

Science & Technology Activities Resource

The Ontario Curriculum, Grades 1–8: Science and Technology, 2007

Focus on Sustainability >>>



Grades 1 – 3 Components	Grades 4 – 8 Components
Focus on Sustainability Teacher's Guide	Focus on Sustainability Teacher's Guide
DVD with 7 – 8 Photo Stories	DVD with 7 – 8 Video Clips
Photo cards: a set of 8.5" x 11" photo cards	Tell Me More: 25 sets of original science and technology articles

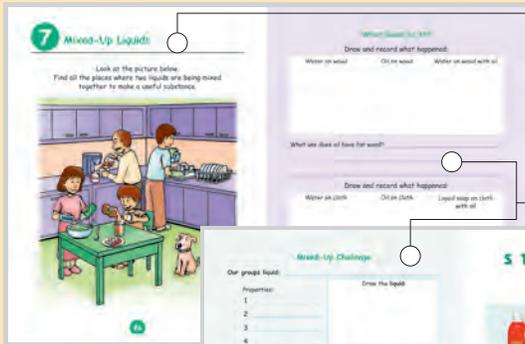
Highlights

- **Big ideas** addressing the fundamental concepts specified in the Overall and Specific Expectations and the Unit of Learning.
- **Multimedia clips** to engage students in the context of the Relating Science and Technology to Society and the Environments (STSE) specific expectations in each of the 4 strands of the revised *Ontario Science and Technology Curriculum, 2007*.
 - › Discussions to connect students' prior knowledge about the subject content of the media text.
 - › Questions to help students focus on the video as they view it.
 - › Thinking and Investigations to help students apply and reflect on the concepts.
- **Literacy Skills Development:** The Tell Me More articles are supported with Before, During and After Literacy strategies, adapted from the *Think Literacy: Cross-Curricular Approaches Grades 7-12, 2003*.
- **Differentiated Learning** strategies for each topic are included for ESL/ELD learners and those seeking Enrichment opportunities.
- **Assessment and Evaluation:** Rubrics, based on the revised Ministry of Education Achievement Chart, using a uniform set of precisely defined criteria to assess student work are provided.

Visit our website at www.gtkpress.com for the multimedia sample resources and more ...

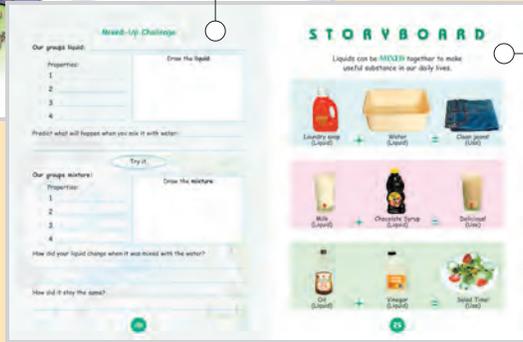
STAR

Grades 1 - 3



Introduction in the Student Journal and **Background Information** in the Teacher's Guide both put each Investigation in context.

Investigation involves the students in exploring the topic using the skills of inquiry and/or design. It is supported by **Activity** details and **Materials list** in the Teacher's Guide.



Storyboard summarizes the concepts developed in the Investigation in the form of poems, stories, pictures, and text. Student achievement is reinforced and evaluated via **Assessment Instruments** and **Rubrics** in the Teacher's Guide.

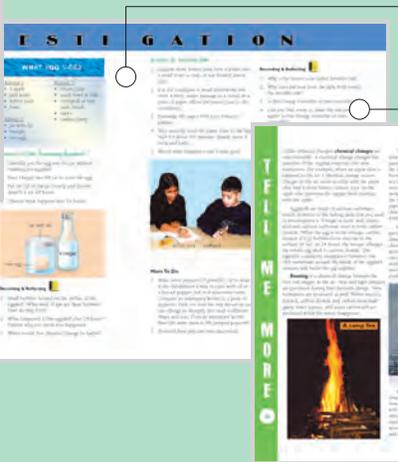
Teacher's Guide also provides **More To Do** to extend the Investigation; **Resources** to suggest reference materials; and **Glossary** to introduce all the significant science and technology terms.

Grades 4 - 6



Did You Know? puts the lesson in context. Whenever appropriate and available, Canadian content is used throughout the program.

Challenge presents the students with a problem to investigate using inquiry and/or design skills.



Investigation gives the students detailed instructions about how to carry out the activities. **More To Do** extends the Investigation. Thorough explanations are provided in the Teacher's Guide.

Recording and Reflecting guides the students to record and analyze their findings in the Investigation. Answers are provided in the Teacher's Guide.

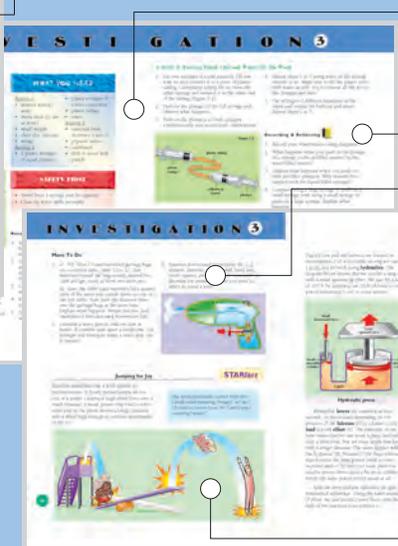
Tell Me More reviews the concepts and principles taught in the Investigation.

Teacher's Guide also provides **Materials list**, **Rubrics** and other kinds of **Assessment Instruments**, **Glossary**, and **Resources** to support the delivery of the lesson.

Grades 7 - 8



Did You Know? and **Challenge** are found on the first page of each Investigation of the Student Resource.



Three pages of **Investigation**, **Recording and Reflecting** and **More To Do** in the Student Resource are supported by detailed explanations and answers in the Teacher's Guide.

Two pages of **Tell Me More** are given at the end of each Investigation.

Teacher's Guide also provides **Materials list**, over twenty pages of **Blackline Masters** of **Rubrics** and **Assessment Instruments**, **Glossary**, and **Resources** to support the delivery of the lesson.

STARfact gives further insights into scientific and technological developments.

Photo Stories

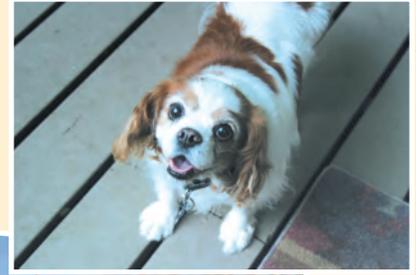
Each Focus on Sustainability unit begins with a multimedia clip in the form of a Photo Story. This story provides a visual and audio introduction of the concepts on which the discussions and the activities will be based. This multimedia approach also integrates well into several Language strands, in particular Media Literacy. Discussions around the use of media for each topic are also provided in the activities.

Activities

- Involve the students in exploring the topic using the skills of the scientific inquiry and/or technological design process
- Hands-on, Minds-on, Real World Connections

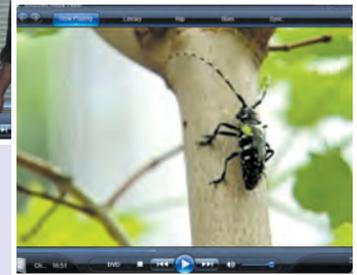
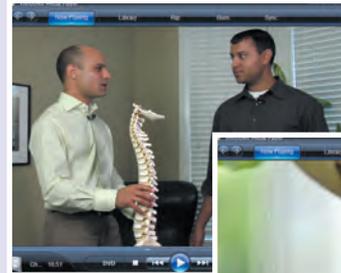
Photo Cards

At least one of the activities in each Unit will be based on a set of two to four Photo Cards taken from the Photo Story. These cards can also be displayed in the classroom for the duration of the unit to act as a visual reminder of the concepts covered in the Photo Story.



Use of Multimedia

“Media literacy explores the impact and influence of mass media and popular culture.... Students must be able to differentiate between fact and opinion; evaluate the credibility of sources; and recognize bias.” (page 13, The Ontario Curriculum Grades 1-8 Language, 2006). The video clips in the Focus on Sustainability Resource support this vision of media literacy. Each clip has been chosen to engage the students in the context of the STSE expectations. They have been chosen from a variety of sources and present a variety of viewpoints. Each video includes Before and During viewing strategies as well as direct links to specific expectations from the Media Literacy component of the Language Curriculum, along with relevant Teacher Prompts for using those links. After viewing the video, students will investigate the issues brought up in the discussions using a case study approach.



Thinking and Investigation — Case Studies Approach

1. A short video presentation to “set the stage” for student learning.
2. A clearly defined Opening Scenario to provide background information to enable students to complete the research.
3. Research Questions to help develop decision-making skills
4. Actions through Research – to allow students the opportunity to present their research findings using one of the following:
 - a) Classroom Debate
 - b) Student Role Play
 - c) Media Presentation
 - d) Written Report

Tell Me More

Included in this Resource are seven or eight original articles, connected to STSE, called Tell Me More. These fun-to-read, ‘magazine style’ articles are written in grade appropriate language and are meant to provide the final touch to the topic, adding another perspective. Teachers can use the articles to apply different Literacy Skills strategies.

Who Spill the A

On August 3, 2005 43 CNV approximately 45 minutes west of was in 26 of the derailed cars. 74 ground and into Wabamun Lake. cars was carrying toluene (a hazardous and flammable) but fortunately no precaution, 22 people living in

On Alberta avoid outside still a

But what of the anti water. They cannot see these animals! The red damage done. Our animals. Who will use on the animals take us to caused by our negligent

Grade 8 - Spilling the beans about Oil Spills

IPM

device ways to control the pest damage by such things as encouraging insect predators to prey on pest insects, rotating crops, varying planting times and tricking pests into false opportunities to reproduce. If all of these methods fail, then carrying out very limited and closely targeted spraying is allowed. With IPM, it is the combination of pest control strategies that has the desired effect. Instead of relying on one method, the pest problem is attacked in many ways. IPM deals with the specific problem of the pests and is more likely to be successful over the long term than using pesticides alone.

In the Holland Marsh, the IPM program has led to a big reduction in the volume of pesticides used in this area, with an 80% reduction in insecticide use in onions. Over all, across the 18 years of operation, the IPM program has contributed to a 40% reduction in the amount of pesticides used on crops.

One of the biggest changes over the last 10 years has been the introduction of pesticide seed coating. This new idea has led to a nearly 90% reduction in the amount of pesticides used to control specific insects or diseases. Rather than treating the entire field, only the seed is treated which reduces the amount of pesticide required for control.

IPM is a 'win-win' situation, for the farmer, the consumer and the environment.

Grade 7 - Interactions in the Environment

Uses of Pheromones in Integrated Pest Management [IPM]

Many insects communicate with each other of the same species by use of chemicals called pheromones. Insect pheromones are similar in some ways to hormones that are found in humans. Many release sex pheromones around them to attract a mate, and some insects can sense a possible mate from as far away as 10 km.

Modern IPM strategies often use sex pheromone traps to lure male insect pests by tricking them into thinking females are nearby. These traps with their captured insects provide important information to farmers about the size of insect pest populations. Calculating the number of trapped insect to determine the best solution to control the problem. For example, if pest populations are high at a particular time in the growing season, limited insecticide spraying may be necessary. Careful monitoring and experience in interpreting collected data are important for success. Traps may also be placed with the objective of destroying males for population control.

Scientists spray and fill the air with commercially produced pheromones. This spray moth is confused by the pheromone chemical on the leaf and is not able to find the next pheromone and hence, the mate.

A scientist uses a trap containing a pheromone lure to monitor pest population density.

Photo Credit: Agriculture Research Services, United States Department of Agriculture

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Every year more than 300,000 birds are killed by oil off the south coast of the island of Newfoundland alone. Birds cannot be cleaned of oil they must be put humanely to death.

Grade 8 - Spilling the beans about Oil Spills



Life Systems	Structures and Mechanisms	Matter and Energy	Earth and Space Systems
Grade 1			
Living Things	Objects and Material	Energy in Our Lives	Daily and Seasonal Cycles
Grade 2			
Animals	Movement	Liquids and Solids	Air and Water
Grade 3			
Plants	Stability	Forces and Movement	Soils
Grade 4			
Habitats and Communities	Pulleys and Gears	Light and Sound Energy	Rocks, Minerals, and Erosion

Life Systems	Structures and Mechanisms	Matter and Energy	Earth and Space Systems
Grade 5			
Human Organs	Forces	Matter	Conservation of Energy
Grade 6			
Diversity of Living Things	Air and Flight	Electricity	Space
Grade 7			
Ecosystems	Strength and Stability	Substances and Mixtures	Heat
Grade 8			
Body Structures and Functions	Systems in Action	Fluids	Water Systems