Duration: 1 hour; participants: 40 to 150; held in the Auditorium) (ST47)

Earth and Mars Revealed:

Crusts and Water Systems

(Grades 5 to 8)



Investigate geological processes and natural events common to Earth and Mars in this hands-on discovery program. Identify common features using images from the Pathfinder satellite and Canada's RADARSAT. Use our custom-designed activity tables to see how uplift and subsidence have shaped landscapes. Investigate how flowing water has shaped Earth and Martian surfaces with our stream trays, and compare factors that affect the polar icecaps of both planets. The program ends with a look at Canada's contribution to Mars exploration. (ST44)

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)

Science Solutions: A Day in the Life of "Bert"

(Grades 6 to 8)

Help "Bert" (our "prominent" scientist) solve some of the problems he encounters as he struggles through a "normal" day! A fun way to learn how science helps us deal with problems — from leaky car radiators to acid indigestion. (Duration: 1 hour; participants: 40 to 150; held in the Auditorium) (ST20)



Exciting Physics! Materials, Structures, Heat, and Light (Grades 7 to 8)

Investigate basic engineering principles in the design of everyday products. Which materials make the best insulators? How do UV light and heat affect the strength and durability of materials used in construction? Students explore, measure, and discover the effects of various forces on the efficiency and performance of a structure at hands-on activity stations. A visit to the Museum's exhibitions relates these concepts to the real world. (ST46)

Available free online in September 2007 two new virtual programs for teachers

http://www.sciencetech.technomuses.ca/english/ schoolzone/index.cfm

Cycle-ology

Classroom Resource for Teachers (Modules for Grades 4 to 6)

Students 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. Students see how bicycle use has evolved from simple recreation to effective mode of transportation and ultimate fitness machine.

Weather Wise

Classroom Resource for Teachers (Modules for Grades 4 to 7)

With downloadable activity sheets and excercises, 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.

Grades 9 and Up

Electricity: Characteristics and Applications

(Grades 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 can solve the case. Narrow the list of suspects through the use of fingerprinting, DNA testing, blood splatter analysis, and more. (ST49)



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)



Solstices, Equinoxes, and Astronomy(Grades 9 and up)Limited timeDecember 18–21, 2007, and March 18–20, 2008

Learn how astronomers determine the first day of Winter — down to the second! Discover the motions of the Sun and the night skies in our inflatable planetarium. Learn how the cycles of the Sun and stars allow us to predict the seasons. Observe our Sun safely with our solar telescopes, and use spectroscopes to explore a powerful method for probing the natures of stars — including our nearest star, the Sun. Learn about the tools and methods that let us use the stars and the Sun for timekeeping and calendar-making. (ST42)

All Ages

Browsing the Museum

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

SimEx Virtual Voyages™ Simulator

Climb aboard our SimEx 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



National Science and Technology Week

Grades 9 and up October 16 and 17, 2007

Enjoy one of the Museum's exciting lectures celebrating science and technology in Canada. The perfect opportunity for students in grades 9 and up to explore potential careers in Science and to supplement the Science curricula! (The full schedule will be available online in September 2007.) 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 6–9, 13–16, 20–23, 2007, and April 1–4, 8–11, 2008

Curriculum Days workshops complement and extend our regular school programs, and 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)

Engineering Challenge 2008

(Grades 4 to 6) February 26, 2008

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!

Summer Fun Days

(Grades 1 to 8) June 2–6, 9–13, and 16–20, 2008

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, crimesolving, roller coaster-building, rocket-launching and more, there's no better way to end the school year! (ST28)

Science and Engineering Olympics

(Grades 7 and up) February 19, 2008

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.

Biotechnology Days

(Grades 7 and up) May 6 and 7, 2008

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 2008). This annual science competition brings together bright, enthusiastic students with an interest in biotechnology. For further information on how your students can enter the competition, please contact the National Research Council at 613-993-9212. For information on the Lecture Series, please call 613-991-3053.

Canada Science and Technology Museum

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)

Programs 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.

CANADA SCIENCE AND TECHNOLOGY MUSEUM

Program Information

Programs are available weekdays from September 25, 2007, to June 20, 2008, 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 10 to 14, 2007.

Program Fees (All fees are per student,	taxes included)
Regular Programs	\$4
Special Program Curriculum Days Summer Fun Days Biotechnology Days	\$5 \$5 \$5
Self-Guided Programs	\$2.50
SimEx Virtual Vovages™ 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 \$80 per group will be charged for all regular programs, \$100 per group for Curriculum Days and Summer Fun Days, \$40 per group for Self-Guided Programs.

Method of Payment

Fees may be prepaid, or paid upon arrival, by cash, credit card, or by 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.

Fall 2007 Early-Bird Special

Get your science and technology curriculum off to a flying start this fall. School programs delivered between September 25 and October 12, 2007, are available for only \$80 per class (our minimum fee). Book now to avoid disappointment! Offer subject to program availability.

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 1867 St Laurent Blvd Ottawa, Ontario K1G 5A3 Telephone: 613-991-3053 Toll free: 1-866-442-4416