

Forces of nature

HOW EXTREME WEATHER IMPACTS OUR DAILY LIVES



BRINGING THE REAL WORLD INTO YOUR CLASSROOM.



FORCES OF NATURE

This teacher’s resource, “Forces of Nature: How Extreme Weather Impacts our Daily Lives,” has been developed by the Insurance Institute’s Career and Curriculum Connections program to help bring the real world into the classroom.

The mandate of the Career and Curriculum Connections program is to improve the understanding of insurance, illustrate its role in society and encourage young adults and career seekers to pursue one of the many skilled professions available in the insurance industry.

The Career and Curriculum Connections program, as a division of The Insurance Institute of Canada and supported by the property & casualty insurance industry in Canada, is pleased to support the teaching of insurance in the classroom with free resources and other information available at our Web site: www.career-connections.info.

The Insurance Institute of Canada is the educational arm of the property and casualty insurance industry educating insurance professionals since 1899. The Institute provides nationally and internationally recognized professional designation programs such as the Chartered Insurance Professional (CIP) and Fellow Chartered Insurance Professional (FCIP) designations, to ensure standards of education, experience and ethics in the industry.

The Institute is the not-for-profit professional association representing 35,000 individual members employed in the general business with insurance and reinsurance companies, brokerages, agencies, adjusting firms, employers of risk managers, and others.

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Forces of Nature was developed by the Insurance Institute of Canada.

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“The management of disasters is a field that brings people from many disciplines together. It was often seen primarily as a role for engineers or natural scientists to do their work. We’ve been able to bring another perspective and part of the work our Institute and the support coming from the insurance industry, has been to involve historians and sociologists and people from many different backgrounds to say that these complicated events that are disrupting society need to be better managed, need to be addressed. We need to understand the engineering but also the economics, the social science aspect of it.”

~ Paul Kovacs, Executive Director, Institute for Catastrophic Loss Reduction (ICLR)

~ ‘Forces of Nature’ DVD

“Forces of Nature: How Extreme Weather Impacts our Daily Lives” is a very timely resource which aims to teach students about natural disasters and their impact on their communities. Unfortunately it would appear that natural disasters are becoming a more regular occurrence in our world. Almost every week reports come out of the news of a hurricane, earthquake, mudslide, flood, or other, devastating a community somewhere in Canada or the world. But what happens to these communities in the aftermath of these disasters? What happens when a natural disaster occurs right at our door step? How do the communities rebuild?

“Forces of Nature” examines four natural disasters in depth; the Quebec ice storm, Hurricane Juan, the Peterborough flood, and the Kelowna fires. We chose these four disasters because they happened right here in Canada, in our own back yard. These disasters affected our families, friends, neighbours, our communities, and perhaps even someone using this resource. We wanted to ensure that the disasters we chose were relevant. We realize that there are many other Canadian natural disasters we could have chosen, such as the Red River that seems to flood annually. However, we chose these four because they are some of the most devastating natural disasters to occur in Canada and have severely affected their communities.

We connect a discussion about natural disasters to the insurance industry because insurance plays a significant role in helping people get their lives back and communities recover from the unforeseeable. Insurance companies are experts at assessing risk. As a result, they pay attention to weather systems and assess the probabilities of severe weather occurring. The insurance industry also plays a significant role in researching prevention strategies and ways to lessen the impact of severe weather. We think it’s a little known story that is worth telling.

Teachers are encouraged to use this resource as an introduction to the discussion of natural disasters, the impact on communities, prevention strategies and research into mitigating the risks and the impact, and the perception of increased frequency and severity of such extreme weather. As well as, the DVD and certain exercises in this resource explore the types of professionals who play a role in our protection and recovery, including insurance professionals. Teachers are open to broaden the discussion beyond the four natural disasters we have chosen and discuss other natural disasters that have occurred in your own communities, elsewhere in Canada and/or around the world. We chose to talk exclusively about Canadian catastrophes and to highlight how the insurance industry in Canada has responded, and does respond, in cases of natural disasters.

How to Use this Resource

“Forces of Nature” consists of a 14-minute DVD plus this resource of thirteen lessons which are designed to align with science and geography curriculum across the country. Lessons vary in their length of time; many are designed for one 45-50 minute lesson, while some are designed as a lengthier group project to be determined by the teacher. All lessons are designed with a lesson set-up, group activity and follow-up.

It is recommended that teachers pre-view the DVD a couple of times in preparation in order to see how the content in the video works with the lesson plans in this resource and how it can be incorporated into classroom plans. We also recommend that the DVD be shown to the class as a whole to begin with. Teachers can then choose to show particular parts of the DVD in conjunction with the lessons to enhance the real life application of the lesson.

The teacher’s notes have been created to facilitate presentation of the material and to guide class discussion and student activities. Student activity sheets have been created for easy photocopying.

About the DVD

The "Forces of Nature" DVD tells the stories of four insurance industry professionals who were on the frontlines assisting in the recovery process during four major national natural disasters. To garner the most benefits from the DVD, it is advisable to view it as a whole with the class and then watch it in segments as deemed appropriate by the individual lessons.

The four natural disaster are:

1998 Quebec Ice Storm

On January 4, 1998, Eastern Ontario and Southwestern Quebec were paralyzed by a freezing rain that left 4 million people freezing in the dark. In this section, Donna Robinson, a paralegal/insurance claims consultant in Ottawa, discusses her experience in helping the community to get back to how they were. She details the human experience of going in to peoples' homes and seeing how they were surviving without the amenities of our normal daily lives that we depend on, and what it was like to see the Army roll by to help in the restoration process.

Hurricane Juan

On September 29, 2003, the coast of Nova Scotia experienced a hurricane like no other in the past 50 years. Through his interview, Atlantic Regional Claims Manager Grant King takes viewers back to the time of Hurricane Juan and shows us the area most affected by the hurricanes catastrophic impact and how their catastrophe team was on the scene to help the community pick up the pieces.

Peterborough Flood

What happens when a 1 in 290 year rainfall pours down on a city? The result is 14 billion litres of water in a five hour period finding its way into the streets of Peterborough and the basements of approximately 2,000 homes. It was July 14 & 15, 2004, and Stephen Scullion, Field Claims Manager of the Ontario Disaster Relief Assistance Program, was there on the scene, along with many other claims adjusters. In the video, he describes the feeling of hope the insurance industry helped to give to those affected by the flooding, often with their most prized possessions strewn about on their lawn.

Kelowna Fires

Technical Services Adjuster Greg Thierman takes viewers on a tour of the once forested area of Kelowna, British Columbia, that was devastated by the wildfires of 2003 – which started August 16 and raged for a month. Greg discusses the devastation felt by the residences of Kelowna who lost their homes and possessions, and how a coordinated team of adjusters brought in from across Canada, were on the frontlines to assist 50,000 residents in recovery as soon as the evacuation order was lifted from the area.

Also included in the DVD is Paul Kovacs, Executive Director of the Institute for Catastrophic Loss Reduction (ICLR), which is a world-class centre for multi-disciplinary disaster prevention research and communications established by Canada's property & casualty insurance industry. ICLR staff and research associates are international leaders in wind and seismic engineering, atmospheric science, risk perception, hydrology, economics, geography, health sciences, public policy and a number of other disciplines.

Based on our research and the lesson plan developments, we believe that "Forces of Nature" has applications in the following science and geography courses throughout the country. If you would like to see the specific curriculum links that can be made within these courses, please visit our 'Teachers Section' on the Career Connections Web site at www.career-connections.info.

	Geography Courses	Science Courses
British Columbia	Grade 12 Geography	Grade 10 Science
Alberta	Outdoor Core Environmental Core	Science 10 Science 14 Science 20 Science 24 Science 30 Biology 20
Manitoba	Senior 2: Geographic Issues of the 21st Century	Grade 10 Science
Saskatchewan	Biology 20	Grade 10 Science
Ontario	CGC1D: Grade 9 Geography of Canada CGD3M: Grade 11 The Americas: Geographic Patterns and Issues CGF3M: Grade 11 Physical Geography: Patterns, Processes, and Interactions CGW4U: Grade 12 Canada and World Issues: A Geographic Analysis CGU4U: Grade 12 World Geography: Human Patterns and Interactions CGU4C: Grade 12 World Geography: Urban Patterns and Interactions CGR4M: Grade 12 The Environment and Resource Management	SNC1D: Grade 9 Academic SNC1P: Grade 9 Applied SNC2D: Grade 10 Academic SNC2P: Grade 10 Applied SNC3E: Grade 11 Workplace Preparation SNC4E: Grade 12 Workplace Preparation
Atlantic Canada	Canadian Geography Atlantic Canada in the Global Community Grade 10 Geography Physical Geography Geography 521 A	Grade 10 Science Grade 10 Science 431 A Environmental Science 122/123 Environmental Science 3205 Science 1206

FORCES OF NATURE

Curriculum Connections

To see how each lesson is applied to the curriculum standards, please visit the 'Teachers section' of the Career Connections Web site at www.career-connections.info to download your provincial rubric.

Lesson	Summary	Group Activity	Individual Activity
1. What is Risk?	To define risk and understand that different activities pose different levels of risk to individuals	Students will play "Jenga" to illustrate risk involved with various activities.	Students will list activities they participate in regularly and rank the level of risk involved.
2. Frequency and Severity	To define frequency and severity in terms of natural disasters and understand how that impacts communities.	Students will chart the frequency and severity of Canadian natural disasters over a period of time and analyze the results of the chart and the implication that has on society.	Students will examine the impact of severe weather on their own community.
3. It's Raining Ice	To understand the conditions necessary for an ice storm to occur and the damage caused by the Quebec ice storm.	Students will use satellite imaging to track and predict the weather.	Students will consider what they would need to survive 72-hours during an ice storm.
4. To Salt or Not to Salt?	To look at an environmental issue from both sides of the argument.	Students will participate in a class debate regarding the benefits and drawbacks of salting the road.	Students will become civically involved by expressing their opinion in a medium of their choice on whether or not rock salt should be used in their community.
5. I'll Huff and I'll Puff but Can I Blow Your House Down?	To recognize that homes need to be designed to withstand environmental factors such as hurricanes.	Students will design and build a model home that will be tested against a variety of wind strengths to see which design is the strongest.	Students will assess and analyze their design and the research into creating more wind resistant homes.
6. A Mighty Wind	To better understand how hurricanes are formed, where they occur, as well as understand the possible cause and effect relationship between climate change and hurricane frequency.	Students will use a map to locate 3 regions of hurricanes over the last 50 years and use a graph to plot the correlation between hurricane frequency and temperature.	Students will research the impact of a major hurricane in Canadian history.

FORCES OF NATURE

Curriculum Connections

Lesson	Summary	Group Activity	Individual Activity
7. Water Water Everywhere!	To gain an understanding of the types of locations susceptible to floods and the impact that has on surrounding communities.	Students will research the impact of floods on communities and plot flood risk areas on a map of Canada.	Students will assess the risks within their own homes for what could be damaged in a flood.
8. When Is Too Much Rain Too Much?	To understand that there are different types of earth and each type absorbs water at a different rate.	Students will test the absorption rates of three different types of soil.	Students will debate the pros and cons of building communities next to bodies of water, and consider the role soil plays in flooding.
9. Would You Want to Live Here?	To gain an understanding of what types of locations are susceptible to natural hazards.	Students will research and assess the impact of urban growth has on the environment.	Students will create a fire safety plan for your school or other community building.
10. Fire! Fire!	To understand the dangers and benefits of forest fires and the role fires play in the life cycle of other forest dwelling species.	Students will research a plant whose life cycle is dependent on fire and create a storyboard to illustrate its life cycle and effect on the biotic and abiotic ecosystem.	Students will research fire prevention in your community to assess whether appropriate prevention strategies and tactics are in place.
11. Putting It All Together	To think critically about the factors involved in building a community.	Students will take on the role of a professional involved in the building of a new community and make recommendations based on the interests of that role.	Students will explain their rationale for choosing their location as the ideal location to build a new community.
12. Protecting Your Belongings	To understand that there are ways to mitigate risk.	Students will brainstorm ways to mitigate risk against their community.	Students will think of different things that could happen should disaster strike and how to lessen the impact of these damages.
13. Careers in Insurance	To gain an understanding of a variety of careers in the insurance industry.		Students will visit the Career Connections website to learn more about careers in insurance.

Frequency: The number of losses that a particular risk will incur in a year. It is used along with 'severity' for a calculation to determine the cost of insurance based on the degree of risk.

Insurance: A contract (policy) between an individual or business (insured) and an insurance company in which the insured receives financial protection, or reimbursement, against losses. Insurance is a means of transferring the risk of a loss to make it more affordable. Insurance works as a pool in that the premiums of the many pay for the losses of the few.

Natural Disaster: Occurs when a natural hazard has an impact on a human population, infrastructure and/or economic assets.

Natural Hazard: A geological, meteorological, hydrological, volcanic or seismic phenomenon, or other process in the natural environment.

Risk: The chance of loss; specifically, the possibility of loss or destruction of property or the possible incurring of a liability. Sometimes refers to the subject of an insurance contract.

Risk Avoidance: Eliminating the possibility of loss

Risk Control: Reducing the frequency or likelihood of a particular loss or reducing the severity of a loss

Risk Transfer: Transferring the legal and financial responsibility for a loss to another party. For example, an insurance company accepts a transfer of risk from an insured.

Severity: The average cost of losses that a particular risk will incur in a year. It is used along with 'frequency' for a calculation to determine the cost of insurance based on the degree of risk.

Career Connections would like to thank and acknowledge the following Web sites for helping to inspire some of this resources' lesson plans:

Windows to the Universe
www.windows.ucar.edu

Discovery Education
http://school.discoveryeducation.com/lessonplans/programs

Insurance Bureau of Canada
www.ibc.ca

"In our everyday lives, we can deal with many of the risks we face. We put locks on our doors. We install smoke alarms. We wear seatbelts. But what about the risks in life we can't control or avoid? What happens when a natural disaster overwhelms us?"
~ 'Forces of Nature' DVD

PURPOSE

- To demonstrate an understanding of the meaning of risk as it relates to daily living and insurance
- To recognize how risk management strategies (risk avoidance, risk prevention and risk transfer) can help to protect people against risk
- To practice applying risk management strategies to everyday situations involving risk

SUMMARY

Students will define risk and discuss how to rank relative levels of risk using scenarios and personal experiences.

Set-up

Ask students to brainstorm situations in their lives where they might encounter risk. Write these on the board or chart paper. Encourage students to give a range of examples from the extreme to the everyday in such areas as personal relationships, school, home, extra-curricular activities, sports, physical activities, and the community.

With students, develop a scale to rank the relative severity of risk in these situations. Write descriptors beside the scale to ensure that everyone agrees on the meaning of the ranking. Develop simple criteria for each ranking.

Example:

RANKING	DESCRIPTOR	CRITERIA
1	Low Risk	Harmful Consequences Unlikely

Choose an activity from the list. Ask several students to assess the level of risk for that activity.

Class Discussion:

- Why do these rankings apply?
- Would everybody agree with these rankings? Why or why not?

Discuss how risk rankings are relative to an individual's skills, attitudes, and response to challenges. Discuss how, despite these differences, the level of risk associated with certain activities can become intolerable for them all.



WHAT IS RISK?

Teacher's Notes

Group Activity

This game can be played as a whole class or in smaller groups.

The Jenga Game:

1. Set up Jenga game (or any type of blocks of equal size that can be stacked).
2. Present participants with a hypothetical event (i.e. road trip, hosting a party, going skiing).
3. Ask participants to describe **in detail** all activities associated with the event, challenging them to think beyond the major components.
4. Explain concept of risk including physical and emotional safety, property damage, financial security, reputation, etc.
5. Ask individual students to identify a single risk and then have that individual remove a block from the tower. If that individual deems that risk a high risk, a block must be taken from closer to the bottom of the tower, a low risk can be taken from higher up on the tower.
6. Repeat #5 until either
 - A. the tower falls, or
 - B. the students cannot think of any other reasonable risks.
7. If A, explain how the falling tower is like an event impacted by risk realization. Discuss the nature of risk associated with last block pulled, recognizing that it may have represented a major risk or a minor risk.
8. If B, explain how the standing tower is what we are used to, unrealized risks. However with each block pulled the risk of the tower falling grows greater, and a block pulled for even a minimal risk could cause it to fall.

Follow-up

Have students complete the "What is Risk" handout. Have students list activities important to their own lives, rank their level of risk, and comment on these levels. They can evaluate the overall level of risk in their lives and assess how they might lower their risk ranking. When the students have completed the worksheet individually, lead a whole class discussion using their findings.

Class Discussion

- Were there some activities where most of the rankings were similar? Which activities?
- Why were they similar?
- Were there some activities where the rankings were very different? Why?
- What does this tell you about an individual's acceptance of risk?
- Are there situations where everyone can agree that the risk is too great? Give some examples and state why.
- What does this tell us about the nature of risk?

Make the Connection

Insurance is a means of transferring risk. If a person can't avoid a risk or prevent a loss, they can ensure they have insurance to help manage the impact if and when a loss occurs. For example, driving a car can be risky. The driver can try and avoid or prevent a car accident by avoiding and preventing risks (such as driving safely, driving sober, wearing their seatbelt, checking their mirrors, driving a reliable car, etc.). But generally someone who drives may be at risk of being in a car accident sometime in their driving life. That's where insurance comes in, to help repair the car and the driver if there is an accident. Have your students examine their auto insurance policy, or that of their parents, or talk with their insurance broker to learn more about what coverage they have. To help understand the insurance policy, the Insurance Bureau of Canada provides information on automobile insurance at

www.ibc.ca/en/Car_Insurance/index.asp

WHAT IS RISK?

Student Handout

List activities important to your own life, assign a level of risk to each activity, and comment on these levels.

You can then evaluate the overall level of risk in your life and assess how you might lower your risk ranking.

	Activity	Level of Risk	Why did you assign this ranking?	How can you Lower the risk ranking (i.e. avoid or prevent the risk)?
1.				
2.				
3.				
4.				
5.				

Answer the following:

1) What does this tell you about the overall level of risk in your life?

2) How do you think you should respond to this overall level of risk?

FREQUENCY AND SEVERITY

Teacher's Notes

"Experts believe that the weather is only going to get worse with a more frequent and severe impact on society."
~ 'Forces of Nature' DVD

PURPOSE

- To discuss the impact of severe weather systems on economic and social conditions
- To interpret patterns and trends in data, and infer or calculate linear and non-linear relationships among variables
- To consider the implications of more frequent and severe weather systems on society
- To recognize the role of insurance in helping people and communities recover from damage caused by severe weather conditions.

SUMMARY

Students will create a graph based on data informing them of the frequency and severity of catastrophic weather over a number of years.

Materials

- graph paper and/or Excel spreadsheet and graphing capabilities

Set-up

Discuss with your students the meaning of the terms "frequency" and "severity" and have them relate these concepts to severe weather.

Class Discussion:

- What is the meaning of frequency? (How often an event such as a natural disaster occurs over a certain time frame)
- What is the meaning of severity? (The amount of damage caused by an event such as a natural disaster)
- How could we graph the frequency and severity of a natural disaster? (Have students think of what information would go on the x axis and on the y axis of a graph)

Group Activity

Distribute the handout "Natural Disasters – major multiple payment occurrences" to your students. Have students pair up and choose one type of severe weather (for example, wind/hurricane/tornado). Together they will decide how to plot the frequency and severity to create a graph. Teachers should review how to construct various types of graphs with the class.

In small groups or to the whole class, student pairs will share some of the emerging trends and patterns that they discovered while creating the graph about natural disasters in Canada.



FREQUENCY AND SEVERITY

Teacher's Notes

Class Discussion:

- What patterns or trends did you discover after creating your graph?
- Has the frequency or severity of particular natural disasters gone up or down over the years? In insurance terms, catastrophes usually referred to infrequent or rare occurrences that were very severe. What does your graph suggest? What are the implications?
- In this exercise, the severity of a natural disaster is measured by the number of claims, the total value of all claims and the average amount per claim. Is this an effective measure of severity? Why is it that, on the whole, the monetary loss each year seems to go up? (flat screen televisions, computers, more expensive cars, etc.)
- What predictions would you make about future severe weather? Do you agree or disagree with the statement that "the weather is only going to get worse with a more frequent and severe impact on society"?

Follow-up

Have students examine the impact of severe weather on your local community. This could include asking your students to source and discuss newspaper or magazine articles describing severe weather related incidents in your community. Or it could include having your students monitor and prepare an analysis of weather and news reports for a time period and type of weather of their choosing. For example: all weather-related damages over the next four to six to nine months; or all weather-related damages in the past year; or all wind storms in spring (March, April, May) for the last five years; or all flooding in the last ten years.

Making the Connection

Insurance is about assessing potential risks and protecting people and communities from the unexpected and unanticipated with the promise to help them recover if the unforeseen happens. If severe weather becomes more frequent and more predictable or likely, that is, if you build your home in a location that is prone to natural hazards, it becomes an anticipated risk and your home insurance may not cover you for the risk or it may be costly to obtain. This is because the insurance company will want to ensure that sufficient funds are available from premiums to cover the anticipated claims.

Have your students examine the homeowner's or tenant's policy that their parents have on their family home. Have them review the wordings for any exclusions for weather related damages, particularly any related to severe weather incidents in your community. To help understand the insurance policy, the Insurance Bureau of Canada provides information on homeowner's/tenant's insurance at www.ibc.ca/en/Home_Insurance/

DID YOU KNOW?

The risk of fire was the biggest threat at the turn of the 20th century, whereas flooding of homes is the biggest threat at the turn of the 21st century. One of the reasons why the amount of each claim for water damage in the home may be on the rise is because today, unlike 30 or more years ago, most people have finished basements with furnished family rooms and expensive entertainment units requiring replacement.

IT'S RAINING ICE

Teacher's Notes

"The 1998 ice storm paralyzed one of the largest populated and urbanized areas of North America leaving more than four million people freezing in the dark for hours, if not, days."

~ 'Forces of Nature' DVD

PURPOSE

- To explore the development and impact of storms
- To examine the principles of weather prediction and predict local weather conditions
- To identify the impact of severe weather systems on economic, social, and environmental conditions
- To determine what risk management strategies (risk avoidance, risk control and risk transfer) might mitigate the impact of severe weather conditions.

SUMMARY

Students will understand the conditions needed for an ice storm to occur and the damage that can be caused by severe weather by looking specifically at the Quebec ice storm.

Materials

- Curriculum Connections' Forces of Nature DVD

Set-up

Discuss with students how and why ice storms occur and some of the ramifications that can occur. (see <http://icestorms1.tripod.com/id14.html> for a detailed answer)

Have students watch the Ice Storm section of the Curriculum Connections' Forces of Nature DVD. Tell them they will be viewing commentary on the biggest Ice Storm in Canadian history, 1998 in Quebec. Encourage them to pay particular attention to the impact on the community and the actions taken to restore order.

Class Discussion: About the weather

- What were some of the weather conditions that caused this ice storm?
- What contributed to the severity or scope of the storm?
- Could the severity of this storm be lessened?
- Would advance warning of the severity of the storm have helped?
- What tools are available to help us predict severe storms?
- What are some of the drawbacks or limitations of these tools?

Group Activity

Once the class is comfortable with their understanding of the weather conditions needed to cause an ice storm, discuss what other weather conditions are common in your region. Place students into an appropriate number of groups so that each group can research the weather conditions required to cause one type of severe weather conditions (i.e., torrential rains, hurricanes, hail storms, etc.).



IT'S RAINING ICE

Teacher's Notes

Have each group share with the class their findings on the predetermined conditions for the type of severe weather conditions they were exploring.

Hand out "Tracking the Weather" to your students. Have your students work in their groups to forecast the weather for the following week for your city and for a city in another country, for comparison. Students can use remote sensing satellite images, and discuss how the satellite imagery differs between cities and countries. Useful sites for satellite images may include:

www.cbc.ca/weather/s0000458.html

www.usatoday.com/weather/forecast/wglobe.htm

www.theweathernetwork.com/video/forecasts

Throughout the week, have students look back at their predictions based on the remote sensing images to see if their predictions about the weather were correct. Have them record the actual weather next to their predictions for comparison.

Class Discussion: About predicting the weather

- How accurate were your predictions?
- Do you think that this is a fool proof way of predicting weather, severe or not? Why?
- How likely is it that the predetermined conditions for ice storms could occur in your region?
- How likely is it that the predetermined conditions for the other types of severe weather conditions explored in your groups could occur in your region in the future?
- If you saw that a big storm was coming what would you do?
- What are some preventative measures that both citizens and the government can make or did make to ensure that a disaster like the 1998 ice storm does not occur again?

Follow-up

Class Discussion: About the impact on the people and the community

- What were some of the ramifications of the 1998 ice storm?
- What was the impact on people's lives? (see Appendix: Natural Disasters in Canada (Insurance Claims from 1993 to 2006) for the number of insurance claims made as a result of the storm)
- How did the province of Quebec work to restore itself back to the way it was before the ice storm?

Making the Connection

Individual Activity

Have students think about all the things they would be without or could potentially lose in an ice storm such as the Quebec storm. Hand out the worksheet "Taking Stock" and have your students think about all the aspects of their daily lives that would be impacted by an ice storm and what they would need to survive.

DID YOU KNOW?

The prolonged freezing rain during the Quebec ice storm brought down millions of trees, 120,000 km of power lines and telephone cables, 130 major transmission towers each worth \$100,000 and approximately 30,000 wooden utility poles costing \$3,000 each.

TO SALT OR NOT TO SALT?

Teacher's Notes

"Ice storms can be winter's worst weather. More slippery than snow, freezing rain is tough and tenacious, clinging to every object it touches. A little can be dangerous, a lot can be catastrophic."

~ 'Forces of Nature' DVD

PURPOSE

- To assess social, environmental and economic impacts of the use of common elements or compounds
- To compare and contrast the properties of pure substances and mixtures, and relate this information to practical applications
- To analyze information gathered from research sources, and justify their conclusions
- To understand the relationship between severe weather and insurance.

SUMMARY

Students will be given the chance to research the pros and cons of an environmental issue; whether salting icy roads is beneficial or detrimental to the environment and to communities, and be given the chance to debate their side of the argument.

Materials

- Curriculum Connections' Forces of Nature DVD

Set-up

Briefly review the difference between a natural hazard and a natural disaster. Have your students keep this in mind when viewing the clip of the Quebec ice storm from the 'Forces of Nature' DVD. Discuss with students the dangers that those effected faced and some of the methods used to help communities cope with, and rebuild after the disaster.

Class Discussion:

- Based upon the class discussion, was the Quebec ice storm a natural hazard or a natural disaster? Support your answer with at least two examples from the Forces of Nature video.
- How were communities affected by the storm?
- How were communities able to rebuild after the storm?
- Name the specific people and organizations that helped individuals and the community get back to the way they were before the storm.

Individual Activity

Discuss the impact on the environment when rock salt is used as a means of de-icing the roads. Have students individually research the pros and cons of salting the road and other methods for de-icing icy roads. The class will be participating in a debate regarding the pros and cons of using rock salt to de-ice wintry roads and sidewalks.



TO SALT OR NOT TO SALT?

Teacher's Notes

Group Activity

Divide the class into two groups for "pros" and "cons."

Questions "pro salting" might want to consider:

- What are the economic benefits compared to that of alternative solutions?
- How does salting work and why is it the most effective manner of melting ice?
- How does salting the road improve road safety?

Questions "con salting" might want to consider:

- Is there a negative environmental impact of salting?
- Can salting have a negative impact on cars?
- What are alternative solutions to de-icing the roads and are they more environmentally friendly?
- Is there a large cost for people and communities to incur by salting the roads?

The students will participate in a debate, led by the teacher, arguing for their side of debate. The arguments will be clearly laid out with well researched arguments for both sides. Students may wish to use the handout "Debate Preparation" to organize their argument. Students on each side of the debate will come together to form a cohesive argument.

Follow-up

Post-debate, have your students investigate whether your community uses salt or an alternative to de-ice the city's roads in winter. Give your students the opportunity to become civically involved in order to express their opinion on whether or not rock salt should be used on the roads. Students may choose to write a letter to the mayor or Head of Road Safety, create a poster, or write a letter to the editor of the local newspaper.

Making the Connection

Icy road conditions and other weather related hazards can have a serious impact on drivers and their driving ability. While salting the roads might help with de-icing, it is not a fool-proof means of preventing a weather related accident. Have students consider other ways to prevent winter accidents, for example: snow tires. Did you know that the province of Quebec made it mandatory that all passenger vehicles (including taxis and rental cars) must have tires specifically designed for winter driving between December 15 and March 15 each year. Have students investigate whether your province or community has any mandatory requirements for snow tires as well. Students may also consider reviewing their car insurance or their parent's car insurance or talking to their insurance broker to see if there are benefits to their insurance if they put snow tires on their cars.

DID YOU KNOW?

When raindrops fall through a layer of air that is colder than 0 degrees Celsius and become super cooled, freezing rain occurs. The drops may freeze on impact with the ground to cause "black ice."

DEBATE PREPARATION

Student Handout

To salt or not to salt?

RESOLUTION: (State your argument)

5 SUPPORTING POINTS (Remember to use evidence and reasoning to support your argument)

1. _____
2. _____
3. _____
4. _____
5. _____

What might the opposing team say to argue against you? Think of 3 points to refute their arguments.

1. _____
2. _____
3. _____

Concluding Argument

I'LL HUFF AND I'LL PUFF BUT CAN I BLOW YOUR HOUSE DOWN

Teacher's Notes

"One of the areas we [ICLR] have chosen to focus on is that the change in the climate is leading to more vulnerability. How do we address that? How do we design homes for the future that will reflect the weather we will increasingly see?"
 ~ Paul Kovacs, Executive Director
 Institute for Catastrophic Loss Reduction (ICLR)
 ~ 'Forces of Nature' DVD



PURPOSE

- To describe the impact of climatic conditions (hurricanes) on human activity
- To discuss how climate has influenced house types and construction materials
- To understand the role that the insurance industry plays in preventing and mitigating the impact of natural hazards.

SUMMARY

Students will have the hands-on opportunity to design and construct a model home and test it to see how it holds up against high winds.

Materials

- Curriculum Connections 'Forces of Nature' DVD
- For Group Activity #1:** Teachers are free to modify or augment the materials for this project; below are suggested per group; teachers may wish to establish quantities or limitations on use.
- popsicle sticks, straws
- construction paper or light weight cardboard
- tape and/or glue (can be white glue or glue gun)

For Group Activity #2:

- outdoor area (or large indoor if appropriate or feasible)
- suggestions for wind sources for option #A: hand held fan, blow dryer, household fan, industrial fan, leaf blower
- measuring tape, stop watch

Set-up

Show students the hurricane section on the 'Forces of Nature' DVD as well as the video clip *Turbulent Flow Over a House in a Simulated Hurricane*, as this is a real life example of the modified activity they will be doing. (www.aps.org/units/dfd/pressroom/videos/index.cfm.) For more information about the real life project, building a wind-proof house, please visit: www.eng.uwo.ca/irlbh/default.htm. For more information on classification of hurricanes (category 1 – 5) visit: www.hurricane.com

Class Discussion:

- Why do you think this type of research on building stronger homes is important?
- Where do you think this research will have the most significant impact? Why?
- Do you think this research is important to society? Why?
- How does the knowledge gained from this type of research impact urbanization and urban growth?
- How does the research impact areas that are particularly in areas affected by natural hazards?
- Will this research impact urbanization and growth? If yes, how? If no, why not?

I'LL HUFF AND I'LL PUFF BUT CAN I BLOW YOUR HOUSE DOWN

Teacher's Notes

Group Activity #1: Building wind-proof model homes

In teams, students will design, build and test a hurricane proof house using the above materials. The teams will be in competition to see who can build the strongest house to withstand the strongest winds.

Before beginning construction on the house, have students research techniques for reinforcing buildings and attempt to incorporate as many of these techniques as possible into their design. Introduce students to the concepts of "hard" and "soft" building construction. The traditional view for construction was that structures should be built as rigid as possible in order to make them sturdy and to withstand extreme weather. However, architects and engineers now realize that it is more efficient to use strong but flexible building materials that allow their structures to lean and sway rather than snap and fall as a rigidly built structure would.

Hand out "Designing a House" worksheets to the groups to record the design of their structure, making use of all the materials available to them. The design will include both a front and top view, including measurements. They will also show where they have put into action the design techniques they researched.

Group Activity #2: Testing the wind-resistance of the model homes

The durability testing will begin when all houses are complete. As a class, determine the variables to be tested and decide on a scoring mechanism. There are two ways to conduct this experiment:

- Option #A: Choose five wind devices for testing that represent category 1-5 hurricanes. You will determine if and to what extent distance and time are factors to be measured or to remain fixed variables. (for example, all wind sources start at 10 feet from the house and blow until the house falls down or for two minutes, whichever comes first).
- Option #B: Choose one wind source and determine five different distances for testing. (for example, start the wind source at 10 feet, then decrease the distance between the house and the wind source.)

Each group will bring their model homes outside to see how they hold up in to the wind-resistance testing. Students will keep track of their observations on the handout "Will it Stand?" Using the scoring mechanism determined by the class, students will score each test.

Class Discussion:

- What features made the winning house the strongest?
- What features made the first house to fall the weakest?
- Were there any features of any other houses you found particularly innovative? How could you work that into a new design?
- Was there any interesting information you came across in your research about building hurricane proof houses?

I'LL HUFF AND I'LL PUFF BUT CAN I BLOW YOUR HOUSE DOWN

Teacher's Notes

Follow-up

Have students assess and analyze the choices they made with their team regarding design and implementation by answering the questions on the handout "Will it stand?" They will analyze the use of design features and indicate how they could have improved upon this and what changes they would make if given the opportunity. Students will assess the performance of the house (how well it stood up to the wind) and analyze what worked and didn't work. Students will reflect on the outcome and describe any changes they would make next time and why.

Making the Connection

Have students visit the website for the Institute of Catastrophic Loss Reduction (www.iclr.org/). Give them the opportunity to see what research projects are underway to improve the sturdiness of homes against natural hazards. Have your students complete the handout "How to Build a Sturdy Home." Discuss the importance and the motivation for this type of scientific study and improved technology and construction. Explain that if you cannot avoid or prevent hazards from happening, insurance is a means of transferring that risk so that you have coverage if and when a hazard such as a hurricane impacts on your lives. Understandably the insurance industry also works to help prevent risks and/or lessen the impact of such risks on people, their possessions and their communities. There is more information about insurance in general at the Insurance Bureau of Canada at www.ibc.ca.

DID YOU KNOW?

Hurricane names are chosen from a list selected by the World Meteorological Organization. The Atlantic region is assigned six lists of names with one list being used per year.

DESIGNING A HOUSE

Student Handout

Hypothesis: What will your design be able to withstand?

Methodology: What are your design strategies?

List of Materials:

Front View:

Top View:

WILL IT STAND?

Student Handout

DURABILITY TESTING

Date: _____

Weather Conditions: _____

Option #1: Test 5 wind sources at a distance of _____ between wind source and house.

Option #2: Test 1 wind source, namely _____, at 5 different distances.

Variable:	Observations:

Answer the following:

1) How well do you feel your structure stood against the wind?

2) What was the strongest design feature of your structure?

3) What could you have improved upon and how?

HOW TO BUILD A STURDY HOME

Student Handout

Take a look at the Web site for the Institute for Catastrophic Loss Reduction (www.iclr.org) and answer the following questions:

1) What kinds of initiatives is the Institute for Catastrophic Loss Reduction spearheading or supporting in order to build weather resistant homes?

2) Why do you think this kind of research is important?

3) What industries might be interested in this research and why?

4) Based on this research, scientists and technology have found ways to reduce the risk on both new and old homes against fierce weather and natural hazards, how would that impact on someone's insurance? And why would it impact their insurance rates?

A MIGHTY WIND

Teacher's Notes

"Canada's most catastrophic hurricane in 50 years, the Category Two storm packed gusts of 185 kilometres per hour and pushed mountainous ocean waves of twenty metres as it steamrolled onto land with the Maritimes' most populous city in its sights."
~'Forces of Nature' DVD



PURPOSE

- To understand the development and impact of storms
- To describe the impact of climatic conditions (hurricanes) on human activity
- To interpret patterns and trends in data, and infer or calculate linear and non-linear relationships among variables
- To recognize the role of insurance in helping people and communities recover from damage caused by severe weather conditions.

SUMMARY

Students will review how and where hurricanes are formed and decide whether or not there is a cause and effect relationship between climate change and hurricane frequency.

Materials

- Curriculum Connections 'Forces of Nature' DVD
- Graph paper
- Map of North America

Set-up

Begin by looking at the hurricane section of the 'Forces of Nature' DVD. Discuss with the class the impact of the high winds and how wind can cause such damage.

Discuss the origins of hurricanes.

- They usually begin over the ocean because the ocean provides warm, moist air that fuels the storm.
- They do not form at the poles because these are tropical storms therefore it is too cold there.
- They do not form at the equator because there is no Coriolis force at the equator and it takes Coriolis to get the storm rotating.

Class Discussion:

- How is it possible that wind can cause such damage to a community?
- How can understanding the nature of wind help communities to better prepare themselves, should another hurricane blow through?
- By looking at the origins of hurricanes, what areas of Canada are most likely to encounter a hurricane? Why is that?
- If hurricanes need warm temperatures to form, do you think that there is a cause and effect relationship between climate change and the severity of hurricanes?

A MIGHTY WIND

Teacher's Notes

Group Activity

Divide the class into three, six or nine groups. On a map, have students divide the North American continent into 3 regions: the Pacific coast, inland, and the Atlantic coast. Assign a region to each group. Have students find a list and information about hurricanes to have hit their region over the last 50 years. Students will also find the average temperatures for those areas in the months that the hurricanes hit. Students will then graph this information to draw conclusions about the correlation between climate change and hurricane frequency. Based on their previous knowledge of charts and graphs, students will be able to decide what is the most appropriate type to best represent their information.

For more information about hurricanes and forecasting please visit www.weatheroffice.gc.ca/canada_e.html

Follow-up

As yet, scientists are not positive that climate change contributes to the frequency of hurricanes, however they are certain that warm water does increase the likelihood of a hurricane. Based on the students' findings, discuss how climate change might impact hurricane frequency.

Class Discussion:

- Do you agree or disagree with hurricane frequency being an effect of climate change?
- Why or why not?
- If you do believe that climate change impacts hurricanes, what are your predictions for the Atlantic region in the next 10 years? Pacific region? Inland?

Individual Activity

As a class, think of 3 catastrophic hurricanes to have happened in Canadian history. Have students choose one of these hurricanes and research the impact that it had on industry in that community. Have them consider: how would people have recovered from the financial loss incurred by the devastation? What role did insurance and insurance professionals play in helping the people and businesses of that community recover from the impact of the Hurricane?

Making the Connection**Role Play**

After learning about the various industries that were affected by past hurricanes, and roles that were integral in helping industries and communities get back on their feet, students will choose a community affected by a hurricane. Then each student will choose a role in the community (fisherman, mayor, fireman, etc.) and act out the hurricane's impact upon them. Students can then research the role that insurance professionals played in helping the people and businesses of that community recover from the impact of the hurricane.

DID YOU KNOW?

Hurricane Juan left seven people dead and caused \$113 million in insured losses in the Atlantic region – the largest insured loss ever recorded in the region.

WATER WATER EVERYWHERE

Teacher's Notes

"What happens when a city is pummelled by a rainfall that's only supposed to happen once every 290 years? What happens is that the sheer volume of water overwhelms it."

~ 'Forces of Nature' DVD

PURPOSE

- To identify the impact of severe weather systems on economic, social and environmental conditions
- To interpret patterns and trends in data, and infer or calculate linear and non-linear relationships among variables
- To determine what risk management strategies (risk avoidance, risk control and risk transfer) might be necessary when building homes and communities in areas with greater potential for natural hazards.

SUMMARY

Students will gain an understanding of what types of locations are susceptible to floods and the impact that has on the surrounding communities.

Materials

- Curriculum Connections 'Forces of Nature' DVD
- graph paper and/or Excel spreadsheet and graphing capabilities
- map of Canada

Set-up

Show students the floods section of the 'Forces of Nature' DVD. As a class, have students discuss what they know about the impact flooding can have on affected communities such as Peterborough.

Class Discussion:

- Why do floods occur? What causes heavy rainfall to lead to massive flooding?
- What makes flooding a natural hazard?
- Do you know of any other communities in Canada that have been affected by flooding? [FYI: Teachers may wish to expand the discussion to include other communities in other countries, including reference to Hurricane Katrina. Please note that in creating this resource, a conscious decision was made to focus on Canadian catastrophes and the Canadian insurance industry's response to these occurrences. (See Introduction on page 2.)]
- In what ways have communities been affected by flooding?

Group Activity #1: Mapping Flood Damage in Canada

Distribute the handout "Natural Disasters in Canada (Insurance Claims 1993 to 2006)" to pairs of students. Using this data, have them (1) design a graph that analyzes the frequency and severity of flood claims in Canada, and (2) depict on a map the communities that have experienced flooding in Canada since 1993.



Class Discussion:

- Do you think there is more flooding or less flooding in Canada (and/or North America) in the recent past?
- Why do you think this is? (For example, are urban floods increasing in numbers due to an increase in frequency and severity of heavy rainfall caused by climate change?)
- What sort of personal and community damage is reflected in this data?

Group Activity #2: Researching Contributing Factors to Flooding in Canada

Have your student pairs research the worst floods in Canada, exploring a variety of resources to gain a better understanding of heavy rainfall resulting in flooding in Canada. Encourage them to investigate factors that contributed to why some communities may be susceptible to more frequent or more severe flooding. Look at location, seasonal influence, costs, efforts to minimize damage, those who helped in rebuilding the community, etc. From their research, have student pairs answer the questions for each of 3 or 4 floods using multiple copies of the handout entitled "Water Water Everywhere!"

Follow-up

Have the pairs of students present their findings to the class. Have students offer an analysis on the contributing factors to the severe impact of heavy rainfall. Record on the board what students have learned about flooding as a natural hazard.

Class Discussion:

- Was there anything you discovered in your research that surprised you in regards to the impact flooding can have on a community? If yes, what was it?
- What manmade changes to the environment potentially increase the impact of this hazard?
- How are communities able to rebuild after a natural hazard does its damage?
- What sort of industries/institutions might play a critical role in the restoration process? How?
- What sort of protective factors are being implemented to stop flooding (think of Red River)?
- What manmade changes to the community have helped to alleviate the impact of another flood?
- How is insurance important to the restoration process?
- What could you do within your own home to protect your belongings from flood damage?

Individual Activity**Making the Connection**

Have students imagine what would happen if their home was flooded. Have them think about all the things that would be damaged or lost as a result of such extensive water damage. Have them complete the handout "Assessing the Risks" indicating what they might do to mitigate the risks now, before they experience a flood and lose everything.

Extension Activity

As a class, look at a map of your local community to identify flood prone areas. Role play the part of your community's Risk Manager and assess the risks these flood prone areas might have to people and their homes, businesses and new building developments. As a risk manager, you are responsible for protecting the community through insurance policies, disaster recovery plans, emergency evacuations and more. What are the potential risks? If you would like to link this activity to Lesson 11, have students use this information to help them in making a decision about where to build their new community.

More information about the role of a risk manager is available in the 'High School Students' section at www.career-connections.info

DID YOU KNOW?

The Peterborough flood was a 1-in-290 year heavy rainfall.

Large floods are often given designations as a "one-hundred-year flood" but a 100-year flood does not mean that such a flood occurs once every 100 years; instead it means that there is a one in one-hundred (or 1%) chance of such a flood occurring in a given year. Two 100-year floods could occur a year apart or even a month apart – it all depends on how much rain is falling or how quickly the snow melts.

A "20-year flood" has a one in twenty (or 5%) chance of occurring in a particular year so it would be a less destructive flood than a 100-year flood while a "500-year flood" has a one in 500 (0.2%) chance of occurring so it would be much more catastrophic than a 100-year flood.

WATER WATER EVERYWHERE

Student Handout

Answer the following questions based on your research which may include the following Web sites:

- www.weatheroffice.gc.ca/canada_e.html
- www.iclr.org/resourcecentre/cathotsheets.html
- www.getprepared.gc.ca/KNW/ris/fld-eng.aspx
- www.canadiangeographic.ca/SpecialFeatures/Floods/flood.htm
- www.preventionweb.net/english/countries/statistics/?cid=31

1) Pick an example of a flood and the community it affected.

2) What time of year is that community at the greatest risk of encountering flooding? Does it vary by region? What areas of Canada are most at risk?

3) What are the factors that contributed to the flood's severe impact on the community?

4) What types of threats do floods pose to both individuals and communities?

5) What were some specific damages caused by the flood and what were the approximate costs to the affected community to get back to a state of normalcy?

6) What are some of the efforts put forth by people in communities to reduce the impact of flooding?

7) What are some of the efforts put forth to restore communities after the flooding occurs?

ASSESSING THE RISKS

Student Handout

Imagine what would happen if your home was flooded. Think about all the things that would be damaged, lost or irreplaceable as a result of extensive water damage. What might you do now to mitigate the potential risks, before you experience a flood and lose everything?

Item	What could happen?	Replaceable (Yes/No?)	Cost?	What could you do to prevent damage/loss?
1.				
2.				
3.				
4.				
5.				

Questions:

1) How can you protect against the loss of these items in the case of a flood?

2) How could you prove that you own these items? Or their cost?

3) Could some of these items ever truly be replaced? Why or why not?

4) How has completing this list demonstrated how your belongings are at risk of being damaged, lost or stolen?

For more information on home insurance, please visit: www.ibc.ca. And to create an online home inventory, please visit: www.knowyourstuff.org/iii/ibc_login.html

WHEN IS TOO MUCH RAIN TOO MUCH?

Teacher's Notes

"In a span of 5 hours, 14 billion litres of water came down. That's enough to fill the Rogers Centre nine times or to sustain the flow of water over Niagara Falls for 40 minutes. No sewer system in the world is designed to accommodate the deluge Peterborough experienced. And with nowhere else for the water to go, it found its way into almost 2,000 basements."
~ 'Forces of Nature' DVD



PURPOSE

- To develop an understanding of the weather conditions and environmental factors that contribute to a natural hazard becoming a natural disaster
- To identify the impact of severe weather systems on economic, social and environmental conditions
- To determine what risk management strategies (risk avoidance, risk control and risk transfer) might mitigate the impact of severe weather conditions.

SUMMARY

As part of your lesson on particulate matter of soil types, students will learn about the different absorption abilities of different types of earth and how this may impact (negatively or positively) on a community affected by severe rainfall. [It is recommended that the class do Lesson 7 before this lesson.]

Materials (per group)

- three earth samples: sand, potting soil, clay
- water
- three measuring cups
- three funnels
- filter paper
- Curriculum Connections 'Forces of Nature' DVD

Set-up

Show students the flooding section of the 'Forces of Nature' DVD. Have students consider the many factors that contributed to the severity of the storm in Peterborough and research further for more information (for example, volume of rain, timeframe, sewer system, water table, type of soil, etc.). Discuss the impact of heavy rainfall on communities in Canada (and/or North America), based on the class' findings from Lesson 7.

Class Discussion:

- Why do floods occur?
- What are some of the contributing factors that cause heavy rainfall to lead to massive flooding?
- What factors contribute or prevent rain from being absorbed by the earth?

WHEN IS TOO MUCH RAIN TOO MUCH?

Teacher's Notes

Group Activity: Measuring Rain Saturation/Soil Absorption Levels

Have students consider how much rain is too much rain. A heavy rainfall can result in flooding particularly when the ground is still frozen or already saturated from previous storms. Discuss ways to measure ground saturation levels. Have students research the normal precipitation levels for your community and the precipitation levels associated with severe rainfalls and damaging floods.

In small groups, students will have the opportunity to test the absorption capability of three different samples of earth and determine which type is capable of absorbing the most water. Collect enough materials to repeat the experiment with three proportionate amounts of water to represent different levels of rainfall based on the students' findings above.

Hand out one or more copies of the worksheet "Soil Absorption Rates" depending on the number of times the experiment will be repeated. Each group will first test the earth samples in their dry state by measuring the same amount of earth into a funnel lined with filter paper. Then pour the first measured amount of water through each funnel sample into a measuring cup. Students will note the amount of water that drains through each sample and record it on the handout. Repeat this process pouring the same amount of water into the samples in their saturated states. Students will again note the amount of water that drains through each sample and record it on the handout.

Repeat the experiment one or two more times with new samples of earth and larger amounts of water.

[N.B. The experiment could also test the size of the sample as well, (i.e. how much earth does it take to absorb so much rainfall). But be sure to only change one variable in each experiment.]

Follow-up

Have students share their findings with the class and their answers to the accompanying questions. Discuss how these findings might be useful in the real world.

Class Discussion:

- Which sample was able to absorb the most water when dry and when already wet?
- Which sample was able to absorb the least amount of water when dry and when already wet?
- What conclusions can you make about the saturation/absorption rates of the samples?
- Why do you think the test gave these results?
- If you were planning to build a home, which type of earth would you suggest building that home on? Why?
- Knowing what you now do about soil and its absorption capability, can you explain why Peterborough flooded? Why the Red River floods annually?
- What are some ways that you can think of to prevent flooding?

WHEN IS TOO MUCH RAIN TOO MUCH?

Teacher's Notes

Individual Activity
Making the Connection

Use Google Earth to show students before and after aerial photography of flood affected areas. Look at those communities that are affected by the flooding of nearby bodies of water (river, lake, ocean, etc.). Research whether lands that are adjacent to water are more prone to flooding. Determine how much soil type (sandy shores, for example) is a contributing factor to increased flooding. Assess whether waterfront communities are at greater risk of being impacted by flooding. Debate the pros and cons of building communities next to bodies of water where the risk ranking is high.

Have your students imagine being an Underwriter for an insurance company. An underwriter assesses the kind of insurance coverage required by people to protect their homes and cars, as well as coverage required of businesses, city government, construction companies, shopping malls, to name just a few examples. The underwriter examines every facet of an organization's operation and its request for insurance, then decides what the insurance company should cover and how much it should charge. Discuss whether the underwriter should accept or reject a request for insurance from a homeowner or business on waterfront property with a high risk of flooding.

More information about the role of an underwriter is available in the 'High School Students' section at www.career-connections.info.

DID YOU KNOW?

The Saguenay floods of 1996 were the most devastating in Canadian history, resulting in 10 deaths, \$800 million in damages, 1718 houses and 900 cottages destroyed or damaged.

SOIL ABSORPTION RATES

Student Handout

Purpose:

Hypothesis:

Materials:

Observations:

DRY	A	Minus B	Equals C	Ranking
Sample size:	Amount of water poured into the funnel (rain)	Amount of water that drained into the measuring cup	= Water absorbed	1 = most 3 = least
Soil				
Clay				
Sand				

WET	A	Minus B	Equals C	Ranking
Sample size:	Amount of water poured into the funnel (rain)	Amount of water that drained into the measuring cup	= Water absorbed	1 = most 3 = least
Soil				
Clay				
Sand				

Questions:

1) What observations can you make about the absorption rates of the samples?

2) Why do you think the test gave these results?

Conclusion: _____

WOULD YOU WANT TO LIVE HERE?

Teacher's Notes

"By August 16th of 2003, Southern British Columbia had gone through three years of the hottest driest weather in 100 years and set a record for 44 consecutive rainless days. When the strong winds and lightning hit, they touched off a wildfire inferno that consumed almost 26,000 hectares and 239 homes during the next 30 days."
~'Forces of Nature' DVD



PURPOSE

- To identify the impact of severe weather systems on economic and social conditions
- To assess how the effects of urban growth alter the natural environment
- To analyze how environmental hazards affect selected urban areas and their nearby rural regions
- To determine what risk management strategies (risk avoidance, risk control and risk transfer) might be necessary when building homes and communities in areas with greater potential for natural hazards.

SUMMARY

Students will assess the pros and cons of building in an area with nature hazards (such as forest fires) and the impact urban growth may have on the environment and vice versa. Students will also gain an appreciation for fire safety and prevention in and around their school and community.

Materials

- Curriculum Connections 'Forces of Nature' DVD
- Map of Canada, topographic maps, air photos and/or satellite photos

Set-up

Have students research forest fires in Canada in the past five to ten years. The following government web site may be informative: <http://fire.cfs.nrcan.gc.ca/home-accueil-eng.php>

Identify the locations of forest fires on the map of Canada. Discuss the conditions that make it possible, and/or probable, for forest fires to start and to impact on a community.

Class Discussion:

- Are forest fires more prevalent in Southern British Columbia? Compare the frequency and severity of forest fires in BC with forest fires in other parts of Canada (*To extend this question, see Lesson 2: Frequency and Severity for a graphing exercise.*)
- How many forest fires were natural hazards vs. hazards caused by humans?
- What percentage of forest fires affected urban areas? Has this number increased or decreased over a period of time? To what might that be attributable?

Show students the fire section of the 'Forces of Nature' DVD. Have the class pay attention to the devastation caused by the fires and to give consideration to the pros and cons of building a house in these densely forested hills in terms of urban encroachment on the environment.

WOULD YOU WANT TO LIVE HERE?

Teacher's Notes

Class Discussion:

- Why do you think people choose to build/buy their homes in an area such as Kelowna that is known for its annual wildfires?
- What impact do you think building your home in the hills has on the environment?
- Discuss whether or not the students feel the urban sprawl in this area has impacted the severity and frequency of fires that occur in Kelowna.
- Are there other areas of concern in Canada due to urban sprawl?
- With people spending more time in natural environments such as forests, what sort of actions and activities might lead to more forest fires? (*e.g.: smoking cigarettes, having a campfire during a fire ban*)

Group Activity

Divide the class into groups. Have each group choose one of the forest fire regions that encroaches on urban development. Have students research the impact urban growth has had on the environment, particularly where forest fires are prevalent. Hand out the "Should people live here?" exercise sheet and have each group answer the questions for their region. If you feel as a teacher you would like to expand this lesson to include biotic and abiotic factors, please see Lesson 10.

Follow-up

Class Discussion:

- What kind of risk assessment would you give to the people who live in Kelowna? Will a forest fire impact their lives again in the next year? In the next five years? (*FYI: Kelowna experienced more forest fires in the summer of 2009.*)
- Do you think that there were any preventative measures people can take to lessen the extent of the damage to their homes? If so, what would that have been?
- If you cut down more trees for urban development, does that decrease the number of forest fires? Is clear cutting hillsides to build new subdivisions a viable solution (socially, environmentally, economically)?
- If your school were in a region where forest fires are a natural hazard, what fire safety plan would you want your school and community to have in place? Does it?
- If your home is built in a region where forest fires are a natural hazard, does your family or your neighbourhood have a fire safety plan in place?

Individual Activity

Have students create a fire safety plan for their school or other building in their community using the "Fire Safety Plan" handout.

For more information on the role of a Loss Control Specialist, please visit the 'High School Students' section at www.career-connections.info

WOULD YOU WANT TO LIVE HERE?

Teacher's Notes

Making the Connection

Have students watch the fire portion of the 'Forces of Nature' DVD again. Have your students pay attention to Greg Thierman, an insurance claims professional, describing the role he played during and after the Kelowna fires. Invite them to visit the Career Connections website (www.career-connections.info) to learn more about the different roles in insurance. Have them think about all the other types of people who play a role in the risk management of a community before and after a natural disaster. For example: a loss control specialist would have been consulted to identify potential risks (like fire, crime, liability or accidents) and recommend ways to minimize them; the risk manager for the city where you live would have worked with the loss control specialist and would have been a key player in developing the city's Fire Safety Plan; an insurance broker would have worked with that risk manager to assess the potential risks and to determine the appropriate coverage needed to protect the community; claims investigators would assess the extent of the damages incurred in the event of a loss; and more. Consider inviting one of these insurance professionals into the classroom to talk about their role in protecting the community or their role in helping people recover from natural hazards.

DID YOU KNOW?

Approximately 60% of wildfires per year are caused by humans, while the remaining 40% are caused by natural events.

SHOULD PEOPLE LIVE HERE?

Student Handout

Let's look at the relationship between wildfires and urban growth. Choose a region in Canada that has a high percentage of forest fires and encroaches on urban centre(s).

Wildfire Region: _____

Urban Centre: _____

Based on researching the forest fires in this region over a period of time, answer the following questions:

1) Has the quantity and frequency of forest fires increased or decreased? Has the impact on the urban centre been more or less severe?

2) To what would you attribute these changes?

3) Based on what you've learned, what kind of risk assessment would you give this urban centre? That is, how likely is it that the people in this urban centre will be affected by a forest fire in the next year? In the next five years?

4) Can you make predictions on the following:

	Social Implications	Environmental Implications	Economic Implications
Short Term Effects			
Long Term Effects			

5) Risk management strategies are about risk avoidance and risk prevention. In what ways could people in this urban centre avoid the risk of forest fires and/or prevent the impact of forest fires? Is there a way to mitigate the risk and impact of forest fires on urban centres?

6) To what extent does this region have a fire safety plan in place?

Imagine your community is in a region where forest fires are a natural hazard. Acting as a Loss Control Specialist, create a fire safety plan for your school or other building in your community. Using the checklist at www.pws.gov.nt.ca/publications/Fire/Checklist.pdf as a guide, complete the following:

List 5 potential fire hazards	Recommend preventative action
1.	
2.	
3.	
4.	
5.	

List 5 preventative measures already in place	Evaluate the effectiveness of the measures
1.	
2.	
3.	
4.	
5.	

"The most expensive and the most damaging wildfires in British Columbia's recorded history saw walls of flame moving through the forests near Kelowna at a speed of over 10 metres per minute to threaten cities, neighbourhoods, homes and businesses. Entire towns were burned to the ground. 50,000 people had to be evacuated."
~ 'Forces of Nature' DVD



PURPOSE

- To explore the development and impact of forest fires
- To assess the relationship between land use practices and altering ecosystems
- To discuss some common forest-management practices
- To determine what risk management strategies (risk avoidance, risk control and risk transfer) might be useful in the case of a natural hazard like forest fires.

SUMMARY

Students will understand the dangers as well as the benefits of forest fires and the role fires play in the life cycle of other forest dwelling species.

Materials

- Curriculum Connections' 'Forces of Nature' DVD

Set-up

Show the class the section about British Columbia wildfires from the 'Forces of Nature' DVD. Based on the video and their previous knowledge of forest fires, create a list of negative impacts (social, environmental and economical) that forest fires have on their affected areas. Then ask students to think of any positive uses for or outcomes resulting from fires. Introduce the concept of surface fires and how they occur (*naturally by a force such as lightning*).

Class Discussion:

- What are some of the negative impacts of fire? (*damages homes, communities, ecosystems, can harm/kill people/animals, etc*)
- What are some of the positive uses of fire? (*energy source for cooking, heating, powering machines, symbolic use in religious ceremonies, etc*)
- What is a surface fire? (*a fire which primarily burns undergrowth and leaf litter*)
- What might be the benefit of a surface fire? (*prevent larger, more serious "crown fires." Can aid in spurring the germination of plants such as sequoia, lodgepole and jack pine. The pinecones from these trees' need to be exposed to extreme heat before they can be released from the cone and germinate. Fires help to reduce the number of pathogens and insects, create or help maintain habitat for animals by burning back or thinning the forest, ecosystems such as savannas, chaparral, and jack pine forests rely on fire to prevent themselves from being overtaken by trees, periodic fire can create openings in the forest canopy to create room for smaller plants requiring sunlight to grow.*)

FIRE! FIRE!

Teacher's Notes

- How does the impact of a surface fire differ from that of a man made fire? *(in the past man made forest fires have been extinguished as quickly as possible. This has a negative impact on the forest because it disrupts plant succession patterns and limits the variety of habitat available for animals, as well causes build up of forest underbrush and litter. Therefore, park officials have begun setting fires called "prescribed burns" to counterbalance this.)*
- Do you see any danger in this? *(possibility of fire getting out of control and spreading towards human inhabited areas)*
- A major environmental issue facing the world today is the strong possibility that the climate is warming due to the excess carbon dioxide that is being released into the atmosphere by the burning of fossil fuels and forests. Does this environmental concern influence your opinion about prescribed burning or allowing lightning-caused fires to burn? Why or why not?

Group Activity

In small groups have students research a plant whose life cycle is dependent on fire (e.g., giant sequoia, the lodgepole pine, the jack pine) and/or resilient to fire (e.g., redwood trees). They will examine the plant's role in that particular ecosystem and use the "storyboard" handout to illustrate the life cycle, and the plant's effect on the biotic and abiotic aspects of its ecosystem.

Follow-up

Explore the Fire triangle with students and discuss ways in which we can prevent or stop fires based on this information *(must remove or restrict one of the elements of the fire triangle).*

Class Discussion:

- What 3 things must be present for fire to occur? *(a fuel, oxygen, and a heat or ignition source)*
- Knowing this, what are some ways you can think of to prevent fires, either in the forest or in your home?

Individual Activity

Students will conduct research into the elements that are needed to create a fire, or the fire-triangle. They may wish to answer some of the following questions: Why can't you light a match on the moon? Why won't a wet match light? Why does gasoline allow fire to burn? What makes something fire retardant? Students will also research fire prevention in their community to assess whether appropriate prevention strategies and tactics are in place.

Making the Connection

Have students research what has happened since the Kelowna fires and create a timeline of events to date (homes rebuilt, plant life growing, etc). Have students prepare a storyboard illustrating the recovering in Kelowna. Have there been any other fires in the area? What has the rebuilding process looked like? If the teacher deems it appropriate, students can use photos downloaded from the internet to illustrate the storyboard, from the extensive damage caused by the fire to the rebuilding of homes and regrowth of the ecosystem.

DID YOU KNOW?

The 2003 Kelowna fire was the largest insured loss to date from a Canadian wildlands fire, with a loss of \$200 million.

FIRE STORYBOARD

Student Handout

Create a storyboard illustrating recovery after a forest fire.

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PUTTING IT ALL TOGETHER

Teacher's Notes

PURPOSE

- To demonstrate ethical, responsible, cooperative behaviour
- To identify factors that influence the location of urban centres
- To assess the risks on the surrounding environment of a new community and propose risk prevention strategies to improve the balance and lessen the impact between human and natural systems.

SUMMARY

Students will take on a variety of roles in order to plan a new community. By looking at various factors needed for a successful new community, students will have to think critically about location, environment and risk.

Materials

- Curriculum Connections'Forces of Nature' DVD

Set-up

Review the four natural hazards that have been studied throughout this resource. See if students can find any patterns or similarities among these natural hazards.

Class Discussion:

- What have you learned about natural hazards?
- Can you see any patterns about where or how they form?
- Are there any similarities you see between all of these natural hazards?
- What benefits can you see in understanding natural hazards in Canada?
- If you wanted to avoid natural hazards, where would you live?
- If you lived in an area with high risk for natural hazards, what would you do?
- Knowing what you know now, what might you research when considering moving to somewhere else in Canada?
- Based upon the statistics we have looked at, what are the possibilities of a natural hazard happening to you?

Group Activity

Students are about to become community developers somewhere in Canada. In groups of four, teams will determine where they would like to build their new community. And then each person on the team will assume a different role in the development. One will become the project manager, one the risk manager, one an underwriter, and one a loss control specialist. Give students the handout "Putting It All Together" and the worksheets and review the instructions with them.

Follow-up

Have each group present their projects to the class. Have students vote: of all of the communities presented which do they think is located in the best spot in Canada?

Individual Activity

Have students describe why they feel the location they voted for is the best location to build a community in Canada. They can choose to express their opinion through a newspaper editorial, a comic strip, etc.

PUTTING IT ALL TOGETHER

Student Handout

You are about to become part of the development of a new community. In your groups, you are to work through the questions below and the worksheets to develop the rationale for building this new community. You will prepare a report and a presentation detailing the following:

A) Decide which location in Canada is the best for your new community (e.g., coastal, in land, which province, etc.). Use the worksheet "Location Risk Assessment" to justify your reasons with facts and help you make your decision.

B) Assume one of the following roles within your group: PROJECT MANAGER, RISK MANAGER, UNDERWRITER, or LOSS CONTROL SPECIALIST. Research the roles and write a detailed description for your job. More information about key insurance functions can be found in the 'High School Students' section at www.career-connections.info.

For each of the roles, answer the following questions:

PROJECT MANAGER:

- What are the overarching goals and concerns as the project manager?
- What sort of things does this role need to take into account on a daily basis to ensure that risk is kept to a minimum (e.g., safety equipment worn by workers)?

RISK MANAGER:

- Choose to be the risk manager of the developer, construction company, or the local or provincial government
- What are your overarching goals and concerns as the risk manager?
- What sort of precautions should you recommend be taken in order to ensure risk is managed during development of, and ongoing to, the properties? Take into account both building codes, as well as the surrounding environment.

UNDERWRITER:

- What are your overarching goals and concerns as the underwriter?
- As an underwriter of the insurance company, who will be responsible for the company needing to cover losses should a potential risk become a reality, what is your perception of the potential risks becoming realities?
- You get to decide if the anticipated and unanticipated risks are transferrable to the insurance company at a reasonable risk ranking and at an appropriate level of premium. Would you recommend that your company insure this community? Why or why not?

LOSS CONTROL SPECIALIST:

- What are your overarching goals and concerns as the loss control specialist?
- What assessment will you give the development and the sustainability of this new community?
- What sort of advice are you going to give the community to protect itself against loss? (Think of both the homes and businesses that will dwell within the community)

PUTTING IT ALL TOGETHER

Student Handout continued

C) Assess the impact the building of your community could potentially have on the local environment (consider factors such as pollution, wildlife, natural habitats, etc.) using the worksheet “Environmental Impact Assessment.”

You may wish to research other examples of urban development impacting the environment in that they have not created the impact of a ‘disaster’ but they are creating long term natural hazards. For example, the impact of the size and the lights of the tall buildings in Toronto on the migratory patterns of birds; or the concern that the building of casinos and hotels in Niagara Falls may be creating a wind barrier that is acting like a retaining wall for the mist off the falls; or that environmental change-related stresses are contributing to colony collapse disorder in the North American honey bee populations.

D) Assess the impact of the surrounding environment on the building site of their community (is it a wet environment for example?). Use the worksheet “Development Impact Assessment” to document your group’s discussion.

E) Provide the answers to the following questions in your report and presentation:

- i) Based on your discussions and findings, what are the factors that have the highest risk rankings?
- ii) How confident are you in the assessments you have conducted for this project? Why?
- iii) What predictions would you make about the short-term and long-term social, environmental and economic effects this community may have?
- iv) In creating this new community, are the high risk natural hazards avoidable, controllable or preventable, or transferable (through insurance coverage)? What are your risk management strategies?
- v) In what ways might this new community increase the risk of natural hazards becoming natural disasters?
- vi) Create a positioning statement that defines the community and takes into consideration your focus on the interactions between the environment and human activities.
- vii) Would people want to live in this new community you have helped build?
- viii) Would you want to live there?

LOCATION RISK ASSESSMENT

Student Handout

In choosing a possible location to build your new community, consider these factors:

Pick a location:	
Province?	
Urban or Rural area?	
Near a town or city?	
Near a lake or river? Near a hill or mountain(s)? Other environment?	

Assess the weather:	
Average temperatures: Highest (summer)? Lowest (winter)?	
Average annual rain fall:	
Average annual snow fall:	
Average number of days without sun in winter:	
Average number of days without rain in summer:	

Assess the risk of natural hazards:	Research the frequency and severity of each type of a storm
Ice storms	
Severe wind storms and hurricanes	
Severe rainfall resulting in flooding	
Wildfires	

Define the Location:	Provide the rationale

ENVIRONMENTAL IMPACT ASSESSMENT

Student Handout

Assess the **impact** of the building of your community **on the local environment**, during development and ongoing once it is built.

Community may impact:	During Development	Risk Ranking	After Development / Ongoing	Risk Ranking
Air Pollution				
Noise Pollution				
Sewer Systems				
Local Waterways				
Flora				
Fauna				
Natural Habitats				
Migratory patterns				
Earth/Soil				
Wind Currents				
Snow Removal				
Other:				

DEVELOPMENT IMPACT ASSESSMENT

Student Handout

Assess the **impact** of the local environment **on the building of your community**, during development and ongoing once it is built.

Environment may impact:	During Development	Risk Ranking	For Sustainability	Risk Ranking
Timeline for Construction				
Construction Materials				
Transportation to and from				
Delivery of materials and resources				
Site Preparation				
Site Maintenance				
Natural Hazards				
Hazards becoming disasters				
Other:				

PROTECTING YOUR BELONGINGS

Teacher's Notes

"Dealing with risk is at the heart of insurance. But what do we actually buy when we pay for insurance? We are buying peace of mind that if something happens and we have coverage, then our insurance will help us to recover from that loss. Insurance companies collect the premium that you and I pay, and add this to the premiums from all the policyholders, . . . and from this large pool of funds, they compensate those customers who have suffered a loss. By sharing the risk of catastrophic loss among all of us, we can re-build and restore those homes, businesses and communities affected by environmental disasters."
~ 'Forces of Nature' DVD



PURPOSE

- To identify the difference between risk and protective factors
- To determine what risk management strategies (risk avoidance, risk control and risk transfer) might mitigate the risks
- To analyze risk and protective factors in catastrophic situations

SUMMARY

Students will have the opportunity to review the information learned about the impact of natural hazards in order to assess better risk management strategies to mitigate the risks.

Set-up

Now that students have an understanding of a variety of natural hazards that occur in Canada and the damage that they can cause, brainstorm ways to mitigate the potential risks to themselves and their community.

Class Discussion:

- What have you learned about natural hazards and the damage that they cause?
- Discuss the meaning of the word mitigate (*to lessen the severity of the risk*)
- Can you think of any strategies your community has implemented in order to lessen the damage in case a natural hazard strikes?
- How would you lessen the risk against an ice storm within your community? Hurricane? Flood? Fire?

Group Activity

As a class, students will brainstorm a list of ways to mitigate risk against their community in the case of a flood, ice storm, hurricane, and flood.

Follow-up

Discuss with students what they have learned about mitigating against a natural hazard and how feasible they think it is to implement some of their ideas into the community.

PROTECTING YOUR BELONGINGS

Teacher's Notes

Class Discussion

- What have you learned from this exercise?
- Do natural hazards always have to become natural disasters?

Individual Activity

Students will fill out the handout "Protecting Your Belongings" in order to understand what some potential risks are with each of the natural hazards that have been studied and what they can do to minimize potential risks.

PROTECTING YOUR BELONGINGS

Student Handout

Think about how your daily living would be affected by a natural disaster. What would you be without? What would you lose? What would be damaged and need to be replaced? What steps could you take to reduce the damage or lessen the impact of the disaster on your living conditions?

Natural Hazard	What could happen? What are the risks?	How could you mitigate the risks?
Ice Storm		
Hurricane		
Flood		
Fire		
Other		

CAREERS IN INSURANCE

Teacher's Notes

"Canada's property & casualty insurers are on the front lines of disaster restoration. The claims adjusters and investigators we send into the field are the professionals who survey the damage and work with policy holders to make things right. They arrange for alternate accommodation. They find the tradespeople to restore the properties. They provide peace of mind that things can be made right again."
~ 'Forces of Nature' DVD



PURPOSE

- To demonstrate a variety of career options within the insurance industry where individuals can make a contribution that affects individuals, communities and the environment.

SUMMARY

There are a variety of jobs in the insurance industry that may appeal to a variety of interests. No matter what a person is passionate about, it is very likely they can use that passion to find a place in insurance. Students will be given the opportunity to discover some of the careers options available in the insurance industry.

Materials

- In-class access to the Career Connections Web site at www.career-connections.info.
- Teachers can also pre-order our free 'Careers in Insurance' Teacher's Resource with a career DVD and class set of career brochures. Or invite an insurance professional into the classroom to give a career presentation. Visit our 'Teachers' section to place an order and/or request an ambassador presentation; or call toll-free **1-866-362-8585 ext. 2280**.

Set-up

On the board have students list all the words, phrases or jobs that they associate with the insurance industry. Keep this list on the board while students complete the activity.

Individual Activity

Have students visit the 'High School Student' section on the Career Connections Web site at www.career-connections.info. Here they can watch a career video and video clips of insurance professionals talking about their careers. Give them time to look at each of the career profiles highlighting key roles available within the insurance industry. Have students write a paragraph describing which job they feel is most suited to their interests and personality traits and why.

Follow-Up

Have students share some of the jobs that interested them and why. Refer back to the list of words, phrases and jobs on the board. Ask the class:

- Are there any new words, phrases or jobs that they would like to add now?
- Are there any of the words or phrases that they associated with insurance before this activity that they would like to remove? If yes, why?

FORCES OF NATURE

Natural Disasters in Canada
(Insurance Claims from 1993 to 2006)

*One company reported three commercial property claims totaling \$108 million.

Date and Place	Event	Property		
		# of claims	Loss (\$000)	Average paid (\$)
1993 March 13-14 Quebec	Storm	6,280	11,814	1,881
1993 July 25-Aug 14 Winnipeg	Flooding	21,264	184,837	8,692
1993 July 29-30 Alberta	Hailstorm	759	7,078	9,322
1993 July 29 Saskatchewan	Flooding	2,741	5,383	1,964
1993 July 29-30 Quebec	Flooding	1,366	7,624	5,581
1994 Jan. 16-17 Southern Ontario	Flooding	3,289	11,759	3,576
1994 Jan. 28 Southern Ontario	Storms	1,781	5,470	3,072
1994 May 18 Southern Manitoba	Storms	2,141	8,260	3,859
1994 May 22 Saskatchewan	Storms	5,048	8,666	1,717
1994 June 18 Southern Alberta	Hailstorm	1,653	4,284	2,592
1994 Aug. 4 Salmon Arm, BC	Storm	2,026	10,225	5,048
1994 Aug. 4 Aylmer, Quebec	Tornado	484	6,730	13,904
1994 Aug. 27 Southern Manitoba	Hailstorm	1,908	4,845	2,540
1994 Aug 28 Southern Ontario	Storms	1,236	6,772	5,479
1995 June 6-9 Calgary	Flooding	1,596	20,292	12,714
1995 July 4 Edmonton	Hailstorm	1,785	14,083	7,890
1995 July 10 Southern Alberta	Hailstorm	3,093	17,997	5,819
1995 July 13-15 Southern Ontario	Storms	12,762	36,448	2,856
1995 July 17 Calgary	Hailstorm	9,843	32,887	3,341
1995 July 30 Southern Manitoba	Storm	1,582	4,971	3,142
1995 Aug. 26 Regina	Storm	3,309	12,294	3,715
1995 Oct. 5-6 Hamilton, Ontario	Storm	5,141	15,916	3,096
1996 July 16 Winnipeg	Flood/hailstorm	21,027	94,250	4,482
1996 July 16-18 Calgary	Hailstorm	15,845	91,981	5,805
1996 July 24-25 Calgary	Hailstorm	15,742	71,400	4,536
1996 July 19-20 Saguenay, Quebec	Flooding	5,289	203,579*	[*]
1996 July 23 Outaouais, Quebec	Wind/hailstorm	330	1,257	3,809
1996 Aug. 8 Ottawa	Flooding	2,341	19,705	8,417
1996 Aug. 8 Outaouais, Estrie, Quebec	Flooding	1,459	7,729	5,297
1996 Nov. 9 Montreal and Quebec City	Flooding	9,813	75,684	7,713
1997 Feb. 27 Niagara Peninsula, Ontario	Wind	13,080	22,130	1,692
1997 April 6-7 Sudbury, Ontario	Flooding	2,553	20,426	8,000
1997 July 14-15 Chambly, Quebec	Flooding	3,118	29,865	9,579
1998 Jan. Southern Quebec	Icestorm	658,575	1,376,945	2,090
1998 Jan. eastern Ontario	Icestorm	59,351	161,558	2,722
1998 July 4-9 Calgary	Hailstorm	10,582	46,645	4,408
1998 Sept. 26-27 Niagara Peninsula, ON	Wind	7,294	26,184	3,590
1999 Jan. Southern Ontario	Snowstorm	28,608	99,821	3,489
1999 June 5 Drummondville, Quebec	Hailstorm	2,315	14,225	6,145
1999 July 5-6 Quebec	Wind	20,680	38,289	1,851

FORCES OF NATURE

Natural Disasters in Canada
(Insurance Claims from 1993 to 2006)

Automobile			Total		
# of claims	Loss (\$000)	Average paid (\$)	# of claims	Loss (\$000)	Adjusted for Inflation 2006 (\$000)
3,440	6,633	1,928	9,720	18,447	23,511
----	not available	----	----	184,837	235,581
673	1,038	1,542	1,432	8,116	10,344
----	not available	----	----	5,383	6,861
----	not available	----	----	7,624	9,717
1,042	1,386	1,330	4,331	13,145	16,734
579	780	1,346	2,360	6,250	7,957
----	not available	----	----	8,260	10,515
----	not available	----	----	8,666	11,032
2,032	3,979	1,958	3,685	8,263	10,519
----	not available	----	----	10,225	13,017
81	181	2,235	565	6,911	8,798
1,559	3,267	2,096	3,467	8,112	10,327
366	448	1,223	1,602	7,219	9,190
298	472	1,584	1,894	20,764	25,860
424	615	1,450	2,209	14,698	18,305
3,634	8,392	2,309	6,727	26,389	32,866
11,074	16,991	1,534	23,836	53,439	66,555
8,996	19,417	2,158	18,839	52,304	65,141
1,645	3,497	2,126	3,227	8,468	10,546
----	not available	----	----	12,294	15,311
262	409	1,560	5,403	16,325	20,332
24,444	52,575	2,151	45,471	146,825	180,187
10,778	27,110	2,515	26,623	119,091	146,151
6,005	13,822	2,302	21,747	85,222	104,586
1,172	3,580	3,054	6,461	207,159	254,230
192	314	1,639	522	1,571	1,928
246	552	2,243	2,587	20,257	24,860
65	153	2,353	3,207	7,882	9,673
131	356	2,721	9,944	76,040	93,318
1,194	1,646	1,378	14,274	23,776	28,694
65	132	2,042	2,618	20,558	24,811
----	not available	----	----	29,865	36,043
71,594	99,101	1,384	730,169	1,476,046	1,763,818
2,994	4,004	1,337	62,345	165,562	197,840
7,999	23,097	2,887	18,581	69,742	83,339
19,013	37,219	1,958	26,307	63,403	75,764
10,736	20,200	1,881	39,344	120,021	140,951
2,921	6,330	2,167	5,236	20,555	24,140
2,726	5,032	1,846	23,406	43,321	50,875

FORCES OF NATURE

Natural Disasters in Canada
(Insurance Claims from 1993 to 2006)

Source: IBC, 2008 Facts Book, originally titled:
"NATURAL DISASTERS – major multiple-payment occurrences." Used with permission.

Date and Place	Event	Property		
		# of claims	Loss (\$000)	Average paid (\$)
1999 July 28 Atlantic provinces	Flooding	1,661	15,251	9,181
1999 Sept. 22 Atlantic provinces	Flooding	1,912	14,391	7,527
2000 May 12 Southern Ontario	Storm	14,653	123,773	8,447
2000 July 7 Southern Manitoba	Storm	2,389	18,559	7,768
2000 July 14 Pine Lake, Alberta	Tornado	1,907	12,617	6,616
2000 Aug. 9 Calgary	Storm	4,624	21,229	4,591
2000 October 30 Sydney, NS	Flooding	346	3,909	11,303
2000 Dec. 17 Atlantic provinces	Windstorm	5,478	18,149	11,267
2001 Feb. 1 Atlantic provinces	Snowstorm	2,584	12,321	9,432
2001 Feb. 8 Southern Ontario	Storm	12,606	52,135	4,136
2001 Feb. 8 Quebec	Storm	19,077	53,843	2,822
2001 July 13 Alberta	Storm	5,000	16,964	3,393
2001 July 28 Edmonton	Storm	2,424	22,068	9,104
2001 Sept. 19 Atlantic provinces	Flooding	701	6,201	8,848
2001 Dec. 14 Southwestern BC	Windstorm	4,658	27,035	5,804
2002 Jan. 31 Southern Ontario	Windstorm	6,837	31,972	4,676
2002 March 9 Ontario	Windstorm	26,466	107,774	4,072
2002 June 8 Southern Alberta	Flooding	3,502	42,828	12,229
2002 June 10 Southern Ontario	Storm	5,311	53,377	10,049
2002 July 26 Southwestern Ontario	Storm	4,253	59,220	13,925
2003 March 30-April 1 New Brunswick	Flooding	663	4,695	7,083
2003 March 30-April 1 Newfoundland	Flooding	118	711	6,021
2003 March 30-April 1 Prince Edward Island	Flooding	81	628	7,713
2003 March 30-April 1 Nova Scotia	Flooding	1,865	18,557	9,952
2003 Aug. 11-12 Alberta	Wind/hailstorm	4,013	24,180	6,026
2003 Aug. 11-12 Saskatchewan	Wind/hailstorm	5,702	29,055	5,095
2003 Summer British Columbia	Forest Fire	3,385	200,000	59,084
2003 Sept. 28-29 Prince Edward Island	Hurricane	1,251	6,665	5,327
2003 Sept. 28-29 Nova Scotia	Hurricane	23,077	132,671	5,749
2004 July 2-11 Edmonton	Hailstorm	12,955	166,000	12,814
2004 July 15 Calgary	Hailstorm	4,200	21,500	5,119
2004 July 15 Peterborough, Ontario	Flood	5,154	87,303	16,939
2004 Sept. 9 Eastern Ontario	Rainstorm	5,587	57,600	10,310
2005 June 6-8 & June 17-19 Alberta	Flooding	-----	300,000	-----
2005 June 20-30 & July 1-2 Manitoba	Flooding	-----	60,000	-----
2005 July 5 & Sept. 26 Quebec	Rainstorm	-----	57,000	-----
2005 Aug. 19 Ontario	Wind/rainstorm	-----	500,000	-----
2006 Feb. 6 British Columbia	Storm	1,106	6,406	5,792
2006 Aug. 10 Alberta	Hailstorm	859	13,593	15,825
2006 Sept. GTA, Oshawa, Whitby, ON	Windstorm/hail	750	4,628	6,170
2006 Nov. 15-Dec. 15 British Columbia	Storm	14,437	133,086	9,218

FORCES OF NATURE

Natural Disasters in Canada
(Insurance Claims from 1993 to 2006)

Automobile			Total		
# of claims	Loss (\$000)	Average paid (\$)	# of claims	Loss (\$000)	Adjusted for Inflation 2006 (\$000)
858	505	589	2,519	15,756	18,504
1,566	1,257	803	3,478	15,648	18,376
1,676	4,348	2,594	16,329	128,121	146,520
-----	not available	-----	2,389	18,559	21,225
1,248	5,299	4,246	3,155	17,916	20,488
2,681	6,829	2,547	7,305	28,058	32,087
86	101	1,174	432	4,010	4,586
1,773	1,607	906	7,251	19,756	22,594
2,140	1,425	666	4,724	13,746	15,334
1,865	1,943	1,042	14,471	54,078	60,326
-----	not available	-----	19,077	53,843	61,064
2,582	8,549	3,311	7,582	25,513	28,461
606	1,834	3,026	3,030	23,902	26,663
64	161	2,523	765	6,362	7,098
-----	not available	-----	4,658	27,035	30,159
1,842	2,536	1,377	8,679	34,508	37,648
2,078	3,215	1,547	28,544	110,989	121,089
-----	not available	-----	3,502	42,828	46,726
467	566	1,211	5,778	53,943	58,851
733	839	1,145	4,986	60,060	65,525
-----	not available	-----	663	4,695	4,983
-----	not available	-----	118	711	755
-----	not available	-----	81	628	667
-----	not available	-----	1,865	18,557	19,695
2,401	9,385	3,909	6,414	33,565	35,622
-----	not available	-----	5,702	29,055	30,836
-----	not available	-----	3,385	200,000	212,257
-----	not available	-----	1,251	6,665	7,073
-----	not available	-----	23,077	132,671	140,802
-----	not available	-----	12,955	166,000	172,976
-----	not available	-----	4,200	21,500	22,404
-----	not available	-----	5,154	87,303	90,972
-----	not available	-----	5,587	57,600	60,020
-----	not available	-----	-----	300,000	305,888
-----	not available	-----	-----	60,000	61,178
-----	not available	-----	-----	57,000	58,119
-----	not available	-----	-----	500,000	509,813
-----	not available	-----	1,106	6,406	6,406
-----	not available	-----	859	13,593	13,593
-----	not available	-----	750	4,628	4,628
-----	not available	-----	14,437	133,086	133,086

FORCES OF NATURE

Insurance is already part of everything you do, why not make it part of what you already teach? We make it easy.

The Insurance Institute's Curriculum Connections resources are designed to help Canadian educators achieve provincial curriculum outcomes with experiential activities that make learning about insurance principles both realistic and interesting. From one educator to another, we want you to know that we've done our homework. The resources are able to transfer important insurance concepts such as risk management, and principles such as personal and social responsibility, into the classroom and speak directly to students at their level.

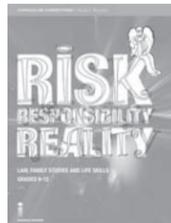
We've developed this and other resources because we feel it is particularly relevant and timely to be educating tomorrow's consumers about basic insurance principles – like risk management, personal and social responsibility, ethics, as well as how home, auto and business insurance works – when they may be first introduced to insurance as new drivers, first-time tenants or creating a summer business.

General insurance (home, auto and business insurance) plays a crucial role in protecting individuals, families, communities, and businesses, while providing stability and confidence for Canadians and the Canadian and global economies at large. That is why we have brought the real-world knowledge of the insurance industry into the study of business, economics, law, math, social studies, family studies, geography, environmental sciences, and career and guidance education for any student looking to better understand the world in which we live.



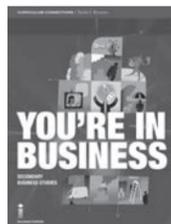
Know Your Risk

This nine-module teacher resource helps students learn about risk in their lives, within the context of the role ethics plays in their personal decision-making. Know Your Risk is also essential for educators of life skills, health and at-risk teenagers. For grades 6 and up.



Risk Responsibility Reality

Based on three humorous vignettes, this classroom resource enables teachers of law, family studies and life skills to introduce students to concepts of personal and social responsibility, legal liability and ethical behaviour. For grades 9-12 (includes 18-minute DVD).



You're IN Business

In order for students to gain a realistic perspective on what is to be expected of them in the workplace, this resource looks at topics such as ethics in the workplace, to force students to think about workplace behaviour. They are also given an opportunity to design their own business model while gaining insight into the role insurance plays in a successful business. For grades 9-12.

DVD AND DVD-ROM INSTRUCTIONS

The enclosed DVD can be used on DVD-ROM equipped PC and MAC computers, and standard DVD players.

Minimum System Requirements:

- Mac or PC equipped with DVD-ROM drive
 - 64 MB RAM
 - Screen resolution 800x600
 - Sound card
- This disk is compatible with a standard DVD player.

TO ACCESS THE VIDEO ON DVD

For PC Computer:

1. Insert the disk into the DVD-ROM drive of your computer.
2. Depending on your computer:
 - a. The DVD may automatically open to the main menu, or
 - b. You may have to click on My Computer, locate the DVD-ROM drive, then double click the DVD drive to open the main menu.
3. When the DVD content menu appears on the screen, make a selection by clicking on the appropriate icon:
 - a. Play Video – to run video from start to finish
 - b. Chapter Selection – to play the video in segments

For Mac computer:

1. Insert the disk into the DVD-ROM drive of your computer.
2. The DVD should automatically open.
3. When the DVD content menu appears on the screen, make a selection by clicking on the appropriate icon:
 - a. Play Video – to run video from start to finish
 - b. Chapter Selection – to play the video in segments



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