

FireEd

A dramatic night photograph of a firefighter in silhouette, holding a large axe aloft. The firefighter is positioned in the lower center, facing away from the viewer towards a large, intense fire. The fire is concentrated on a tree trunk that is being cut, with bright orange and yellow flames and thick smoke rising. The background is dark, with some bare tree branches visible. The overall mood is heroic and intense.

**FOREST
FIREFIGHTING:**

**FROM THE
CLASSROOM
TO THE
COMMUNITY**

A young man with a friendly smile is wearing a red fire helmet with a clear face shield and a red fire jacket. He is standing in front of a pile of yellow fire gear, including jackets and pants, on a dark, possibly charred, ground. The background is a bright yellow border.

INTRODUCTION

During the hot summer months, the lingering smoke, glowing skies and media reports of wildfires capture the hearts and minds of everyone who witnesses the powerful and destructive forces of nature at work. As such, the topics of forest fires and forest firefighting present educators with an unparalleled opportunity to engage students in an area of study that has a wide variety of valuable learning outcomes.

Questions such as: “What causes forest fires?”, “Are forest fires natural?” and “Are all forest fires the same?” become the starting points for lessons on a wide range of topics in both the social and physical sciences. The result is that within this fascinating area of study exists a myriad of explorations for teachers and students of all ages. This FireEd package engages secondary students in environmental education and demonstrates that exciting careers can be found in the application of science.



WHO WE ARE... WHAT WE DO

Every year, young men and women from across British Columbia come together to protect communities and valuable forests from the devastation of wildfire. They are B.C.'s forest firefighters. Their work is extremely challenging and demands strength of character, a high level of physical fitness and technical training. Firefighters take great pride in their commitment to this task, leaving friends, family and the comforts of home behind for grueling work in the hot summer months.

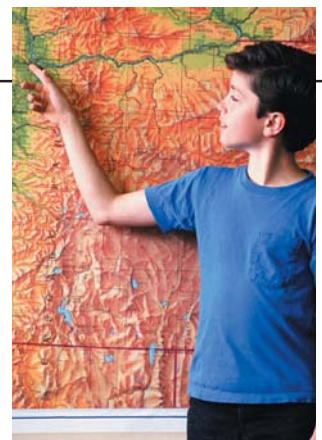
In the past, these firefighters have traveled to remote regions to protect natural resources from the annual cycle of forest fires caused by lightning, industry and human carelessness. As community development and recreational pursuits spread further into B.C.'s forests and wilderness, today's firefighters find themselves not

only battling to save trees, but also helping to prevent the destruction of homes and saving lives.

Following the devastating fire season of 2003 that destroyed a number of B.C. communities, two crews, the Coastal and the Valhalla Firefighting Unit Crews, developed an education package to be used in classrooms across the province to inform and inspire children to prevent wildfire. With the support of FORED B.C., the non-profit conservation charity that manages these crews, and the Ministry of Forests, these professional wildland firefighters worked together to contribute their years of experience, knowledge and passion regarding the field of firefighting to this project. The following package of information and activities is the result of their efforts. The development team included a certified B.C. school teacher and two senior crew leaders, one with his PhD, with over twenty years of firefighting to their credit.

IN THE FOREST, IN THE CLASSROOM

The firefighters of the Coastal and Valhalla Unit Crews also volunteer their time as classroom speakers throughout B.C., displaying equipment and sharing their knowledge of fire prevention and suppression. To further enhance this resource package, contact FORED at education@foredbc.org to arrange for a classroom visit by Unit Crew members, dependent on the fire season and proximity to your school.



CAMPFIRE BAN IN EFFECT



PHOTO BY TIM SHUFF



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PHOTO BY TIM SHUFF

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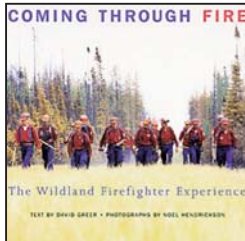
ACKNOWLEDGEMENTS

This FireEd package has been made available with the support and assistance of:

Dr. Paul Miller – Crew leader, Coastal Unit Crew

Justin Mulcahy – Crew leader, Valhalla Unit Crew

Sandra Ulmer – former wildland firefighter & teacher, York House School



Noel Hendrickson – former wildland firefighter, professional photographer and co-creator of the book, "Coming Through Fire: The Wildland Firefighter Experience"
Visit: www.hendricksonphoto.com

Phil Taudin-Chabot – Coastal Fire Centre Manager, B.C. Ministry of Forests & Range

Ross Wilde – Fire Operations Specialist, Detection/Prevention, B.C. Ministry of Forests & Range

Sue Croft – Fire Information Officer, Coastal Fire Centre, B.C. Ministry of Forests & Range

Jim Price – Superintendent, Fire Preparedness & Operation, B.C. Ministry of Forests & Range

Kerry Brewer – Fire Operations Specialist, B.C. Ministry of Forests & Range



Vancouver Foundation Conservation Fund



Natural Resources
Canada

Ressources naturelles
Canada



FireSmart your home – Partners in Protection

<http://www.for.gov.bc.ca/Protect/safety/pamphlets/FireSmart-BC4.pdf>



Cheryl Ziola – President of FOREd B.C. and FireEd project editor
www.landscapesmag.com

Additional thanks to all the members, past and present, of the Coastal and Valhalla Unit Crews – for all your sacrifice, dedication and hard work.

PHOTO BY TIM SHUFF

THE LEARNING OUTCOMES

This educational resource has been created to serve as a springboard for educators to meet the learning outcomes of B.C.'s Ministry of Education's Integrated Resource Packages (www.bced.gov.bc.ca/irp/). The nature of the topic of forest fires is broad in scope and interdisciplinary by nature, so educators can use this FireEd package to captivate a student's attention and meet the learning objectives of a wide variety of disciplines.

LESSON ICONS

The following icons will help you quickly and easily determine the lesson objectives for each FireEd lesson.



Predict



Examine



Explore



Connect



Define



Knowledge



Organize



Critical Thinking



Create



Research

LESSON PLANS

The following lessons have been created by wildland firefighters and educators Justin Mulcahy and Sandra Ulmer of FORED B.C. Please adapt the lessons to suit your class, special needs and/or subject area. All necessary background information is contained in this package. An evaluation rubric is provided for you to assist in organizing your assessment. We also offer special needs adaptation strategies at our website <http://www.landscapesmag.com/teachers/lessonplans/Classroom%20Adaptations%20for%20Students%20with%20Special%20Needs.pdf>

We hope you enjoy exploring the fascinating topic of wildfire with your class!



LESSON 1

FOREST FIRE PREVENTION: PUBLIC AWARENESS

LESSON SUMMARY

Students will use their understanding of forest fires and their impact on our world to create a **public awareness campaign action plan**. Students will use their preferred medium and demonstrate **planning skills** to develop their own prevention campaign and action plan to **educate and inspire** the general public about **fire prevention** in their region of the province.

CURRICULUM CONNECTIONS

Grade 8-10, Applications of Social Sciences

- plan and implement a course of action that addresses the problem, issue, or inquiry initially identified
- plan, revise, and deliver formal presentations that integrate a variety of media
- demonstrate leadership by planning, implementing, and assessing a variety of strategies to address the problem, issue, or inquiry initially identified

LESSON OBJECTIVES



The students will draw connections between the effects of forest fires and the need to reduce preventable forest fires.



The students will use planning and organizational strategies to communicate their message effectively.

LESSON TIME

2-3 80 minute periods

MATERIALS

- Smokey the Bear's Public Awareness Campaign examples (p. 64)
- Evaluation rubric (see appendix)
- Poster paper and suitable art supplies
- Access to computer lab (optional)

EVALUATION

Students will be provided with the criteria used to evaluate them on their performance in this lesson and the product they create. A local fire official may be available to help with your assessment. Call toll-free **(604) 660-2421** (Lower Mainland) or **800 663-7867** (outside the Lower Mainland) to get in touch with the Ministry of Forests Protection Branch for further information or volunteers who could visit your classroom.

PUBLIC AWARENESS CAMPAIGN EVALUATION CRITERIA:

Students will receive a mark (1-4) based on their performance in the following areas:

- The student's awareness campaign design demonstrates care and effort.
- The student's awareness campaign is an effective public awareness tool and contains the B.C. MoF wildfire reporting number **1 800 663-5555** or ***5555** from a cellphone.
- The student's action plan is thoughtful and effective.
- The student's action plan is carefully drafted and well presented.

BACKGROUND INFORMATION

British Columbia has an average of 2,000 fires per year, about half of which are caused by lightning and the other half caused by people.

Forest fires caused by people include abandoned campfires, smoking, industry, logging, railroads, brush or range burns, construction, recreationalists, and arson.

In an attempt to reduce the number of fires caused by people, the B.C. Forest Service has an extensive fire prevention program which targets the general public, the forest industry, communities, property owners and other stakeholders.

The program includes: **FIRE AWARENESS**

- radio advertisements
- newspaper advertisements
- highway signs
- Smokey the Bear program
- pamphlets/brochures
- posters
- **1-888-3-FOREST** fire information line, with pre-recorded updates on wildfire locations, smoke advisories, wildfire hazards and campfire restrictions.



This summer could be a scorcher.

Protect our Forests.

Our forests are a tremendous source of pride for all British Columbians. Tourists and residents alike marvel at their grandeur. Working families, forest communities and our parklands rely on our forests. Yet every year, an average of 2,000 forest fires put it all at risk.

People cause about half of all forest fires, endangering lives, threatening property and affecting tourism.

Protect yourselves and our forests.

Campfire Safety
Runaway campfires are a leading cause of unwanted forest fires in B.C. costing millions of dollars to fight each year. Before you start a campfire, consider these tips:

- Ensure there are no campfire restrictions in place.
- Ensure having a campfire is, and will continue to be, safe.
- Take reasonable precautions to ensure the fire is contained.
- Be equipped with sufficient firefighting tools.
- Never leave a fire unattended.
- Report the fire if it spreads beyond the burn area.
- Extinguish the fire before leaving the area.

For more information on how you can prevent forest fires, visit www.gov.bc.ca



Recent B.C. wildfire prevention advertisement campaign

Locate this on the internet at:

<http://www.for.gov.bc.ca/protect/prevention/PreventWildfire.pdf>

WHAT ABOUT SMOKEY THE BEAR?



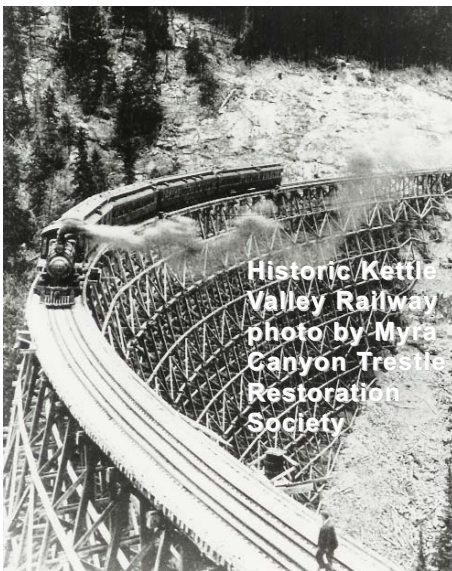
Interestingly, the Smokey Bear campaign began as a result of World War II. With many able-bodied men overseas fighting in the war, the remaining American public began to worry about the security of their national forests under the threat of forest fires. Many believed that the enemy would use incendiary shells to ignite the timber of the Pacific Northwest. In an attempt to encourage vigilance, the first Smokey Bear advertisement was produced in 1944. His popularity grew extensively. You can trace the evolution of the Smokey Bear campaign and learn more about his history through the web link www.smokeybear.com and in the FireEd appendix.

ACTIVITY SUMMARY

Students will create their own fire prevention campaign plan meant to instill care and concern in the citizens of British Columbia for the protection of our forests from wildfires.

In addition, students will design an “action plan,” in which they develop unique and engaging ways to publicize their campaign to generate interest in wildfire prevention. Suggestions include using posters, radio broadcasts, television spotlights, musical pieces, plays, highway signs (small versions), hip hop songs and raps, pamphlets and brochures as creative approaches.

- 1.** Brainstorm examples of things that are precious within B.C.'s forests (consider wildlife, natural resources, atmosphere, aboriginal sacred areas (i.e. totems of Haida Gwaii) and man-made structures such as people's homes and the Kettle Valley railway). Discuss the negative impacts of forest fires on our society and have students generate a list of reasons why forest fire prevention is important.
- 2.** Ask the students what kind of public awareness campaigns they have noticed within our province. Have they heard any public broadcasts, seen signs, or television advertisements? Provide students with an opportunity to view some examples of previous public campaigns attempting to draw attention to, or prevent, wildfires. See examples on Page 64 or search the Internet for others.
- 3.** Explain to students that they are to create an awareness campaign plan of their own. Outline the project criteria (see Page 8) and allow the students to ask questions and give suggestions. Try a pair-share brainstorming activity, where students are paired up and discuss their plans before beginning.



EXTENSION

Hold a school-wide contest for the best fire awareness poster. Choose a small panel of judges, which include students and staff. Consider inviting a B.C. Ministry of Forests official judge from your local protection branch (see contact numbers in Appendix). Have your students advertise the contest around the school, posting details, deadlines and prizes. If you live in an area that has a high risk of forest fires, ask local businesses to post your school's posters in their windows. Community involvement helps students realize they can make a difference!

REPORTING WILDFIRES

LESSON SUMMARY

In role-playing scenarios, students will demonstrate critical thinking and problem-solving skills in relation to the task of reporting a wildfire. Using relevant terminology and following specific protocols, the students will use their growing knowledge of the important factors which influence forest fires to report wildfires.

CURRICULUM CONNECTIONS

Grade 8 - Applications of Science and Social Sciences

- use information and conclusions as a basis for further comparisons, investigations or analyses
- critique information presented in a variety of media
- analyze the costs and benefits of making alternative choices that impact on a global problem
- gather and organize a body of information from primary and secondary print and non-print sources, including electronic sources

Grade 9 – Applications of Science and Social Sciences

- plan, implement, and assess a course of action that addresses the problem, issue, or inquiry initially identified

Grade 10 – Applications of Science and Social Sciences

- analyze costs and benefits of alternatives in resolving socio-scientific issues

LESSON OBJECTIVES



Students will predict the fire behaviour and effects of a wildland fire based on its initial report.



The students will use critical thinking skills to make clear, rational and effective decisions based on the information they have been given and their prior knowledge.



The students will gather and organize the information given to them and prioritize the necessary details and note important elements of the fire report.



The students will gain new knowledge in the area of wildfire reporting. They will apply this knowledge in their role-playing as a wildfire dispatcher.

LESSON TIME

80 minutes

EVALUATION

Students will be evaluated on their ability to accurately and effectively gather and organize relevant forest fire scenario details and generate suitable reports (both oral and written) based on the information given. The evaluation rubric for this lesson will be used to evaluate student performance.

MATERIALS

- Evaluation rubric (in appendix)
- "How and What to Report?" sheet p.13
- Fire scenario sheets p.15 -17
- Wildfire report sheets p.18

BACKGROUND INFORMATION

In British Columbia....

British Columbia has over 95 million hectares of forests, or approximately one million square kilometres. There can be over 2,500 forest fires throughout the province in an average year. Lightning accounts for approximately half of these fires and the other half is due to human activities.

The Forest Service has many ways to locate and detect fires, including lightning locators, satellites, air patrols and lookout towers, but nearly one third of all fires are detected and reported by the general public.

Every fire season in British Columbia the toll-free number for reporting forest fires (**1-800-663-5555** or ***5555** on most cellular networks) is displayed on road signs, on Ministry of Forests trucks and throughout the media. Wildfire reports to this number have resulted in immeasurable savings in property damage, forest resources and fire suppression dollars.

Source: B.C. Ministry of Forests

Provincial Lightning Locators...

Approximately 50% of all forest fires in B.C. are caused by lightning*. Using satellite imagery, radar and ground reports, the Canadian Lightning Detection Network, provided by Environment Canada, consists of a network of lightning locators that provide complete coverage of the province. **This network can detect more than 90% of all lightning strikes occurring in B.C.** To collect the data, the lightning locators continuously detect and record all cloud-to-ground lightning strikes as they occur within or near British Columbia. Lightning data is triangulated and the approximate location of the lightning strike is determined. After triangulation, the data is sent to a large main-frame computer. All of this takes about 60 milliseconds. The information is then sent to the B.C. Forest Service's Protection Branch.

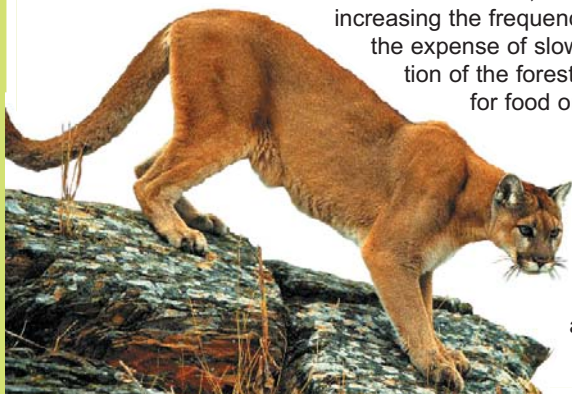


* Some summers are exceptionally bad for human-caused fires, while other summers have more lightning strikes resulting in fires – 50% is therefore an average figure over time.

Source: B.C. Ministry of Forests

A Fine Balance...

The impact of fires on the forest depends on the scale (the area burnt), **frequency, distribution** (or patchiness), **intensity** and **seasonality** (the season in which fires occur) of the fires. These elements combine to produce what is known as a fire regime. A change in any one of these elements, or the balance between them, will impact a forest's structure and species composition. For example, increasing the frequency of fires often favours plant species which can quickly regenerate at the expense of slower growing species, thus gradually changing the species composition of the forest and in-turn affecting the animal species which rely on certain plants for food or shelter.



Conversely, decreasing the frequency of fires can result in loss of species that rely on fire to regenerate. Decreasing the frequency of fires also often results in the build-up of more fuel in the forest and thus eventually results in more severe fires, which are more difficult to control and can have serious, negative impacts on fire-sensitive plant and animal species as well as being a threat to human life and property.

HOW & WHAT TO REPORT?

What will happen if you see a fire that appears to be unattended and you wish to report it? The more information you have and the better you can answer the following types of questions, the easier it is for the Fire Centres and fire crews to locate and “action” the fire or put it out.

1. An agent at the Provincial Forest Fire Reporting Centre (PFFRC) at Protection headquarters in Victoria will answer your call.
2. The agent will ask for your phone number, and enter it into an Initial Phone Report form that is part of the computerized Dispatch System. The telephone exchange plots crosshairs on a map of the province and moves to the caller's location. This automatically tells the agent which of the six Fire Centres will take responsibility for fire response:



- **Coastal**
(including Vancouver Island, the Lower Mainland, and Central Coast Regions)
- **Kamloops**
(including the Kamloops, Okanagan, and Merritt Regions)
- **Southeast**
(including Kootenay, Boundary, and Columbia Regions)
- **Prince George**
(including the areas North and East of Prince George)
- **Cariboo**
(including Williams Lake, the Cariboo, and Chilcotin Regions)
- **Northwest**
(including Smithers, Terrace, and locations further north)

3. The agent will take your name and ask if you're able to stay near your phone for the next 20 minutes in case the Fire Centre requires more information.
4. You will then be asked the exact location of the fire. If possible use geographic place names (creeks, mountains, etc). This help to plot the fire on a specialized electronic map. If you're unfamiliar with the area, compass references (north, south, east and west) when describing which way you are looking or traveling are useful. Your description of the location should include how the fire might be accessed. This is especially important if there does not appear to be any roads near the fire, and if helicopters are needed to drop crews nearby.
5. The agent now gathers details about the fire and its behaviour:
 - **Fuel:** What is the fire burning: trees, grass, brush, other, unknown, etc?
 - **Fire Size:** How big is the fire: the size of a campfire, a house, a football field, unknown, etc?
 - **Fire Spread:** How fast is the fire spreading: fast, slow, or unknown?
 - **Is anyone fighting the fire?** Neighbours, passersby, fire department, forest industry personnel, etc.
 - **Smoke:** What colour is the smoke: black, grey, white, brown, blue, or unknown? (colour indicates fire intensity and fuel type and moisture content)
 - **Is the smoke going straight up?** Are any values or lives threatened? I.e. Homes, buildings, parks, heritage or sacred aboriginal sites, campgrounds, structures, industrial sites with hazardous chemicals, etc. This information is very important for fire suppression authorities to decide what personnel and equipment will be dispatched to the fire. Only a few minutes pass from the time the Initial Fire Report is completed until crews are dispatched to the fire.



ACTIVITY SUMMARY

1. As a class, brainstorm a list of possible ways that fires get reported:

- general public reports
- aircraft patrols
- lookout towers in remote areas of forest
- lightening locators

2. Hand out the “How and What to Report?” sheet (p.13) to each student and have the students review the information independently, in partners or small groups.**3.** Provide students with the following possible choices for the type of resources that can be dispatched to their scenario forest fires:**FIRE RESOURCES:**

- A Fire Warden (single person in truck equipped with a radio, shovel and other basic firefighting tools)
- An Initial Attack Crew (a 3-person crew, capable of accessing a fire by truck or helicopter; equipped with hand tools, a small water pump and a chainsaw, capable of 24 hours of fire suppression without assistance)
- A Unit Crew (a 20-person, extended attack crew, capable of accessing a fire by truck and/or helicopter; equipped with large water pumps and able to access remote water sources to supply suppression effort, multiple chainsaws, capable of 72 hours of suppression without assistance)
- An Air Tanker (a fixed-wing aircraft capable of dropping either water or fire retardant in a “one-strike concept” to help contain a fire for a limited time or reduce the intensity of fires to support ground troops).

It should be noted here that while exact figures are not available, the monetary cost of each resource type is vastly different and should be considered by students when making their decisions.

4. Pair students to practice role-playing Scenarios #1 and #2, in which they observe and report a wildfire to B.C. Forest Service personnel. Students will take turns playing the roles of general public and Provincial Forest Fire Reporting Centre (PFFRC) agent. In order to instill a sense of urgency and realism to the exercise, have one student read the scenario to the student who will ultimately “report” the fire. That student should take notes, writing the important details, ignoring irrelevant facts, and organizing the information for their phone report. Once ready, have the first student pretend to be the PFFRC agent, while the other phones in the report. Following the report, the PFFRC agent must make a recommendation for what type of resource (from the list above) to dispatch to the fire.**5.** Once both students in each partnership have had an opportunity to play the role of both general public and PFFRC agent, the entire class will be given the opportunity to complete one final report (for evaluation) in which they read the scenario (Scenario #3) independently and write out their own fire report. Remind students to be concise and accurate in their written report and send the most appropriate resources to the fire, based on the information given.

EXTENSION

For other lesson ideas, visit the B.C. Forest Service’s Protection Branch:

www.for.gov.bc.ca/protect/index.htm

WILDFIRE SCENARIO #1

You are visiting your relatives who live in Squamish. It's a Saturday morning at 9:45 a.m. and you are driving to a lake near your relatives' home to go hiking for the day. You've never been to this lake before and are excited to see it for the first time. You and your relatives decided to leave for the lake quite early today because the weather forecast indicated it would be a very hot day. In fact, it's already 23 degrees outside so you're driving with the windows down. You've got your arm stretched out the window to feel the air rush against your hand. As you drive along you notice that the uppermost tree branches along the roadside are also experiencing a rush of air. Today is quite windy and the branches are bending and swaying in the wind.

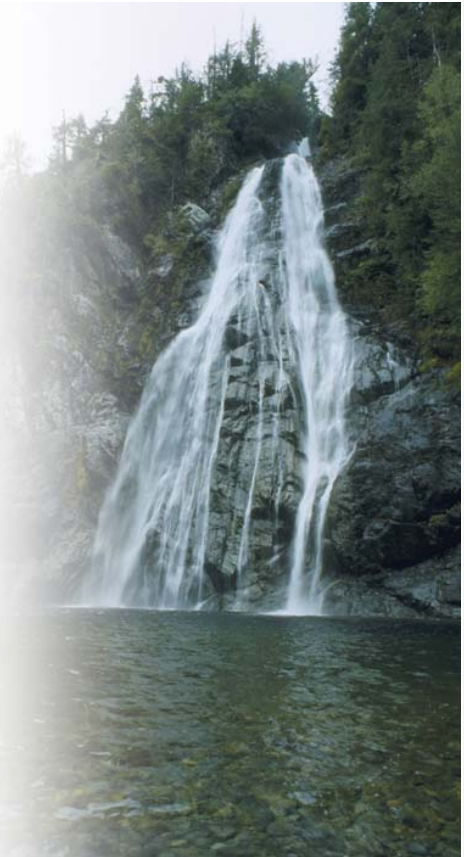
You pass a large sign which reads, "Welcome to Crystal Creek Park". The park's entrance is 10 km North of Squamish along Highway #99. During this drive you have been passing between some very steep mountains. These mountains are beautiful and the old-growth timber in this area is also incredible. A relative remarks that you'll be going over the Crystal Creek bridge soon and that the creek is still very deep despite the unusually dry summer they've had so far in this area of the province.

As you drive around the next corner you are amazed to see a large wildfire ahead of you at the base of the mountain just off the highway. You pull over in the car and watch it for a minute, awestruck at how quickly it is growing. The wind seems to be fanning the flames as the fire consumes the massive old trees all around it. It seems to be advancing up the mountain at an incredible rate. The wind is blowing the flames and bright orange embers up the mountain, sparking new fires everywhere. The smoke from the fire is thick and black at the base, sending a huge grey mushroom cloud very high up into the sky.

Right now the fire is bigger than a football field, and it is growing very quickly. Up ahead you can see that three cars have already pulled over but no one has gotten out. Everyone appears to be entranced by the sight of the fire. Your relative remarks that he hopes the park's picnic area and camping sites won't be burnt over – they are right in the path of the fire.

Thinking back to a lesson you had in school, you reach into your pocket and pull out your cell phone. You remember the emergency wildfire reporting number and make the call: **1-800-663-5555**

How will you report this fire?



WILDFIRE SCENARIO #2

You are visiting your relatives who live in Kelowna. Your uncle really wanted to take you fishing to his favourite little fishing spot outside of Kelowna. It seems like such a hassle to go, but you decide to make your uncle happy. Early one summer morning, the two of you pack up the car and drive East along Highway #33 for what seems like forever.

Once you get to the Big White Ski Resort sign you park the car and begin hiking (your uncle insists that this fishing spot is worth it!). The hike is pretty easy because you simply walk south under the power lines and the path is quite clear and open. It isn't very difficult terrain; only moderate slope with easy rolling hills but there is no way the car would have made it.

About 1 hour into the hike, your uncle looks up and says, "Well, good thing we packed the rain gear." He is right because the sky has noticeably darkened and the air feels funny. You realize that it is going to rain. In the distance, a huge, towering thundercloud has developed and that's when you hear the first rumbling of thunder.

Another 30 minutes of hiking and the two of you decide to take a break. You sit down under a tall Ponderosa Pine tree (which are the most plentiful in this part of the hills) and watch flashes of lightning in the distance. Suddenly, you feel the hairs on the back of your neck stand up as a bolt of lightning strikes a tree only 500 metres away from you. The tree it hit explodes in flames while pieces of burning bark and branches fly everywhere.

For a minute, you are frozen with fear and wonder. The tree continues to smoke and smolder. You can see open flames from where you are sitting. Ensuring the lightning has moved away from your location, you and your uncle hesitantly approach the fire. Only about the size of a tennis court, it is mostly grass and pine needles that are burning and it isn't spreading very fast. In fact, the rain is beginning to come down now and the fire is only crawling along the ground. The smoke is pretty low to the ground and light in colour, but it is still hard to breathe. You and your uncle decide to get out of the smoke, try and get cell reception and observe the fire from a safe distance.

Thinking back to a lesson you had in school, you remember the emergency wildfire reporting number: **1-800-663-5555**

How will you report this fire?



WILDFIRE SCENARIO #3

You and a few of your best friends are away on a camping trip near Cranbrook. You left your place at noon and it only took you 15 minutes to drive up an old logging road to the east of town before you found this great spot. Once there, you decide to set your tents up beside the beautiful lake you've found, then you spend some time gathering wood to make a campfire. Before you left on your trip, you first checked with your local Ministry of Forests office to ensure no campfire bans were in effect. The wood is easy to collect, as it seems that everywhere you look there are plenty of broken branches and dry sticks for your fire. About 100 metres away from your site, towards town, you can see and hear another group of campers who have obviously been drinking and have built a huge fire. You decide to keep your eye on them.

You and your friends are enjoying some hot dogs and marshmallows when you hear screaming and yelling. You look over and see that the other campers' fire has jumped from their fire pit. It's spreading across the ground fast, fanned by the gusty afternoon winds. You watch as the other campers try to stomp it out and dump bottles of water on it. As the fire climbs up into the crown of the trees, they realize it's too late and they take off running towards their Ford Explorer. You can just barely read the numbers on their license plate.

Your group decides it's best to quickly break camp and then drive back into cell range to call the Ministry of Forests to report the fire. It takes you only 10 minutes to put away your tent and extinguish your own campfire. To your amazement you can see the forest fire has already made it halfway back towards town! It must be spreading faster than running speed and you can hear its incredible roar. You can already see rabbits and deer fleeing towards the nearby lake area.

The smoke plume is huge, with billowing white smoke at the top and dark black at the bottom. The wind seems to be driving the fire towards the outlying homes and you realize the severity of the situation. People and property are in the way of this fire's path. There is a beautiful old farmhouse with horses and sheep in the way, plus that expensive new bed and breakfast that was just built and the old mining museum. As the fire makes its way towards Cranbrook, you are just thankful that the logging road you drove in on isn't blocked by fire.

Quickly you gather your friends into the vehicle and head back towards cell coverage. As you drive out, you can see the fire skipping from treetop to treetop, devouring everything in its path.

Thinking back to a lesson you had in school, you remember the emergency wildfire reporting number: **1-800-663-5555.**

How will you report this fire?



WILDLIFE REPORT SHEET

PFFRC agent creating this report: _____

Name of person reporting fire: _____

Time of report: _____

Location: (including which fire centre will take responsibility for this fire?)

Fire size: _____

Fire behaviour: _____

Values at risk: _____

Other relevant details: _____

RECOMMENDATION for resources to immediately dispatch:

A MATCHSTICK FOREST

LESSON SUMMARY

Following specific procedures and safety protocols and using critical thinking skills, students will participate in, and reflect upon, an experiment in which they create a forest fire simulation model. Students will demonstrate and describe the effect of topography, weather and fuel spacing on forest fires and their rate of spread.

CURRICULUM CONNECTIONS

Grade 8 - Applications of Science

- use models to demonstrate how systems operate

Grade 9 - Life Science (Global Ecosystems)

- evaluate how major natural events and human activity can affect local and global environments

Grade 10 - Applications of Science

- analyse data and conclusions (that may be subject to bias)

LESSON OBJECTIVES



Students will explore the effects of varying conditions on a model forest fire, making observations and gaining new insight.



Students will make predictions about the effects of varying spacing, slope and wind conditions on the rate of spread of their model fires.



Students will make connections between their own model forest fires and the actual conditions and adversities faced by B.C.'s wildland firefighters working on real fires.

LESSON TIME

80 minutes (plus additional time to complete written work if required)

EVALUATION

Students will self-evaluate their participation in the experiment. The information collection sheet (Page 24) will be evaluated using the attached rubric (Page 25 and 26).

BACKGROUND INFORMATION

Fuel, topography and weather are the three main factors which influence the behaviour of forest fires. Understanding and predicting how these factors will affect a fire is a critical job for firefighters as they seek to suppress a fire and stay out of harm's way.

Rate of Spread (ROS) refers to the speed with which fire can move across the landscape. It is an important term for firefighters, who need to be aware of the potential threat of a fire moving toward human and/or natural resources. Knowing how to predict the ROS based on the fuel, weather and topography of a fire is critical to firefighters' safety and tactical success.

MATERIALS

- Data Collection Sheet p.24
- Evaluation rubric
- Student self-evaluation sheet
- 150 wooden matches per group of 4 or 5 students
- Plasticine (one fist-sized ball per group)
- Firm cardboard sheets (1 per group – approximately 30 cm by 30cm)
- Wooden blocks or sticks
- Paper fans (one per group)
- 50 matches, one cardboard sheet and enough plasticine for one "control" model
- Access to water hoses or one filled water bucket per group

This experiment involves students using open flame; please ensure that safety issues and protocols are carefully discussed prior to the start of this lesson.

HOW A FIRE BURNS

When enough **heat** and **oxygen** is applied to **fuel**, fire can result. These three components are commonly referred to as the fire triangle.

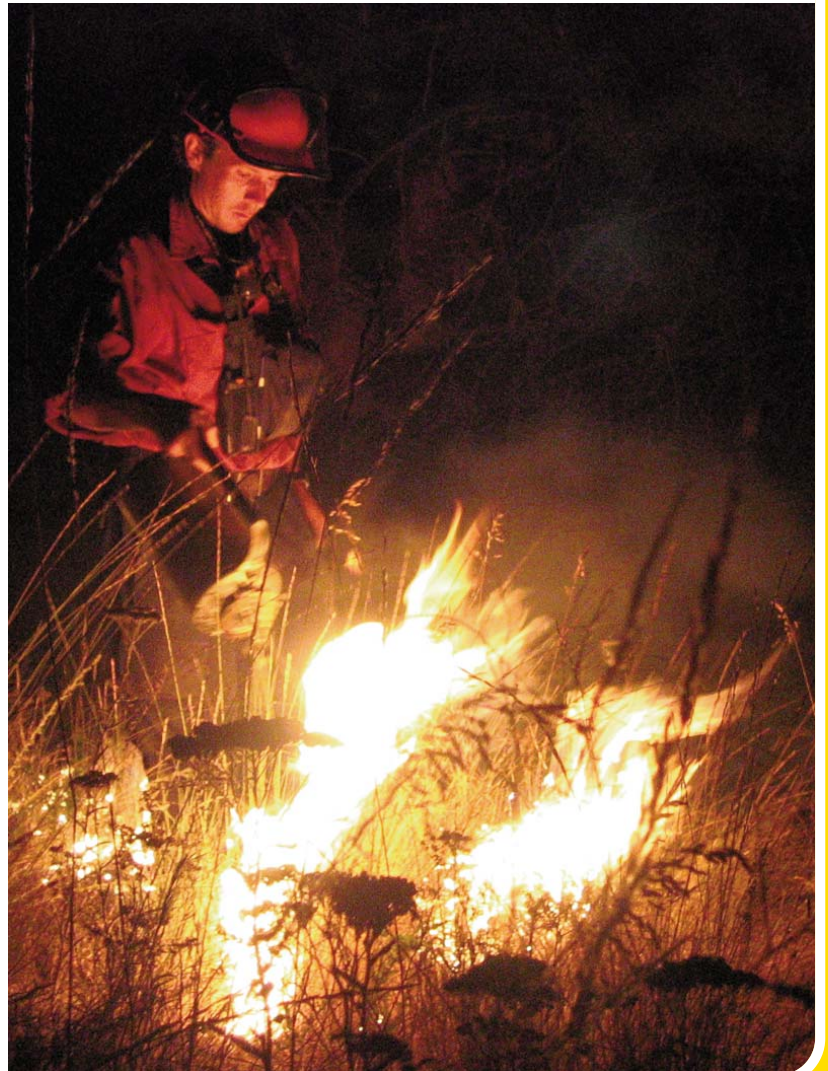


PHOTO BY TIM SHUFF

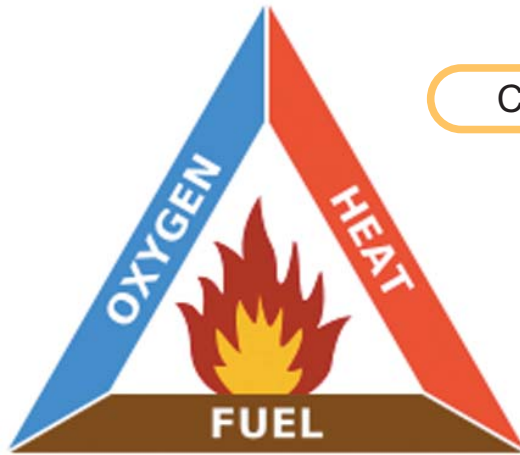


Figure 1

COMPONENTS OF FIRE

The Fire Triangle

$$\text{Heat} + \text{Oxygen} + \text{Fuel} = \text{Fire}$$

If one of these is missing, ignition or combustion will not occur. Variations in balance among heat, oxygen and fuel governs the violence of the fire and will indicate to the wildland firefighter whether the fire will smolder, spread slowly, or flame-up with a rapid rate of spread.

The primary influences on fire behaviour are fuel, weather and topography.

Fuels

Light, small or fast-burning fuels

Dry grass, dead leaves and tree needles, brush and small trees; light fuels ignite quickly and cause rapid spread of fire. They serve as kindling for heavier fuels and burn out faster.

Heavy, large, or slow-burning fuels

Logs, stumps, branch wood and deep duff (the topsoil or partly-decayed leaves and tree needles found under dense stands of brush or trees); these heavy fuels take longer to ignite, spread slower, burn longer and throw off large volumes of heat when dry.

Snags

The term snag refers to a standing dead tree. Because of the abnormally high percentage of forest fires that start in snags, they must be placed in their own category. Snags are drier and always ready for ignition.

Fuel Spacing

Fuel spacing describes the distribution of fuels in a given area. Fuel continuity is an important factor in the behaviour of fire because it indicates how quickly and why a fire may spread. For simplicity in determining fire behaviour, two broad classifications of fuel spacing will be discussed: horizontal and vertical. Horizontal spacing is the spacing of the fuel as it lies on the ground. When fuels are close together, the fire will spread faster. When fuels are closely spaced vertically, fire will spread rapidly up towards the tops of trees as the fuels (branches) are pre-heated prior to ignition.

Quantity

As the amount of flammable material in a given area increases, the amount of heat produced by the fire also increases. The hottest fires, as well as those most difficult to control, occur in areas containing the greatest quantity of fuel.

Weather

One of the most important factors affecting the behaviour of a fire is weather. The three most important components of weather are wind, temperature and humidity.



Wind

The stronger the wind is, the faster the spread of the fire. Wind brings an additional supply of air to the fire. It flattens the flame which pre-heats the fuel ahead and causes spot fires by blowing sparks and embers ahead of the main fire into a new source of fuel. Winds generally blow upslope at 5 to 10 miles per hour during the day because sun-warmed air rises. At night, they reverse and blow downslope because cooler night air sinks. The wind at night is not usually as strong as the wind during the day. When you are planning a fire attack, the direction of canyon and slope winds should be carefully considered. Air currents flow up a canyon and slope during the day and down during the night.

Temperature

Fuels pre-heated by the sun burn more rapidly than cold fuels. The temperature of the ground also affects the movement of air currents, as explained previously. High temperatures also reduce the endurance and efficiency of the firefighters.

Humidity

Moisture in the form of water vapour is always present in the air. The measurement of that moisture is called humidity and is always expressed as a percentage. Warm air absorbs more moisture and produces a lower humidity. As air cools, the humidity increases. The amount of moisture in the air affects the moisture in the fuel. Air is usually drier during the day than at night. Fires, then burn more slowly at night, under normal circumstances, because the fuels absorb moisture from the damp night air. This partially explains why a fire burns out of control in the afternoon and yet may be controlled by the same crew at night. Every effort should be made to control a fire before burning conditions build up the next day. In British Columbia, the goal of all firefighters is to control or extinguish any fire by 10:00 a.m. of the following day.

Topography

The 'lay of the land' is called topography. This is an important factor in the rate and direction of fire spread and is usually broken into three categories: slope, aspect, and terrain.

Slope

Slope is the steepness of the land and has the greatest influence on fire behaviour. The steepness of the slope affects both the rate and direction of the fire spread. Fires usually move faster uphill than downhill and the steeper the slope, the faster the fire will move.

Aspect

Aspect is the direction the land faces - north, south, east or west. Firefighters are often highly concerned with south-facing aspects because these receive more direct heat from the sun, producing drier fuels, higher temperatures, lower humidity and stronger upslope winds.

Terrain

Terrain or special land features may control wind flow in a relatively large area. Wind flows, like water in a stream, and will follow the path of least resistance across the terrain.

ACTIVITY SUMMARY

1. Initiate a class discussion on the importance of the factors affecting forest fire behaviour: fuel, topography and weather. Include discussion of Rate of Spread (ROS) and have students share their thoughts on how ROS affects a firefighter's ability to suppress a fire.
2. Using the teacher model board, the students will observe the fire behaviour in the "control" experiment. The teacher's board will be made using standard spacing of approximately 3 cm between each matchstick (simulating a well-spaced forest). The teacher's demonstration "control" model will be set alight without the influence of any slope or wind affects.

See diagram for example:



3. Students complete the section "**BEFORE COMPLETING THE EXPERIMENT**" of their data collection sheet (p.24) prior to beginning any part of their own experiment.
4. Students are divided up into small groups and materials are handed out.
5. Student groups will work outside with extinguishing resources at hand to complete the experiment. Together, each group will create their model forests three times: first with slope, then with tight spacing, and finally, with wind influence.

See the following description of each scenario to inform the students of how to create each of their three variables.

- **Increased Slope** – students will use wooden blocks to prop one end of their matchstick model forest up so that the board is tilted at approximately a 45 degree angle. The fire should be lit from the bottom of the slope to achieve best results.
- **Tight Spacing** – to simulate a forest which has very dense timber and tightly spaced fuels, the students will create their matchstick forest by placing the matches approximately 1cm apart.
- **Wind Influence** – to simulate the affects of significant wind influences on forest fires, the students will use a simple paper fan to fan the flames of their model.

6. Groups of students will complete their experiments accordingly, altering the conditions of their simulated forest fire each of the three times they re-light their fires.
7. Students help to clean up the materials and fully extinguish their fires before proceeding to complete the data collection sheet section "**AFTER COMPLETING THE EXPERIMENT**".
8. Students fill out the self-evaluation portion of the evaluation form contained in this lesson.

EXTENSION

Now that students have had an opportunity to explore the effects of slope, spacing and wind on the rate of spread of a forest fire, try taking your class out into a forested area or park to further explore these topics and to analyze their influences on forest fires in your own local region.

MATCHSTICK FIRE BEHAVIOUR EXPERIMENT

Data Collection Sheet

BEFORE COMPLETING THE EXPERIMENT:

My group consists of: _____

My observations of the "control" experiment were: _____

Today you will be producing three model forest fires in which different variables will be manipulated. Predict the effect of each of these different conditions below and describe why you believe these effects will occur.

Explain how will the fire be affected when the slope is increased: _____

Explain how will the fire be affected when the "trees" are tightly spaced:

Explain how will the fire be affected under the influence of significant winds:

AFTER COMPLETING THE EXPERIMENT:

Now that you have completed this experiment, describe what you have learned:

NAME: _____

MATCHSTICK FIRE BEHAVIOUR EXPERIMENT

Student Self-Evaluation and Teacher Evaluation Form

Self-Evaluation:

Students, following the matchstick fire behaviour experiment, please fill in the following evaluation chart to assess your own participation in this FireEd lesson. Put a check in the box which best describes your level of achievement.

1 – not at all 2 – minimally 3 – good 4 - exceptional

During the lesson, I listened to the information presented and positively contributed to the class discussion.				
I worked cooperatively and effectively with my fellow group members to complete the experiment.				
My written work was completed thoroughly and accurately to the best of my ability.				

MATCHSTICK FIRE BEHAVIOUR EXPERIMENT

Student Self-Evaluation and Teacher Evaluation Form

Teacher Evaluation:

Teacher, use the rubric below to evaluate each of your students for this FireEd lesson. Each student will receive a score of between 1 – 4 based on their observed participation in the three different elements of this lesson: **1) the discussions**, **2) the experiments**, and **3) the written product they produced**.

1.	2.	3.	4.
Was disruptive or did not participate in the class discussions.	Was reluctant to participate and some of his/her thoughts were unclear or inaccurate during the discussion.	Contributed positively and accurately to the whole class discussion.	Brought great insight to the discussion and demonstrated exceptional enthusiasm for the topic.
Did not demonstrate satisfactory level of participation in group work during the experiment.	Demonstrated minimal level of participation during the experiment.	Participated fully in the experiment and worked well with his/her group.	Actively participated in group work and demonstrated positive leadership skills.
Did not complete written work and/or significant errors were evident throughout the work.	Completed the written work with encouragement or assistance from the teacher and showed some success.	Endeavoured to complete written work independently and did so with a great deal of success.	Independently completed written work with accuracy and ease, demonstrating solid mastery of concepts.



Male and female firefighters alike enjoy a brief break, resting sore feet after climbing a mountain peak.

FIGHTING FIRE WITH FIRE

LESSON SUMMARY

In their effort to understand the methods of forest fire suppression in British Columbia, students will use an internet source to conduct independent research regarding this topic. Students will watch CBC-archived video clips and then answer questions related to what they have learned.

CURRICULUM CONNECTIONS

Grade 8 – Language Arts: Comprehend and Respond

- use a variety of resources to obtain background information
- interpret and report on information obtained from more than one source to inform others

Grade 9 – Language Arts: Comprehend and Respond

- demonstrate an understanding of the main ideas, events, or themes of a variety of novels, stories, poetry, other print material and electronic media

Grade 10 – Language Arts: Comprehend and Respond

- interpret and report on information from more than one source that they have read, heard, or viewed to develop and support positions on a variety of topics

LESSON OBJECTIVES



The students will explore the topic of wildland firefighting through the medium of television.



The students will gather knowledge and information on the topic of firefighting and then use it to answer given questions.



The students will use critical thinking skills to engage in a discussion of the following: “why forest fires are inevitable, how they can be threatening, and how, in some cases, they are essential.”

LESSON TIME

2 lessons (approximately 80 minutes each)

EVALUATION

Student performance will be evaluated using the FireEd rubric (in appendix).



*** NOTE:** The CBC archive’s on-line resource, “Fighting Forest Fires” is an outstanding resource for teachers. Spanning from 1957 to 2002, the CBC archives are able to provide students and teachers with access to 8 video and 8 audio clips which serve to enlighten and educate Canadians on various forest fire-related topics. A special section called “For Teachers” presents excellent lesson plans covering a range of specific topics and for a wide audience of students (K – 12).

Go to archives.cbc.ca and search “fighting forest fires”.

MATERIALS

- Evaluation rubric (in appendix)
- Access to high-speed internet for each pair of students is necessary
- Teachers can download the printable master worksheet from the CBC website:

www.archives.cbc.ca/294p.asp?IDCat=75&IDDos=849&ActProf=540&Nav=AvPr&IDLan=1

ACTIVITY SUMMARY

1. Before Exploring

Conduct a class poll on the following statements:

True or False?

1. Forest fires threaten people, property, and valuable timber in Canada.
2. Forest fires are inevitable.
3. Forest fires are essential.
4. Many people have died in Canada as a result of forest fires.

After tabulating the results of the poll, lead a discussion about why forest fires are inevitable, how they can be threatening, and how, in some cases, they are essential.

2. Outline the Opportunity

Direct students to the topic Fighting Forest Fires on the CBC Radio and Television archives website. Students will explore Clips # 3, 4, and 6, and the Additional Clip “Controlled fires manage the forest” and answer the following questions (also available on the download sheet Fire with Fire):

1. How do forest fires start?
2. What are the three elements necessary to sustain a forest fire?
3. What are five ways in which forest-firefighters control forest fires?
4. How are forest fires sometimes advantageous to some plants and species?
5. How do conservationists incorporate fires into forest management?

3. Revisit and Reflect

Have students assemble in small groups to share and compare their findings. Each group will prepare answers to each of the questions and present its findings to the rest of the class.



EXTENSION

Students can interview local firefighters about forest fire control, using the questions above as a basis for their interview and adding questions of their own. Students can present a transcript of the interview to the rest of the class. To find local forest firefighters in your community, try using the list of contacts provided at the end of this FireEd educational package.

LESSON 5

FIRESAFE YOUR HOME

LESSON SUMMARY

In this lesson, the students will demonstrate their understanding of specific precautions taken to reduce the likelihood of the occurrence of damage caused during a forest fire to a rural home. By creating a site map of their own homes, or using a given model home, students will critique how “fire-safe” their homes are.

CURRICULUM CONNECTIONS

Grade 8 – Applications of Social Sciences

- identify and clarify a problem, an issue, or an inquiry

Grade 8 – Personal Development (Safety and Injury Prevention)

- assess the risks associated with various unsafe situations
- propose strategies to avoid unsafe situations

Grade 9 – Information Technology (Presentation)

- apply the principles of effective communication and good design when using information technology tools

Grade 10 – Planning Process

- describe various approaches to planning

LESSON OBJECTIVES



The students will create a map outlining their property and home location.



The students will examine their own homes and analyze them in terms of their fire safety.



The students will use critical thinking skills to redirect their knowledge of a “fire-smart” home in order to critique their own house (or generic model) for its fire preparedness.

LESSON TIME

1 – 2 class periods (approximately 160 minutes)

MATERIALS

- Evaluation rubric (in appendix)
- 8.5 x 11 white paper or grid paper for making student maps
- Access to a computer per student (optional)
- “Generic home” student handout diagram p.35
- “Interface Fires” student information handout p.31
- “Fire-Smart Your Home” student worksheet p.33

BACKGROUND INFORMATION

Interface Fires (student information handout)

British Columbia is primarily a forested province and wildfires (fires involving flammable vegetation such as trees, brush and grasses) have been a natural and regular occurrence for thousands of years. Many wildfires occur in remote parts of the province, but some occur in areas called the "interface." The wildland-urban interface is any area where structures - residential, industrial, recreational or agricultural - are located adjacent to or among combustible wildland fuels.

WILDLAND-URBAN INTERFACE AREAS

There are many different types of wildland-urban interface areas in the province, including:

- large cities containing forest or grassland areas, i.e. Pacific Spirit Park or Stanley Park in Vancouver or Mission Creek Park in Kelowna
- structures (e.g., homes) situated in lightly-populated agricultural areas
- low-density housing communities or subdivisions located next to or in the forest
- cottages, cabins, and recreational and industrial facilities located in the forest
- small- to medium-sized communities surrounded by vast expanses of forest



WHY ARE B.C. RESIDENTS AT SIGNIFICANT RISK?

Two main factors are contributing to the growth in the interface fire problem in our province. First, years of successful fire suppression by the Ministry of Forests has allowed tree stand density to increase and vegetation to accumulate, increasing the availability of fuels for future fires. Insect and disease infestations, which create standing dead trees, making them more susceptible to fires. Second, the number of people choosing to live in the more rural areas of the

province (attracted by the natural environment and lower property costs) is continuing to rise. More people living near our forests means a greater number of human-caused fires. It also means greater chance of wildfire affecting people. Migration to the countryside is a significant phenomenon on Vancouver Island and the Sunshine Coast and in the Fraser Valley, Cariboo, Prince George, Kootenays and Okanagan-Shuswap regions.

'IT WON'T HAPPEN TO ME'

The B.C. Ministry of Forests estimates that several hundred thousand people live in interface zones and that there are thousands of private and business properties in these areas. The combined value of the properties, improvements and nearby timber easily amounts to several billion dollars. Fire experts say that people even in somewhat isolated locations tend to expect the same level of fire protection service as they received in urban settings. And although many have received information about the risks and solutions, they seem to disregard it - a result, perhaps, of seeing past wildfires successfully contained, and of thinking "it won't happen to me."

AND SO...

Each year there are more than 2,500 forest fires in British Columbia. Although most are far from populated areas, many threaten or actually burn homes, summer cottages and cabins. Forest homesite developments often lack building restrictions, provisions for fire protection, or roads suitable for the movement of heavy firefighting equipment. For these reasons, it is increasingly important that homeowners take it upon themselves to make sure their property is fire-safe.

ACTIVITY SUMMARY

*** NOTE:** This lesson is best suited to those students who live in rural parts of British Columbia where potential exposure of their home to a wildland fire is a genuine possibility. For those students who live in urban areas where wildland fire is not as likely, unless they live close to major urban parks, the lesson below will require slight alterations. When these students are asked to critique their own homes based on its exposure to wildfire, they will use the provided “model home” on p.35 as their own home.

- 1.** Initiate this lesson with a class discussion about interface fires. Students are asked to provide stories or ideas which demonstrate their level of knowledge regarding this phenomenon. Use the background information provided to spark dialogue and encourage your class to discuss their thoughts on those fires and how they affected them.
- 2.** Distribute the handout called “Interface Fires”. Ask students to read and discuss the information within a small group.
- 3.** Equipped with this background knowledge, the students will be asked to create a map of their home and surrounding area. Particular emphasis should be placed on identifying the location of water sources, landscaping near the house, vehicle access and surrounding properties. As an option, teachers may wish to integrate a technology component into this lesson and have the class create their maps using a computer graphics program of their choice.
- 4.** Once their home diagram is complete, students will be given the “Fire-Smart Your Home” handout. Using this tool, the students will evaluate their home with respect to its level of fire safety. (At this point, urban students can use the “generic home” diagram).
- 5.** Class reunites to discuss the process and compare how various individual’s homes scored as fire-safe homes.

FIRESMART YOUR HOME

Student worksheet

How fire-safe is your home? Use the following tips and guidelines to ensure that your home is fire safe. Under each guideline (in bold) give your house a score by circling number 1, 2 or 3, and then write a brief comment about how your home either meets or does not meet the guideline.

1 = does not comply with this guideline

2 = meets this guideline somewhat

3 = fully meets this guideline

Prune trees near the home so that branches near the ground are cut off to a height of 2 metres or more above the ground (to prevent them from becoming ladder fuels).

1 2 3

All combustibles such as firewood, picnic tables, boats, etc., should be 10 metres or more away from the house (avoid down slope locations).

1 2 3

Remove all trees, long grass, shrubs, logs, branches, twigs and needles within 10 metres of the house and thin trees (with 3-4 metres between crowns) for at least 30 metres from the house.

1 2 3

Grass within 10 metres of the building should be mowed and watered.

1 2 3

LESSON 5

Address should be clearly posted at the driveway entrance for quick identification by fire service.

1 2 3

Driveway should be wide enough to accommodate emergency vehicles, and clear of trees to a distance of 3 or 4 metres. Home owners should try to provide an alternate emergency access route to their property.

1 2 3

Pond or tank with emergency water supply is available; residents should know the location of nearby creeks, rivers, lakes and ponds so that firefighters can obtain additional water supply if needed.

1 2 3

Chimney installed to code and complete with spark arrestor screen. All eaves should be enclosed or cleared regularly to avoid the accumulation of flammable materials.

1 2 3

Propane tanks, gasoline and other flammable liquids are located at least 10 m from building.

1 2 3

LESSON 5

Keep fire tools handy such as: ladder long enough to reach the roof, shovel, rake, and bucket for water. A long garden hose should be connected to outside water outlet.

1 2 3

Plan ahead: have a safe escape route for you and your family before wildfire occurs, and make sure everyone knows the plan. Emergency numbers should be posted near the telephone and programmed into your cell phone speed dial.

1 2 3

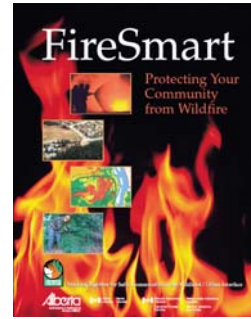
GENERIC HOME DIAGRAM

(Student handout diagram)



EXTENSION

- Students can trade home diagrams with a partner and practice analyzing another home
- Students can write a brief paragraph which relates whether or not their own home is fire-safe
- Students can use the information below to find out more about making homes fire-ready.



For more information on how to make your home fire-safe order a detailed copy of "**FireSmart – Protecting Your Community from Wildfire.**" Copies are available from Partners in Protection, phone (780) 435-7283 or go on-line at www.for.gov.bc.ca/protect/

or from the FORED website:

[http://www.landscapesmag.com/teachers/lessonplans/Fire%20education%20folder/Home owners%20FireSmart%20Manual.pdf](http://www.landscapesmag.com/teachers/lessonplans/Fire%20education%20folder/Home%20owners%20FireSmart%20Manual.pdf)

or go to: <http://www.partnersinprotection.ab.ca/downloads/index.shtml>

Other good websites which provide information about making a fire-safe home:

www.firewise.org/fw_index.htm

www.redcross.org/services/disaster/0,1082,0_594_,00.html

HOME & SITE HAZARD ASSESSMENT

Important Factors	Characteristics of Material	Point Rating	Your Score	
What kind of roofing material do you have?	If you have asphalt shingles, metal, clay tile or ULC rated shakes	0		
	If you have unrated wooden shakes	30		
How clean is your roof?	No needles, leaves or other combustible materials	0		
	A scattering of needles and leaves	2		
	Clogged gutters and extensive leaf litter	3		
What is the exterior of your home built out of?	Non-combustible material stucco, metal siding, brick	0		
	Logs or heavy timbers	1		
	Wood, vinyl siding or wood shakes	6		
Are your eaves and vents closed up and screened?	Closed eaves and vents with 3 mm wire mesh	0		
	Closed eaves and vents with no mesh	1		
	Open eaves, open vents	6		
Have you screened in your balcony, deck or porch?	All decks, balconies and porches are screened or sheathed in with fire resistant material	0		
	All decks, balconies and porches are screened or sheathed with combustible material	2		
	Decks, balconies and porches are not screened or sheathed in	6		
How fire resistant are your windows and doors?	Tempered glass in all doors/windows	0		
	Double pane glass:	• Small/Medium	1	
		• Large	2	
	Single pane glass:	• Small/Medium	2	
• Large		4		
Where is your woodpile located?	More than 10 metres from any building	0		
	Less than 10 metres from any building	6		
Is your home set back from the edge of a slope?	Building is located on the bottom or lower portion of a hill.	0		
	Building located on the mid to upper portion or crest of a hill	6		

HOME & SITE HAZARD ASSESSMENT

Important Factors	Potential Hazards	Point Rating	Your Score
What type of forest surrounds your home, and how far away is it?	Deciduous trees (poplar, birch) within 10 metres of buildings	0	
	Deciduous trees 10 - 30 metres from buildings	0	
	Mixed wood (poplar, birch, spruce or pine) within 10 metres of buildings	30	
	Mixed wood 10 - 30 metres from buildings	10	
	Conifers (spruce, pine or fir) within 10 metres of buildings • separated • continuous	30 30	
	Conifers (spruce, pine or fir) within 10 - 30 metres of buildings • separated • continuous	10 30	
What kind of vegetation grows in the zone around your buildings?	Well-watered lawn or non-combustible landscaping material	0	
	Uncut wild grass or shrubs • within 10 metres of buildings • within 10 - 30 metres of buildings	30 5	
	Dead and down woody material within 10 metres of buildings • scattered • abundant	30 30	
	Dead and down woody material within 10 - 30 metres of buildings • scattered • abundant	5 30	
Are there abundant underbrush and ladder fuels in the surrounding forest?	None within 10 - 30 metres	0	
	Scattered • within 10 - 30 metres of buildings	5	
	Abundant • within 10 - 30 metres of buildings	10	
The Wildfire Hazard Level for your home is:		Total Score	

Low <21 points Moderate 21-29 points High 30-35 points Extreme >35 points

OTHER FIRESMART CONSIDERATIONS

Important Factors	Yes	No
Do you have adequate insurance on your home and property?		
Do you have the necessary fire suppression equipment (shovels, rakes, buckets, hoses, etc.) easily accessible?		
Are your burn barrels screened and at least 10 metres from combustibles and buildings?		
Are overhead powerlines clear of vegetation and at least a tree's height away from nearest forest?		
Are propane tanks clear of vegetation and at least 10 metres from dwellings and other buildings?		
Are emergency fire services within a 10 minute drive from your home?		
Is your chimney safe? Is your chimney clean? Does it have proper clearances and stack heights with proper screens and fire arresters?		
Do you have good access to your property for emergency response vehicles?		
Is the area within 10 metres of your home and other buildings free of trees, flammable vegetation and other combustibles?		
Do you have an adequate municipal or on site water supply in case of fire?		
Does your family have an emergency fire and evacuation plan?		

LESSON 6

TO BURN OR NOT TO BURN?

A CLASSROOM DEBATE

LESSON SUMMARY

Using available background knowledge, students will develop and implement a debate over the topic of “prescribed burning”. **Prescribed burning is defined as fires that are deliberately set by forest professionals in a controlled fashion, in an attempt to reduce the combustible fuels in the forest, thereby preventing a larger, unmanageable fire later.** Students are encouraged to develop logical and well-planned arguments, and to present their side of the issue with conviction and effective evidence.

CURRICULUM CONNECTIONS

Grade 8 – Comprehend and Respond (Critical Analysis)

- identify bias and false reasoning in communications as these relate to their contexts

Grade 9 – Comprehend and Respond (Critical Analysis)

- locate and assess the effectiveness of a variety of persuasive techniques in relation to purpose, audience, and medium

Grade 9 – Communicating Ideas and Information (Presenting and Valuing)

- create a variety of communications designed to persuade, inform, and entertain classroom and other audiences

Grade 10 – Communicating Ideas and Information (Presenting and Valuing)

- create a variety of academic, technical, and personal communications, including debates, research and technical reports, oral and multimedia presentations, poetry, and personal essays

LESSON OBJECTIVES



The students will define their positions in their debate and follow the guidelines of typical debate practices.



The students will research their debate positions, gathering relevant information and locating credible sources.



The students will use their prior knowledge of forest fires to implement an effective debate and make informed responses to their opponents.



The students will organize their information and thoughts to present them in clear and logical fashion during the debate.

LESSON TIME

2 to 4 80-minute class periods (approximately)

EVALUATION

Students will be evaluated based on their research work and their performance in the classroom debate. As well, students will self-evaluate their efforts. Criteria (see below) will be made available to the students prior to beginning the research.

DEBATE PARTICIPATION EVALUATION CRITERIA

Students will receive a mark (1-4) based on their performance in the following areas:

- The student's ability to develop a logical argument based on the background information given.
- The student's willingness to work with and contribute to their group's efforts.
- The student's ability to express his/her side of the argument clearly and effectively.
- The student's ability to follow the outlined debate format protocol.

MATERIALS

- Evaluation rubric (see appendix)
- "To Burn or Not To Burn" information handout p.43
- Basic Debating Format student information sheet p.45
- Computer access for internet research
- Student self-evaluation form p.46

ACTIVITY SUMMARY

- 1.** Divide students into small groups. Randomly assign to each group whether they will argue for the affirmative or the negative side of this debate.
- 2.** Have students review the guidelines for basic debating as outlined in the Basic Debating Format sheet. Students are reminded to use "**logic**", "**pick the important points**" and "**play the ball**".
- 3.** Provide students with time to develop their debates and to further research their topic. Distribute "To Burn or Not To Burn" and have the students access the internet for further research. 2 – 3 class periods should be sufficient.
- 4.** Host the debate. Follow the basic debate format provided and have students self-evaluate their performances in this debate process.
- 5.** Invite professionals involved in prescribed burning from the Ministry of Forests, forest industry or Association of B.C. Forest Professionals into the classroom to help critique performance and research. Contact information can be found in the appendix of this document.



PHOTO BY TIM SHUFF

TO BURN OR NOT TO BURN

INFORMATION HANDOUT

TO BURN

Recent Signs of Trouble

Over recent years, large areas of British Columbia's interior forests have burnt, and along with natural resources, people's homes and livelihoods have been lost. Are these fires burning faster or hotter, spreading more quickly and burning larger areas than in previous years?

In 2003, widespread wildfires in British Columbia created the worst summer fire season in the history of our province. The dire situation forced B.C. Premier Gordon Campbell to issue the first-ever province-wide state of emergency.

“ This is the first time ever that we've had a state of emergency for the entire province and that goes for any kind of emergency, not just fires. This is the worst fire season we've had. ”

— **Steve Bachop**, B.C. Provincial Fire Information Office, August 4, 2003

In today's forests, loggers, trappers and hunters are not the only people found in the forest. Increasing numbers of us live in forested areas. Many more go into forested areas for recreation. How prepared are we to face this new reality?

Our Changing View of Fire in the Forest

Fire has always been an important factor in shaping forest ecosystems. It is clear that our forests evolved under the influence of natural fires. Scientists have pieced together a history of the occurrence of fire in pre-European North America which includes both natural and man-made fires.

We once saw fire as the "enemy of the forest" and a serious threat to effective forest management. To understand where fire is going in the future, we need to understand where fire came from in the past. Around 1920, fire suppression became a widely-used and popular tool to manage forests. However, the lack of fire has caused a massive amount of litter to build up on the forest floor. This has reduced seed germination because certain tree species need bare soil to grow. It has also made it more difficult to disperse seeds, since some trees, the lodgepole pine and white-bark pine included, need fire to open their sealed cones.

As contradictory as it may seem, fires that can devastate forests and communities are nature's way of fixing the problems created by fire suppression by getting rid of excess litter and making the forest healthy again. Proper management policy once identified all fires as bad. Later, ecosystem management practices brought in a modest program of prescribed burns. The result of our efforts was the effective suppression of forest fires - at least until a disturbing trend began to appear sometime around the early 1970's.



PRESCRIBED BURNING

After decades of fire suppression, the natural cycle of low-intensity fires burning through open forest grasslands no longer exists in most ponderosa forests. Natural fires occur as generally frequent, low severity surface fires (those that move along the forest floor leaving large trees intact) allowing the under-story of the forest and

canopy to be kept relatively open. Additionally, low severity fires make forests more resistant to catastrophic crown fires (those that move up to and through the tops of trees) and provided habitat for many species of wildlife who are specially adapted to the southern interior forest's unique conditions.

TO BURN OR NOT TO BURN

INFORMATION HANDOUT

OR NOT TO BURN

Prescribed burns are generally costly and extensive. As well, these controlled and deliberately set fires by professionals are a dangerous process; therefore a series of conditions must be met in order to effectively execute and maintain one.

In places on the West Coast, there are as few as 50 days a year that firefighters can even start a successful prescribed burn. Variables such as humidity, temperature, wind level and smog level play a crucial role in determining if a burn can and will take place within a given time window. Ideal weather conditions include humidity levels between 25 and 50 percent and a temperature of at least 68 degrees Fahrenheit. Burns are most frequent during early to late spring.

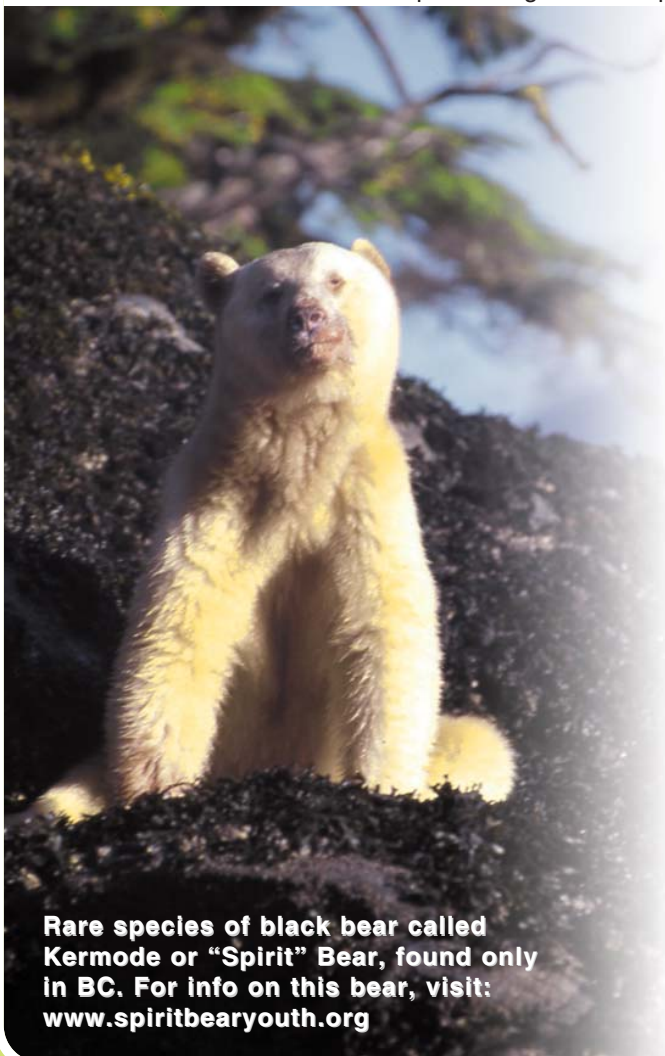
Many difficulties lie in the way of widespread use of prescribed burning to reduce fire hazards. "Cost, for instance, favours fire suppression over burning," says Dr. Stephen J. Pyne of the University of Arizona, a historian of fire and fire policy. Public agencies tend to finance firefighting but not fire-setting. Getting permits from agencies concerned with air-quality control and protection of threatened species can cause damaging delays.

In addition to the calculated deaths of a wide variety of common forest animals – defenseless in the path of a prescribed burn - there is certainly public concern given the inevitability that some individual members of threatened species might die in a prescribed fire.

There is, of course, the problem of safety. Controlled fires rely on the heroism and hard work of dozens of forest service personnel. Firefighters, young men and women, are required to put their lives on the line to prepare for, ignite and suppress these controlled fires. Despite careful planning and diligent training, following all safety precautions, accidents do occur and lives are sometimes at risk.

Though advocates will say that prescribed burning is the best method of forest management to prevent major forest fires, another method of fire prevention, forest thinning, is also available. This mechanical removal of trees not only helps to create a more fire resistant and natural forest, but it also provides financial rewards in that the harvested "thinned" timber can be used to produce wood products and generate revenue.

With many people living in areas that border wildlands, the idea of "prescribed" burning is being heavily resisted throughout many parts of the province. Opponents argue that heavy smoke from fires causes air pollution and health problems, and that the danger of a prescribed fire getting out of control and burning homes is too great.



Rare species of black bear called Kermode or "Spirit" Bear, found only in BC. For info on this bear, visit: www.spiritbearyouth.org

LESSON 6

OUT OF CONTROL

In May 2000, a huge forest fire in New Mexico made national and international news as it burned almost 50,000 acres in and around nuclear weapons production and waste storage facilities. This wildland fire caused immense destruction, destroying 235 homes and causing more than \$1 billion in damage. This destructive wildfire was the result of a prescribed burn which, despite careful planning, raged out of control. It is clear that regardless of how the day of a prescribed burn begins, weather is always unpredictable and the fire can become dangerous in seconds.

SMOKE

Smoke from prescribed burning may be an issue for local neighbours and has the potential to affect urban areas where residents may be more vocal in their opposition to smoke. One aspect of this may be different levels of smoke tolerance by rural and urban populations as well as Native American and non-native populations. Another aspect may be the acceptability of smoke from "natural" fires versus from forestry or agricultural burning. Smoke is a natural product of prescribed burning and poses potential health hazards, physical discomfort and reduced visibility, all of which are unacceptable to many people. Although major efforts are made to coordinate burning with meteorological conditions that favor rapid smoke dispersal, weather conditions do not always develop as expected.

For more information about forest management techniques like prescribed burning, visit:

www.wildernesscommittee.org/campaigns/policy/forest_fires

www.forestfire.nau.edu/prescribed.htm

www.afrc.ws/testimony/DrLewisStatement.shtml

www.idahoforests.org/health2b.htm

www.pc.gc.ca/pn-np/bc/kootenay/natcul/natcul21_E.asp

www.forestnet.com/archives/March_00/forest_management.htm

PHOTO BY TIM SHUFF



BASIC DEBATING

(go to http://www.actdu.org.au/archives/actein_site/basicskills.html for more information)

Because debating is a team event, it is important that the speakers work together as a team. The **TEAM LINE** is the basic statement of "**why the topic is true**" (for the affirmative) and "**why the topic is false**" (for the negative). It should be a short sentence, presented by the first speaker of each team and used by the other two speakers to enforce the idea of teamwork. In debating, each team will present points in favour of their case. They will also spend some time criticizing the arguments presented by the other team. This is called rebuttal. For effective rebuttal, remember:

1. Logic - to say that the other side is wrong is not enough. You have to show why the other side is wrong. This is best done by taking a main point of the other side's argument and showing that it does not make sense. Because a lot of the thinking for this needs to be done quickly, it is one of the most challenging and enjoyable aspects of debating.

2. Pick the important points - try to rebut the most important points of the other side's case. You will find that after a while these are easier and easier to spot. One obvious spot to find them is when the first speaker of the other team outlines briefly what the rest of the team will say. Do not rebut those points until after they have actually been presented by the other team.

3. 'Play the ball' - do not criticize the individual speakers, criticize what they say. To call someone stupid, ugly or a nerd does not make what they say wrong and it will cost you marks.
In a debating team each speaker has specified roles that they should fulfill to play their part in the team as described below:

1st Affirmative must: define the topic, present the affirmative's team line, outline briefly what each speaker in their team will talk about and present the first half of the affirmative case.

1st negative must: accept or reject the definition, present the negative team line, outline briefly what each of the negative speakers will say, rebut a few of the main points of the first affirmative speaker, the 1st negative should spend about one quarter of their time rebutting and present the first half of the negative team's case.

2nd affirmative must: reaffirm the affirmative's team line, rebut the main points presented by the 1st negative, the 2nd affirmative should spend about one third of their time rebutting and present the second half of the affirmative's case.

2nd negative must: reaffirm the negative's team line, rebut some of the main points of the affirmative's case, the 2nd negative should spend about one third of their time rebutting and present the second half of the negative's case.

3rd affirmative must: reaffirm the affirmative's team line, rebut all the remaining points of the negative's case, the 3rd affirmative should spend about two thirds to three quarters of their time rebutting, present a summary of the affirmative's case and round off the debate for the affirmative.

3rd negative must: reaffirm the negative's team line, rebut all the remaining points of the affirmative's case, the 3rd negative should spend about two thirds to three quarters of their time rebutting, present a summary of the negative's case and round off the debate for the negative.

TO BURN OR NOT TO BURN

Student self-evaluation

Name:

Date:

Please grade yourself using the following criteria. Justify your grade in the space provided using specific examples and plausible evidence.

1 = very low 2 = adequate 3 = good job 4 = excellent

1. During the debate preparation sessions with your group, how would you rate your participation in the research and planning? _____

2. How would you evaluate your knowledge of the subject matter? _____

3. During the debate, how would you rate your own performance in terms of clearly presenting your ideas and points to the audience? _____

4. Now that the debate is finished, how would you rate your overall performance in this classroom activity? _____

ADDITIONAL FOREST FIREFIGHTING INFORMATION

SEEING THE FOREST THROUGH THE FLAMES

FOREST FIRES AND ECOSYSTEMS

Fire is a natural, normal process in many ecosystems. It is beneficial and necessary to maintain a healthy forest and the diversity of plant and animal life. Through evolution and exposure to wildfires, many plants and animals have adapted to fire, and, in fact, actually depend on it.

Trees like Western Larch, Douglas Fir and Ponderosa Pine have developed bark so thick that it insulates the living tissue, allowing them to survive surface fires. Fire naturally occurred in stands of these trees every 5 to 20 years and kept the forest floor relatively clean of combustible material. Wildfires can burn with varying intensities across landscapes. In their wake, wildfires can increase biodiversity as they change the composition and density of forests.

Lodgepole pine needs fire, to an extent, to disperse its seeds, even though the trees are usually killed by it. Heat from a fire melts the resinous material that holds the cones' scales together, thereby releasing the seeds for a new forest.

Fires release the nutrients locked up in slowly decaying logs and other organic material. Fires can open up a thickly-treed forest, letting in the sunlight to encourage the growth of shrubs and grasses - forage for wild and domestic animals. Cattle, moose, deer and elk benefit from the grazing area created by fire.

Naturally-occurring fires also help to keep insects and disease in check by killing the pathogens infecting a stand. This is critical when you consider that in recent years more than five times as much timber has been lost to insects and disease than has been consumed by wildfire.

Fire as a natural disturbance is incorporated into the Biodiversity Guidebook, an ecosystem management approach that aims to provide a suitable habitat for all native species. See this weblink for more information:

<http://www.for.gov.bc.ca/tasb/legsregs/fpc/fpcguide/biodiv/biotoc.htm>

In this sense, Natural fires are classified as either:

- **Stand-Initiating events** - significantly alters an ecosystem such that successional processes will form a new plant community with a different structure/composition than its predecessor.
- **Stand-Maintaining events** - fairly frequent occurrences serving to maintain an ecosystem at a particular successional stage.



LIGHTNING BOLTS AND CARELESS FOLKS

FIRESTARTERS

Introduction

All forest fires have a direct cause (an ignition source) – either natural (e.g. lightning) or human. Although the proportion of natural fires compared to human-caused fires varies widely between regions and types of forest, overall the vast majority of forest fires can be attributed to the deliberate or accidental actions of people.

People light forest fires for many reasons. Some fires are started for practical and beneficial reasons, some are accidental, others are deliberately lit to cause damage. All of these fires have the potential to be harmful to the forest ecosystem or human communities, depending on both the condition of the forest at the time and how they are managed once they are burning. Just how harmful a forest fire can be is strongly influenced by the amount and condition of fuel available for the fire (leaf litter, bark, leaves and branches). In most cases, forest management practices help shape these factors.

For example:

For many years United States forest managers allowed the accumulation of large amounts of fuel in mid-western forests by attempting to totally exclude fire – eventually this created conditions for very destructive wildfires that proved impossible to contain.

In some tropical forests conventional logging practices have encouraged harmful dry season fires by leaving large amounts of logging waste and accelerating drying of the forest floor caused by large canopy openings. Reduced-impact logging can minimize the opportunities for this sort of fire.

LIGHTNING SPARKS HISTORICAL STUDY

Natural Causes: Lightning Strikes

Approximately 50% of all forest fires in B.C. are started by lightning strikes. This table shows the number and percentage of people- and lightning-caused fires for each of the past 10 years.

YEAR	# PEOPLE	% PEOPLE	# LIGHTNING	% LIGHTNING	TOTAL
2002	911	51.2%	870	48.8%	1781
2001	787	62.2%	479	37.8%	1266
2000	697	45.3%	842	54.7%	1539
1999	608	50.4%	599	49.6%	1207
1998	910	34.1%	1755	65.9%	2665
1997	487	41.4%	688	58.6%	1175
1996	633	46.6%	725	53.4%	1358
1995	1130	76.7%	344	23.3%	1474
1994	1175	28.7%	2913	71.3%	4088
1993	886	59.2%	611	40.8%	1497
AVERAGE	822.4	45.6%	982.6	54.4%	1805

Source – Ministry of Forests

FOR YOUR SAFETY

PERSONAL LIGHTNING SAFETY TIPS

AVOID: Avoid water. Avoid all metallic objects. Avoid the high ground. Avoid solitary tall trees. Avoid close contact with others.

SEEK: Seek clumps of shrubs or trees of uniform height. Seek ditches, trenches or the low ground. Seek a low, crouching position with feet together with hands on ears to minimize acoustic shock from thunder. If you can, you should seek shelter. If you are in a car, be sure that the windows are rolled up.

KEEP: Keep a high level of safety awareness for thirty minutes after the last observed lightning or thunder.

CARELESS FOLKS

Human carelessness leads to the vast majority of all non-lightning-caused fires. Smoking, abandoned campfires, fireworks, industrial machinery, agricultural and backyard burning are all ways that fires start in British Columbia's natural spaces. Sadly, some of the largest wild fires can be traced back to something as preventable as an unattended campfire.

CAMPFIRES AND THE LAW

What is a campfire?

A campfire, under the Wildfire Act, is a Category 1 open fire which means an open fire that burns pile material no larger than one metre in height and one metre in diameter and includes a campfire that burns such material. A fire for any other purpose or a fire that is larger than one metre by one metre must adhere to the guidelines appropriate for that category of open fire.

When can I have a campfire?

Category 1 open fire is allowed when:

- Category 1 open fires are not prohibited under another enactment
- it is safe, and likely to continue to be safe to have a campfire
- the person takes reasonable precautions to ensure the fire is contained
- the person watches the fire to prevent escape, and the person is equipped with sufficient fire-fighting tools
- the person carries out fire control action if the fire does spread beyond the burn area
- the person ensures the fire is extinguished before leaving the area.

For more information, read "Category 1 Open Fire (Campfires): General Guide to Responsible Burning".

<http://www.for.gov.bc.ca/protect/burning/ResponsibleBurning.htm>

Where can I have a campfire?

Requirements for campfires apply outside of municipal boundaries and within B.C. Parks. Campfire regulations also apply in privately owned campgrounds outside of municipal boundaries. There may be municipal and regional bylaws that restrict campfires. Please check with your local authorities before lighting a fire during the summer.

Do I need a burn registration number in order to have a campfire?

No. A burn registration number is not required for Category 1 open fire.

BEFORE HAVING A CAMPFIRE:

Check to see if a Ministry of Forests campfire ban is currently in effect. Campfire bans apply outside of municipal boundaries and within B.C. Parks. There may be municipal and regional bylaws that restrict campfires. Please check with your local authorities before lighting a fire during the summer. Remember, careless use of campfires is one of the leading causes of forest fires. Campfires (Category 1 open fire) must comply with the requirements of the Wildfire Regulation.

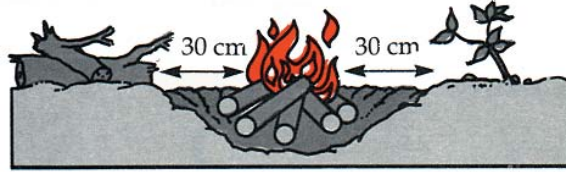
There are times when fires should not be lit. Fires should not be lit or allowed to continue to burn when the:

- wind is strong enough to cause sparks to be carried to other combustible material;

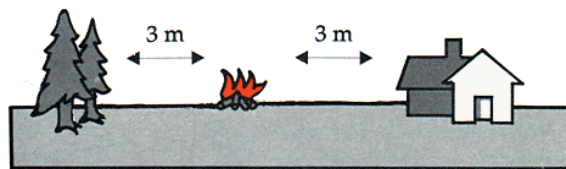
OR

- when a notice banning or restricting the use of campfires is in effect.

When building your campfire:



Select your campsite carefully and with full regard for safety. Prepare your campfire by removing all leaves, twigs and other flammable material from an area extending at least 30 centimetres around the fire. Be sure to scrape or dig down to mineral soil.



Build your campfires at least three metres from any log, stump, snag, standing tree or wooden structure.



Campfires must not exceed one metre in height and one metre in diameter. The best cooking fire is small and hot. Keep a shovel or a pail of water containing at least 8 litres nearby at all times.



Never leave a campfire unattended. Extinguish completely!

Encourage students to use their understanding of human activities in and around forests to answer the question:

Can you think of other human causes of wild fires other than campfires and lightning?

Potential answers...

Backyard Burning
Agricultural Burning
Prescribed Burns (Wildland fires set by Forest Managers)
Careless smoking
Railways (sparks from railway cars)
Industrial Machinery (Chainsaws, skidders sliding across rocks, excavators, road crews etc.)

Car Accidents and Fires
Improper waste disposal/storage (oily rags, paints, chemicals)
Downed power lines
Arson
Fireworks
Structural Fires spreading to adjacent land.

See: http://www.smokeybear.com/case_studies.asp for interesting case studies.



PHOTO BY TIM SHUFF

“FIRE, FIRE EVERYWHERE”

Review of 2003 Fire Season: Average Hectares, Fires, and Dollars

The 2003 fire season was one of the most catastrophic in British Columbia's recorded history. Due to an extended drought in the southern half of the province, forest firefighters faced conditions never seen before in Canada.

Lightning strikes, human carelessness and arson all contributed to igniting nearly 2,500 fires involving more than 10,000 firefighters and support personnel and burning more than 265,000 hectares (ha) at a cost of \$375 million. One hectare is the equivalent of approximately 2 soccer fields. So, the fires of 2003 destroyed forests the size of 530,000 soccer fields. The extreme volatility of the dry forests, compounded by the province's difficult terrain, created unprecedented fire behaviour and made fire suppression almost impossible. The ongoing fires put extreme pressure on human and equipment resources. The daily outbreak of new fires (218 fires on one day alone) added an even greater burden on suppression teams to prioritize and allocate resources, equipment and crews.

In these and other difficult and devastating interface fires, private and public properties are damaged and/or destroyed. The financial impact is great. In 2003, a large sawmill near Barriere was

completely destroyed by fire. In some cases forest companies do not rebuild mills after fire in communities, such as the case with Tolko and its decision not to rebuild the Louis Creek sawmill (http://www.tolko.com/news/releases/oct2_2003.php; see appendix for a copy of this document). What does that mean to a community in terms of lost jobs and tax revenues, etc?

While fire crews often fought uncontrolled fires that travelled at more than 7 km/hour and leapt several kilometres over highways, waterways and fire breaks, human safety remained a priority so not a single firefighter's life was lost on the fireline. In addition, there were no civilian lives lost nor any civil unrest associated with the largest evacuation in B.C. history, which involved more than 30,000 people.

Tragically, two air tanker crew members and a helicopter pilot lost their lives in a crash and one person was seriously injured.

*** TEACHER'S NOTE:** Ask students if they know anyone affected by the fires of 2003. Did these people lose their homes? Lose their source of livelihood? Did the students help with relief efforts, i.e. donations of money or goods?

NUMBER OF FIRES (IN 2003)

- **By Cause:**

964 caused by people
1,515 caused by lightning

- **By Fire Centre:**

Coastal: 271
North West: 58
Prince George: 337
Kamloops: 785
South East: 637
Cariboo: 391

Total: 2,479 Fires



HISTORICAL AVERAGES

YEAR	TOTAL FIRES	TOTAL HECTARES	TOTAL COST	AVERAGE HECTARES PER FIRE	AVERAGE COST PER HECTARE
2003	2479	264,747	\$371.9 million	106.8	\$1,405
2002	1781	8,581	\$37.5 million	4.8	\$4,370
2001	1266	9,677	\$53.8 million	7.6	\$5,560
2000	1539	17,673	\$52.7 million	11.5	\$2,982
1999	1207	11,581	\$21.1 million	9.6	\$1,819
1998	2665	76,574	\$153.9 million	28.7	\$2,009
1997	1175	2,960	\$19.0 million	2.5	\$6,412
1996	1358	20,669	\$37.1 million	15.2	\$1,794
1995	1474	48,080	\$38.5 million	32.6	\$800
1994	4088	30,310	\$90.9 million	7.4	\$2,999
1993	1497	5,183	\$25.2 million	3.5	\$4,860
AVERAGE *	1805	23,129	\$53.0 million	12.4	\$3,361

* The average does not include the most recent year

Source – Ministry of Forests

WHY FIGHT FIRE: A BALANCED APPROACH?

For generations, the goal of forest fire suppression in Canada was based on a European model: fire was seen as bad and had to be prevented and controlled. Today, however, we understand that fire is a natural disturbance in forest ecosystems — a process that should be managed. A holistic approach to forest fire management considers that forest fires are integral to the health, structure and diversity of forest ecosystems. Foresters also increasingly recognize that small controlled fires result in new growth in the forests and reduce the likelihood of large, disastrous fires.

However, fires cannot be allowed to run their natural course when they threaten lives, property or resources. Therefore, Canada has two levels of fire management — intensive and extensive. In the intensive zone, which includes communities, valuable timber, endangered species and other values at risk, all fires are actively suppressed. In the extensive zone, forest fires are monitored and if they pose a threat to social or resource values, they may be suppressed. The key is to balance the costs and benefits of fire to help ensure the ecological, economic and social sustainability of our forests, the forest industry and forest-based communities.

Source: http://www.nrcan-rncan.gc.ca/cfs-scf/national/what-quoi/sof/sof04/feature09_e.html

“ **To be able to suppress the last 3 percent of fires that cause 97 percent of the damage, we would need a firefighter behind every tree and a helicopter on every mountain slope.** ”

— A research scientist
with the Canadian Forest Service
of Natural Resources Canada
Source: Natural Resources Canada

WHAT HAVE WE GOT TO LOSE?

CONSEQUENCES OF FOREST FIRES

The consequences of forest fires fall into three broad categories: ecological, social and economic. As with most things in life, the consequences are not all good or all bad. One's view of a particular effect is influenced by such factors as personal loss or gain and one's own values.

Ecological

As we have seen, fire has a beneficial influence on species composition, abundance and age. For our boreal forest, periodic cleansing through understory burn-off and setting a mosaic of natural firebreaks will trigger new growth, clear out a flammable duff layer (top layer), and stagger the age range of vegetation to encourage regeneration.

Some animal populations rebound after fires whereas endangered species may be wiped out if their habitat is destroyed by fire. Additionally, regular forest fires are useful to cleanse the woodlands of parasitic insects and disease. However, should the insects or disease get there first, they can create dead shells of trees that provide even more fuel, causing larger and more destructive fires.

Forest fires can dramatically affect Canada's greenhouse gas emissions. In a year when many fires are burning, the amount of carbon released into the atmosphere can virtually equal the level emitted by industrial operations. This can affect whether Canada in a given year is considered a carbon sink (a repository of carbon) or a carbon source (when carbon escapes into the atmosphere, it helps to create greenhouse gases and speed subsequent global warming). At stake is our ability to honour our commitments under the Kyoto Accord to reduce such emissions.

Smoke and pollution also have to be considered. Smoke in communities can cause breathing problems, especially among the very young and the very old. In some cases, too much smoke leads to evacuation of the residents, with all its attendant problems. Smoke can also obscure highways in forested areas, causing traffic delays and accidents. And smoke may contribute to global warming: researchers are studying the effects of sunlight on particles of ash in smoke. Finally, smoke from fires in Canada has occasionally drifted into the United States and resulted in communities infringing Environmental Protection Agency regulations, potentially causing international ill will.

Fire ecologists point out one other negative consequence of forest fires—the tragedy of a blaze destroying a rare type of habitat set aside as a park for endangered species.

Social

The social consequences of forest fires in Canada are far-reaching, from the disruptions of the normal living patterns of firefighters and community residents to health concerns related to smoke inhalation.

Evacuating residents from a fire-threatened area can have both financial and cultural costs. For native peoples, being flown to larger communities can be a particular wrench to their way of living, with the resultant exposure to such detrimental influences as fast foods, traffic hazards and an alien lifestyle.



A particularly devastating fire can result in the psychological damage of losing a home and family treasures, having to start all over again. A loss of heritage can also occur, should community halls, libraries and other structures be destroyed. In addition, parks and recreational areas are liable to go up in smoke, creating a sense of emotional loss. In the Okanagan fires of 2003, many historically significant wooden railway bridges over the Kettle River were destroyed. This resulted in an aesthetic loss to history buffs and a loss of convenience to hikers who used the abandoned bridges. Fortunately, these bridges are being rebuilt, but their historic value can never be recaptured.



Photo by the Myra Canyon Trestle Restoration Society

Economic

Forest fires have consequences on both sides of the economic ledger. The loss of revenue from burned trees may not be critical, since about half the timber burned is non-commercial, located in the far north. Moreover, the loss of marketable timber could be mitigated if provincial and territorial agencies put in place measures permitting the salvaging of wood from burned-out areas. In addition, forest companies often control such large tracts of timberland that they can shift operations to another part of the forest and come back to the burned-over area once it has regenerated.

On the other hand, planning to cut in one area is expensive in itself; shifting crews and equipment to a different location increases the costs considerably. There are also potential losses of shareholder equity if the fire destroys sawmills or other property and equipment.

Although firefighting represents a huge investment by government agencies and the private sector in training and salaries for personnel as well as purchasing and maintaining equipment, the argument can also be made that this is a normal part of doing business. In addition, many rural communities rely on the jobs provided to firefighting crews. The Canadian economy benefits from the manufacture and sale of suppression equipment and technology - from aircraft to pumps to hoses - both nationally and internationally.

The costs for direct fire suppression in Canada have been averaging about \$500 million a year. This figure spiked in 2003, when British Columbia alone spent approximately \$600 million and several other provinces had worse than normal fire seasons. While this certainly drains the public coffers, much of this money goes towards

salaries, food and equipment purchases for the firefighters and buying or leasing of firefighting equipment from Canadian firms.

The cost of cleaning up and rebuilding in communities harmed by forest fires, while a burden to those sustaining the losses, is also a source of revenue for individuals and commercial enterprises engaged in the restorative work.

In spite of these moderating factors on monetary expenses, however, the costs in human suffering, wasted resources and devastated landscape are still considered unacceptably onerous by the overwhelming majority of forest stakeholders. Measures need to be - and are being - taken to substantially reduce these costs while safeguarding wildland sustainability through sound forest management.

http://www.nrcan-rncan.gc.ca/cfs-scf/national/what-quoi/sof/sof04/feature07_e.html



BEETLE INFESTATION - I SEE A SEA OF RED!

The mountain pine beetle infestation in the west central interior of British Columbia covers 9,000,000 hectares and is now the largest insect epidemic in the province's history.

The mountain pine beetle (*Dendroctonus ponderosae*) is a small insect that lives most of its life in the inner bark of pine trees. The adult beetles are black to rusty brown and about 1/4 inch in length. They fly from infested trees to new host trees in late June or July. Once they have located a favourable host, the adults tunnel beneath the bark to lay eggs. After the eggs hatch the young, known as larvae, feed within the tree until the following spring when they pupate, a resting stage, for several weeks before becoming adults. The adults emerge from the now dead host and seek a new tree to begin the cycle again.

The beetles can colonize trees in large numbers. The tunneling beneath the bark by the adult beetles and their larvae harms the tree by disrupting the movement of food, produced by the needles, to the roots. The adult beetles also can carry a blue-stain fungus from tree to tree. This fungus stops the movement of water from the roots to the needles. The combination of these two factors results in the tree's death.

Thus, trees that succumb to the mountain pine beetle remain standing and have a low moisture content. This makes these stands of dead trees particularly susceptible to intense wildfire.

Teachers note: *Why not encourage your students to consider how those areas could be managed, should they be harvested/salvaged, what are the current management plans for your area of the province? This could be a fascinating research project. Invite some professional foresters into your classroom to give a presentation on the mountain pine beetle.*

Contact:

The Association of B.C. Forest Professionals

1030-1188 West Georgia St.

Vancouver, B.C.

V6E 4A2

p.604-687-8027

info@abcfp.ca

www.abcfp.ca

They have members all over B.C., so perhaps someone in your community may be available for a class presentation.



B.C.'S FIRE ATTACK PROGRAM

TYPES OF FIRE GROUND CREWS

The Forest Service Protection Program has two types of crews:

THREE-PERSON INITIAL ATTACK CREWS (Fireattack, Helitack, Rapattack or Parattack) respond to the first fire call; and,

20-PERSON UNIT CREWS are dispatched to larger fires where significant resources may be needed to fight the blaze.



Jumping to the ground from a hovering helicopter

INITIAL ATTACK CREWS

Initial attack firefighters are usually the first crews on the scene of a new fire. The crews generally respond to small fires and are the key reason we are able to contain more than 94 percent of British Columbia's fires at a size of less than four hectares.

Motivated by the Hit Hard Hit Fast motto, these well-trained, rapid-response fire crews arrive at the fire by the most effective delivery method, depending on the location and accessibility of the fire.

Once firefighters are at the fire, the crews work quickly to set up water pumps, remove fuel from the fire's path using chainsaws, pulaskis or shovels, and dig fire guards to control or extinguish the blaze. Crews are self-sufficient with food and camp gear and can remain on a fire for up to 24 hours without re-supply.

- **HELITACK CREWS** have access to a helicopter and are trained in hover exit, meaning they can jump to the ground safely from a hovering helicopter. This method allows them to be deployed in remote locations that are difficult to reach by truck.
- **RAPATTACK CREWS** rappel from a hovering helicopter, using specialized equipment and ropes. Rapattack is especially suited for heavily treed and mountainous, remote terrain.
- **PARATTACK CREWS** respond by parachuting from a fixed-wing aircraft in extremely remote locations, typically in the northern part of the Province.
- If the fire can be reached by roads, the crews may be dispatched in well-equipped pickup trucks or if necessary, specially-designed brush trucks. In addition, some crews have access to fire engines and "water tenders", which are ground vehicles capable of transporting specified quantities of water, compatible with city fire department vehicles and used in Urban Interface fire scenarios.

A PULASKI (A FIREFIGHTER'S TOOL)

Initial attack crews are highly mobile and are often relocated throughout the province or anywhere in North America, providing well-trained experience to other fire-fighting agencies. There are more than 330 initial attack firefighters stationed at approximately 50 bases around the province, strategically placed where fires historically break out.



RAPATTACK CREWS

RAPATTACK PROVIDES:

- initial attack on inaccessible fires
- access to fires by building helipads
- project fire support by building helipads
- Emergency Medical Assistance: providing first-aid to injured persons in isolated areas
- Extreme Slope Assistance: use of approved mountaineering equipment to gain access to fire areas on extremely steep sidehills

During the summer months, lightning storms often illuminate British Columbia's skies. Lightning-caused fires most often occur at higher elevations in inaccessible terrain. Historically, these fires ignited in dense timber and would burn unchecked until crews could hike in and fight the blaze.

The high cost of these fires led to the development of the specialized Rapattack fire fighting team which uses a helicopter and rope rappelling technique to drop into the fire area and attack these lightning-caused fires while they are still small.

Rapattack crews are also used on larger fires, where they will remove timber to create a helicopter landing location (called a "helipad") so additional crews and equipment can be strategically located around the fire's perimeter. Using a helicopter and rappel technique requires crew members weigh no more than 170 pounds (77 kilograms) dressed weight (in street clothes).

PARATTACK CREWS

The parattack program is the Forest Service smokejumping operation based in Fort St. John. The smokejumping delivery system deploys firefighters and equipment by parachute from fixed wing aircraft, as opposed to the conventional helicopter response. The use of a twin-engine fixed wing aircraft allows more personnel and equipment to be deployed faster and over greater distances. The aircraft can deliver personnel and equipment to fires as far away as 450 km without re-fueling. The resource is well-suited for fires in the boreal forests of the North, and can also respond to fires throughout the province.

Parattack is primarily an initial attack resource, responding to new fires reported in the region. With two crews on board the aircraft, the spotter can elect to deploy two crews to a larger target, or deploy them singly on multiple target dispatches. It can also be used to support larger expanded attack fires, or re-configured as a twenty-person unit crew.



UNIT CREWS

Each year, a small percentage of fires grow to a significant size which require additional fire fighters and resources. Twenty-member unit crews were developed to serve as a highly trained and coordinated fire fighting force for these larger fires. Each crew is made up of one crew leader, four squad bosses and fifteen crew members. The 20-person unit may also be broken into smaller groups, depending on the nature of the fire activity.



Unit crews are often called sustained action crews because of their specialized skills for fighting larger blazes as well as their ability to be self-sufficient on a fire for up to 72 hours. Once on a fire, crew members are responsible for containing the blaze. Attack strategies include establishing pumps and hose lines, digging fireguards* with pulaskis and shovels, using chainsaws and burning-off techniques to remove fuel from the main fire's path and working around heavy equipment to secure the fire's perimeter. The work can take firefighters into difficult terrain amidst dry, hot, and smoky conditions for up to 14 days.

* FIREGUARD:

A strategically-planned barrier or trench dug in the earth, either manually or mechanically constructed, intended to stop a fire or retard its rate of spread and from which suppression action is carried out to control a fire; the constructed portion of a control line.

PHOTO BY TIM SHUFF

TOOLS

The most common hand tools used in fire suppression work in British Columbia are:



CHAINSAWS



PUMPS



PULASKIS



DRIPTORCHES



SHOVELS

HEAVY EQUIPMENT

Of course, firefighters have many resources available to them besides the basic hand tools. Often, on a large fire, heavy equipment is brought in.

DOZERS

Dozers are used extensively for pushing paths through standing trees, building roads and fireguards. Firefighters work cooperatively with dozer operators to accomplish a great deal of work.



AIR TANKERS



The B.C. Forest Service airtanker fleet command and control is the responsibility of the Provincial Airtanker Centre located in Kamloops. It is important to note that airtankers do not put out fires. In initial attack, airtankers drop fire retardant and/or foam on or near small fires to limit their spread until ground crews arrive to extinguish them. In support action, airtankers:

- support ground control lines
- limit the spread on portions of the fire
- cool hot spots (areas which have substantial fire activity)

Airtankers have a capacity of over 11,000 litres for heavy single aircraft. An Air Attack Officer flying in a smaller "bird-dog" or lead aircraft directs each group. He or she assesses the fire and directs the airtankers to the most effective and safe drop locations.

Tanker groups are positioned for a "one-strike concept" that allows them to hit targets hard, minimizing the need for reloads. This is very important, as up to 70 fires may need airtanker action in a single day.

FIGHTING FIRE WITH CHEMISTRY

FIRE RETARDANT, WATER & FOAM

Fire retardants, foam and water are the three types of matter that can be dropped from an aircraft to slow a fire. They are used to cool fires and slow their progress long enough for firefighters to take other action, such as the construction of fire guards, and are playing an increasingly important role in British Columbia's battle against wildfires.

RETARDANTS

Water-soluble retardants are most commonly used because of their long-lasting effect on fires. They contain ammonium salts which char on contact with flame. This reaction releases a water and carbon dioxide combination that cools and suffocates the fire. Fire retardants are essentially an industrial-strength fertilizer with colouring. Because the active ingredients in retardants don't evaporate, they are particularly useful in fighting high-intensity fires requiring a distant and indirect attack. In these situations, long-term retardant mixtures are usually applied ahead of the advancing fire by air tankers and helicopters.

WATER

Water is a suppressant used to suppress or extinguish wildfires. Water is applied by ground crews using water bags, tanks, pumps and hoses, or by helicopters equipped with buckets or belly tanks. In British Columbia, aerial water bombers are usually limited to coastal areas because of adverse landing and loading conditions in many interior areas.

Water is perhaps the best tool we have to extinguish wildfires. However, unlike structural firefighters who tap into existing networks of water mains and fire hydrants, wildland firefighters must find their own water source and develop their own water delivery systems in order to get water to a fire. Rivers, lakes, streams, creeks, sumps dug into a swamp, and even run-off from a melting glacier can all be used as a water source. In some cases, firefighters must dam up small creeks to get sufficient water to meet firefighting needs.

FOAM

Foam is a suppressant (which is similar to dish soap) that is applied to fires to suppress or extinguish them.

Fire control foam is created by mechanically aerating a water-diluted concentrate, injecting the concentrate into ground or air-borne water tanks, or by simply dropping the mixture from an air tanker or helicopter. Once dispersed on a fire, foams absorb heat from combustion while the bubble structure slowly releases water, which is absorbed by wood fuels.

While the heroic firefighters attract much attention from the public and the media, many others toil on the fires with technology and special training in Ministry of Forests offices throughout BC. For an overview of how these professionals carefully monitor, manage and plan for forest fires, see "FIREFIGHTING IN FOCUS" from FORED B.C.'s Landscapes Magazine on Page 69.

TRICKS OF THE TRADE: FIGHTING FIRE WITH FIRE

Have you ever stopped to consider what the expression "fighting fire with fire" really means? Oddly enough, fire itself is a tool often used by firefighters in battling wildfires. Essentially, fire is used by firefighters in two ways to aid in the establishment of control lines. Small scale burning between the fire perimeter and established fireguards is a technique used to widen control lines. This practice is called "**burning off**". Under certain conditions even the widest of control lines (large clearings, roads, rivers,

rock-outcroppings and lakes) are not enough to stop a fast approaching fire. Therefore, in fast moving wildfires where control lines are situated far from the fire perimeter, firefighters use winds generated by the advancing fires to light large fires at the control line. These fires burn towards the advancing fire and in turn remove a large area of fuel stopping the fire in its tracks. This tactic is called **backfiring** and is used as a last resort due to the difficulty of predicting winds and the risks associated with adding more fire to a volatile fire environment.

POST-FIRE: ENVIRONMENTAL REHABILITATION

The forest firefighting effort can cause considerable damage to ecosystems. In many cases, even before the fire suppression effort has been completed, the process of environmental rehabilitation is started. Significant work may be required to rehabilitate sites impacted by fire suppression activities.

To understand fire site rehabilitation, it is important to understand what happens during forest fire suppression. Trails and roads may be built quickly to allow equipment to reach the fire. Fireguards, which are intended to stop or slow the spread of a fire, may be built by hand or by machine. Fireguard construction can involve knocking down or falling trees, bulldozing the forest floor to expose bare soil, and crossing streams with heavy machinery. Dams and sumps may be built in streams. Camps, staging areas and helipads may be built. Furthermore, all of these structures are usually built under emergency conditions without the benefit of detailed advance planning.

The kinds of structures commonly built during fire suppression would generally not be permitted in non-emergency situations. For example, driving a bulldozer through a creek could cause considerable damage to the environment and, if so, this activity would be usually be prohibited. However, emergency exemptions are made for activities reasonably necessary to control a wildfire.

If sites disturbed by fire suppression activities are not soon rehabilitated, water quality can be negatively impacted by excessive sedimentation. Rehabilitation work is undertaken to ensure that natural drainage patterns are maintained and surface soil erosion is minimized.

PHOTO BY TIM SHUFF



CAREER OPPORTUNITIES & PERSONAL GROWTH

SUMMER JOBS WITH THE FOREST SERVICE

Are you a physically fit, motivated, team-oriented individual looking for a challenging and dynamic workplace with lots of travel opportunities?

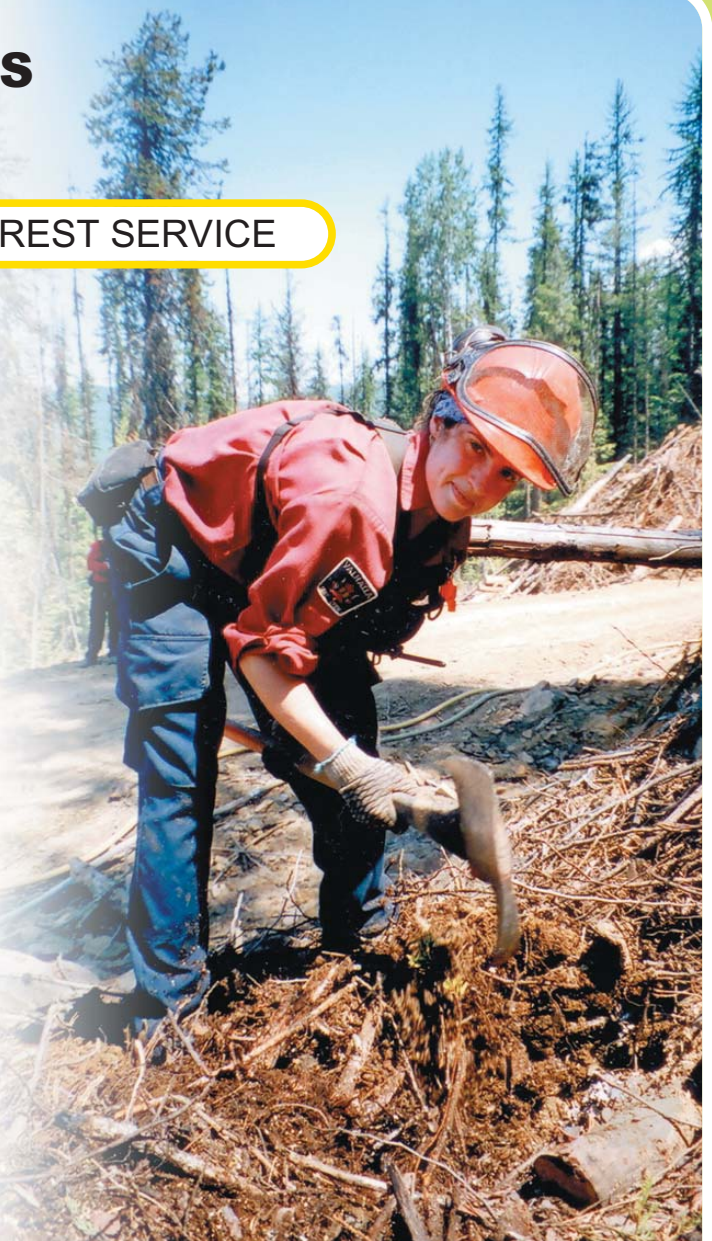
The British Columbia Forest Service Protection Program accepts applications for “fire crewmember” positions until early January. The Ministry of Forests’ website contains all the information necessary to apply. If you are interested in knowing more about what it’s really like to be a firefighter in B.C., what the ups and downs of the job are, and whether this is something you really want to pursue, we recommend reading the book, “**Coming Through Fire: The Wildland Firefighter Experience**” by David Greer & Noel Hendrickson. The text and photos detail the exhilaration and hardships of being a wildland firefighter in a realistic and engaging way. If you’re thinking about joining the B.C. Forest Service, this is the book for you. This book is included in the FIRE ED SECONDARY Kit from FORED B.C.

Physical Fitness is part of the job...

Numerous studies of wildland fire fighting and related job tasks have confirmed the relationship between high levels of aerobic and muscular fitness and work place productivity and safety. Workers with greater physical capacity are better prepared to deal with adverse firefighting conditions such as hard, repetitive physical labour, exposure to extreme heat and smoke, altitude, and long work hours with reduced sleep and rest. Aerobic and muscular fitness, combined with thorough training and experience, are two of the most important factors in determining an individual’s ability to perform safely and efficiently as a firefighter in B.C.

Therefore, all personnel hired or expected to be hired, for the specific purpose of initial attack and/or sustained action fire suppression will meet and maintain the following pre-employment fitness standard comprised of two main tests:

1. Pack Test: a job-specific test where participants are required to carry a 20.43 kg (45 lb.) backpack over a measured, level, 4.83 km. (3 mile) course in less than 45:00 minutes. This



Fored B.C. firefighter Gillian Bigsby uses her pulaski to dig a fire guard

test measures both muscular and aerobic fitness in individuals.

2. Pump and Hose (PH) Test: a job-specific test using standard BCFS fire suppression equipment. Participants carry a Wajax Mark III pump a distance of 100m, and then are timed to carry rolled hose 300m, and drag one end of a charged 1-inch hose 200m. This test must be completed in less than 4 minutes, 10 seconds.

JUNIOR INITIAL ATTACK PROGRAM

In many regions of B.C., the Ministry of Forests offers the Junior Initial Attack Program to senior-level high school students. This program provides students with the opportunity to receive free forest firefighting skills training

and to work alongside B.C.’s Initial Attack Crews. This program is considered a valuable springboard to becoming a wildland firefighter with the MOF. Contact your local Ministry of Forest office for more information.

RELATED FIELDS

Firefighting is an interdisciplinary activity that requires knowledge in a wide range of diverse fields. As such, there are a large number of related post-secondary degree and certificate programs that can be used to launch you into a new and exciting career path. Potential areas of study relevant to the area of forest firefighting include:

- Forestry and Forest Ecology
- Wood Products / Wood Processing
- Natural Resource Conservation and Management
- Resource Management and Wildlife Management
- Fire Science and Hydrology
- Atmospheric and Earth Sciences
- Environmental Studies/Science and Environmental Engineering
- Biology and Geography
- Geographic Information Systems (GIS), Surveying and Mapping
- Wilderness Leaderships and Outdoor Pursuits Programs
- Paramedic and First-Aid Programs
- Helicopter and Aircraft Maintenance Programs
- Aviation: Helicopter and Fixed-wing Pilot Licensing Programs
- Small Engine Mechanics and Repair

POST-SECONDARY OPPORTUNITIES

For any students, or teachers, interested in pursuing firefighting work in summer, please visit this Ministry of Forests link below for information: www.for.gov.bc.ca/protect/

For those who would like to pursue post-secondary studies in fire science or wanting more information about the many jobs and professions associated with our forests, from bear biologist to hydrologist or forester, please visit any of the following B.C. post-secondary institution links:

British Columbia Institute of Technology - <http://www.bcit.ca>
Camosun College - <http://www.camosun.bc.ca>
College of New Caledonia - <http://www.cnc.bc.ca>
College of the Rockies - <http://www.cotr.bc.ca>
Emily Carr Institute of Art & Design - <http://www.eciad.bc.ca>
Kwantlen University College - <http://www.kwantlen.bc.ca>
Malaspina University College - <http://www.mala.bc.ca>
Nicola Valley Institute of Technology - <http://www.nvit.bc.ca>
Northern Alberta Institute of Technology - <http://www.nait.ca>
Northwest Community College - <http://www.nwcc.bc.ca>
North Island College - <http://www.nic.bc.ca>
Northern Lights College - <http://www.nlc.bc.ca>
Okanagan University College - <http://www.ouc.bc.ca>
Royal Roads University - <http://www.royalroads.ca>
Selkirk College - <http://www.selkirk.ca/rr>
Thompson River University - <http://www.tru.ca>
University of Alberta - <http://www.rr.ualberta.ca>
University of British Columbia - <http://www.forestry.ubc.ca>
University College of the Fraser Valley - <http://www.ucfv.bc.ca>
University of Northern British Columbia - <http://www.unbc.ca/forestry>

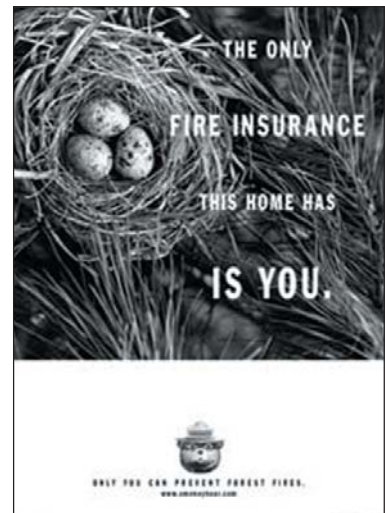
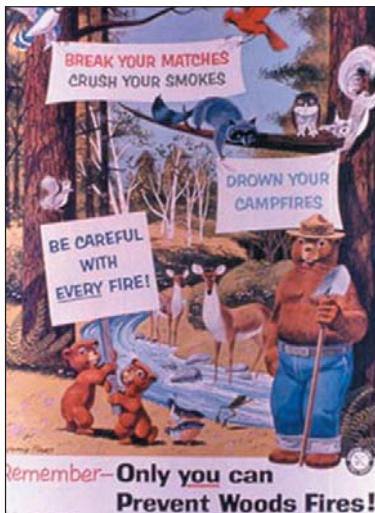
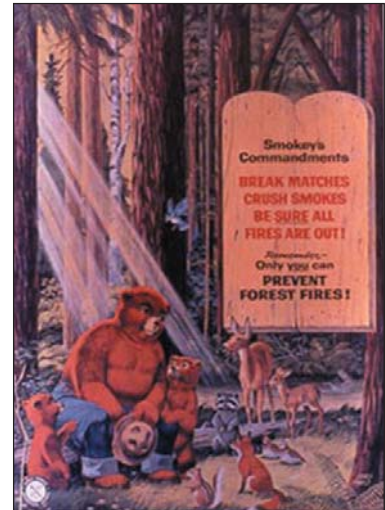
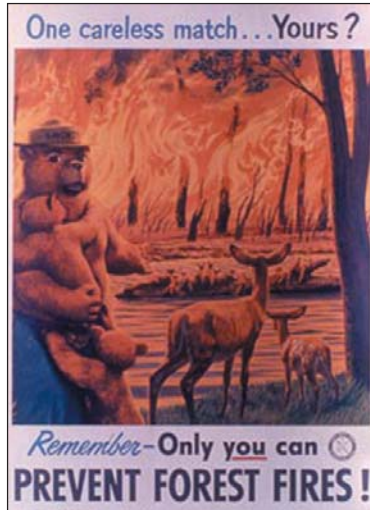
Other useful links include:

<http://www.bced.gov.bc.ca/careers/planning/>
<http://www.openingdoorsbc.com/>
<http://www.iswnetwork.ca/bcpostseclinks.htm>

FIRE EVALUATION RUBRIC

	1	2	3	4
A MATCHSTICK FIRE BEHAVIOUR MODEL	The student's overall score from self and teacher evaluations was low and their final product and/or participation was poor.	The student's overall score from self and teacher evaluations was adequate and final product and participation was acceptable.	The student's overall score from self and teacher evaluations was good and final product and participation was good.	The student's overall score from self and teacher evaluations was excellent and final product or participation was exceptional.
FIRE-SAFE YOUR HOME	The student had difficulty, showed lack of interest, or was resistant to completing the assignment. Did not participate in discussion.	The student completed the assignment at a minimal level and only participated in the discussion in a limited way.	The student fully completed the assignment and participated well in the class discussion.	The student did an exceptional job completing the assignment and provided insightful comments during the class discussion.
REPORTING WILDFIRES	The student's participation and wildfire report demonstrated minimal effort.	The student's participation and wildfire report were satisfactory, though some details were missed or incorrect.	The student's participation and wildfire report were good. All relevant details were conveyed and good effort was shown.	The student's participation and wildfire report were excellent. The student demonstrated enthusiasm and skill in reporting wildfires.
FIGHTING FIRE WITH FIRE	The student's participation in this activity was satisfactory. The student may not have answered all the required questions and did not demonstrate care and effort.	The student's understanding of the topic was good and he/she answered all the required questions with reasonable care and effort.	The student demonstrated a solid understanding of the topic and answered the required questions with considerable care and effort.	The student demonstrated exceptional understanding of the topic through his/her skillful completion of the required questions. This student may have conducted extra research or shown additional interest in the topic.
FOREST FIRE PREVENTION: PUBLIC AWARENESS	The student's visual aid demonstrated little care and effort; it was not effective. The action plan was poorly planned, ineffective, carelessly drafted and not well presented.	The student's visual aid demonstrated some care and effort; it was somewhat effective. The action plan was planned, effective, drafted with some care and reasonably well-presented.	The student's visual aid demonstrated good care and effort; it was quite effective. The action plan was well-planned, very effective, carefully drafted and well-presented.	The student's visual aid demonstrated great care and effort; it was very effective. The action plan was expertly planned, incredibly effective, very carefully drafted and beautifully presented.
TO BURN OR NOT TO BURN	The student demonstrated minimal participation in the research and debate. His/her knowledge of the subject matter was extremely limited.	The student demonstrated adequate participation in the research and debate. His/her knowledge of the subject matter was satisfactory.	The student demonstrated good participation in the research and debate. His/her knowledge of the subject matter was good.	The student was a leader in his/her debate group. He/she demonstrated excellent knowledge of the subject matter and was impressive and articulate in the debate.

SMOKEY CAMPAIGN EXAMPLES 1940 — PRESENT



WILDFIRE CONTACTS IN THE PROVINCE

B.C. Ministry of Forests Protection Branch Office

Telephone: 250 387-5965 **Facsimile:** 250 387-5685

Location Address: 2nd Floor, 2957 Jutland Road, Victoria B.C. V8W3E7

Mailing Address: PO Box 9502 Stn Prov Govt, Victoria B.C. V8W9C1

B.C. Fire Centre Contact Numbers:

Cariboo Fire Centre: Telephone: 250 989-2600 **Facsimile:** 250 989-1294

Coastal Fire Centre: Telephone: 250 951-4222 **Facsimile:** 250 954-0823

Kamloops Fire Centre: Telephone: 250 554-5500 **Facsimile:** 250 376-9732

Southeast Fire Centre: Telephone: 250 365-4040 **Facsimile:** 250 365-9925

Northwest Fire Centre: Telephone: 250 847-6600 **Facsimile:** 250 847-7470

Prince George Fire Centre: Telephone: 250 565-6124 **Facsimile:** 250 565-6672

To avoid long-distance charges to these B.C. government offices, you can also call toll-free **(604) 660-2421** (Lower Mainland) or **800 663-7867** (outside the Lower Mainland) to get in touch with the Ministry of Forests Protection Branch for further information or volunteers who could visit your classroom.

Association of B.C. Forest Professionals: Telephone: 604 687-8027

Facsimile: 604 687-3264 **E-mail:** info@abcfp.ca **Website:** www.abcfp.ca

USEFUL WEB LINKS

www.for.gov.bc.ca/protect/

This link allows you to access the Ministry of Forests' Protection Branch homepage. From here, a wealth of information is available on the current wildfire situation, planning a "fire smart" community, information on firefighting and becoming a firefighter, weather and excellent maps of the province related to wildfire.

<http://www.cbc.ca/news/indepth/fightingfires/>

This address links you directly to a special CBC in-depth report on fighting fires in Canada. All of the information is current and Canadian. This site provides you with many excellent news stories, including: "The Tools", "The People", "The Ecological Benefits" and "Consequences of Climate". In addition to great access to relevant external links, this site allows you to enter the CBC archives and a special "for teachers" section.

www.nrcan-rncan.gc.ca/cfs-scf/science/prodserv/firereport/firereport_e.html

Great resource from the Canadian Forest Service for graphing – access to many wonderful fire related graphs.

http://fire.cfs.nrcan.gc.ca/index_e.php

Natural Resources Canada has its own Forest Fire website with its own fire maps, downloadable educational fact sheets on fire prevention, and provincial fire agencies links. This is a great resource for further research on forest fires.

www.landscapesmag.com/common/movie.cfm

This link allows you access to the FORED B.C. website "Bringing the Environment to the Classroom". A variety of forest fire-related articles in past issues of FORED's internationally award-winning magazine, Landscapes, is available through the link:

<http://www.landscapesmag.com/landscapes/pdf/landscapes-volxiii.pdf>
(pages one and 14)

ADDITIONAL LINKS

<http://www.pfc-cfs.nrcan.gc.ca>

<http://www.bcforestinformation.com>

<http://www.canadianforestry.com>

<http://www.whitebirch.ca>

GRADE 11 & 12 LEARNING OUTCOMES

Due to most grade 11 and 12 teacher's time constraints with provincial examinations, we recognized that the inclusion of a new topic of study is not likely in most programs. As such, we have focused the FireEd educational package towards the junior secondary grades. Included here are the grade 11 & 12 IRP connections to wildfire and firefighting for those teachers and students interested in learning more about this fascinating topic.

GRADE 11

ECOLOGY

- collect, display, and interpret data
- demonstrate knowledge of the process of succession

FORESTS AND SOCIETY

- define resource and forest
- describe factors affecting forest-use decisions
- demonstrate awareness of a variety of perspectives and values related to forests and forest use
- demonstrate awareness of and appreciation for Aboriginal peoples' relationship with the forest in British Columbia
- compare historical and current forest practices
- assess the importance of forests to British Columbians
- describe a variety of forest-related careers
- describe common forest safety issues faced by forest users

FOREST ECOLOGY

- define ecology, environment, and ecosystem
- describe processes in and components of ecosystems
- demonstrate awareness of forests as complex ecosystems
- describe the roles that fungi, microbes, and lichens play in a forest ecosystem
- define structural diversity and biological diversity
- assess the effects of natural and human forces on the forest
- describe a variety of food chains and food webs

TREES

- define silvics
- use a key to identify a variety of local trees with their scientific and common names
- describe the habitat requirements of a variety of local trees

MEASUREMENT

- describe the uses of forest measurement data
- demonstrate the use of forest measurement tools
- apply collected data to describe forest areas
- demonstrate an ability to read forest cover maps
- demonstrate an ability to interpret air photos and satellite images
- identify limitations of data collection and use

FOREST RESOURCES

- identify a variety of forest resources
- describe the origins, development, and trends of forest resource use in British Columbia
- define primary, secondary, and tertiary forest products in British Columbia
- describe methods of harvesting, manufacturing, and marketing forest products
- identify economic factors affecting forest resource industries
- demonstrate awareness of the roles of forests in the local and provincial economies

FOREST MANAGEMENT

- demonstrate awareness of the processes involved in forest resource management
- demonstrate understanding of integrated resource management
- define silviculture
- describe silvicultural systems
- demonstrate awareness of a variety of perspectives on forest health

CAREER DEVELOPMENTS (CAREER SKILLS AWARENESS)

- assess their transferable skills and relate them to occupational and lifestyle choices
- apply research skills to acquire information related to job possibilities and career interests

GRADE 12

MANAGEMENT PERSPECTIVES

- demonstrate understanding of the history of forest land ownership and management in B.C.
- analyze forest-related issues from a variety of perspectives
- critique integrated resource management in British Columbia
- describe a variety of careers in forest management

FOREST ECOLOGY

- describe nutrient cycles and energy flow in forest ecosystems
- relate climatic factors to plant distribution
- describe forest succession
- identify uses of the Bio-geoclimatic Ecosystem Classification in British Columbia

SOILS

- analyze the biotic and abiotic factors that influence forest soil development
- assess practices protecting soils & minimizing degradation

INSECTS AND DISEASE

- identify agents that have an impact on forest health

- identify the roles of various insects and diseases in forest ecosystems
- describe how forest management decisions are affected by insects and diseases
- assess forest health management methods

FIRE MANAGEMENT

- assess the role of fire in the forest ecosystem
- analyze causes of and prevention methods for forest fires
- identify factors that influence fire behaviour
- describe the social, economic, and ecological effects of fire suppression
- explain how prescribed burns can be used to achieve forest management objectives

THE NATURE OF GEOGRAPHY (THEMES)

- apply the following geography themes to relevant issues:
- human and physical interaction (the way humans depend on, adapt to, and modify the environment)
- describe the applications of geography to present and future careers

THE NATURE OF GEOGRAPHY (SYSTEMS)

- identify the physical components of the atmosphere, biosphere, hydrosphere, and lithosphere
- explain how physical and human systems interact within an ecosystem

SYSTEMS OF THE EARTH (WEATHER)

- explain the atmospheric conditions that create extreme weather phenomena
- evaluate how people affect and are affected by weather

RESOURCES OF THE EARTH (NATURE OF RESOURCES)

- describe the characteristics of renewable and non-renewable resources

RESOURCES OF THE EARTH (MANAGEMENT OF RESOURCES)

- contrast the different ethics related to resource management and use
- explain how conditions within a biome can affect resource management

CAREER DEVELOPMENTS (CAREER SKILLS AWARENESS)

- assess their transferable skills and relate them to occupational and lifestyle choices
- apply research skills to acquire information related to job possibilities and career interests



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*Tolko products
are shipped
world-wide*



NEWS RELEASE

For immediate release: October 2, 2003

Tolko makes difficult decision

Vernon, BC – Tolko Industries announced today that they have made the first major decision in their process to replace the capacity that was lost when their Louis Creek sawmill was destroyed by the McLure forest fire. The decision arrived at today is that the Company will not be rebuilding the Louis Creek sawmill or a replacement mill in the North Thompson.

Mike Harkies, Tolko's General Manager Southern Interior Operations, says the decision was difficult. "We are aware of the impact this will have on our employees and the community of Barriere, and we wanted to let them know this decision as soon as it was made. Plans are in place to set up an Employee Assistance Centre in Barriere where employees can come and pick up their severance information and receive employment counseling, financial and tax planning help, pension information, personal counseling, and information about employment opportunities at other Tolko locations. We will be spending approximately \$5.5 million in severance, which is 40% greater than the current collective agreement requires, which respects the terms of the yet unratified memorandum of agreement in the interior industry. We will also be working diligently on a short-term jobs plan and will be meeting with the IWA right away. In addition, we are committed to providing resources to assist the Thompson-Nicola Regional District and the community of Barriere with economic diversification and development initiatives."

Tolko's decision not to rebuild at Louis Creek is based on a number of factors. "The lack of rail access and natural gas are major considerations. Another consideration is the impact of the Canada-US lumber trade dispute," says Mike. "As we continue to examine our options for capacity replacement the need for global competitiveness and economies of scale will require us to make decisions which achieve these objectives and ensures the continued viability and stability of the Company. We believe there is an opportunity to benefit the financial health of the southern British Columbia forest industry through timber trade arrangements and we will look at these opportunities going forward."

Tolko is exploring opportunities to expand its production and employment at its veneer and plywood mill at Heffley Creek. This facility employs approximately 160 people, and combined with the woodlands operation in the north Thompson will ensure Tolko's ongoing presence in the Valley.

Landscapes

Firefighting in Focus

Conversations with the people who fight forest fires tend to revolve around consistent themes. Safety gets prominent mention as does the people skills essential in fighting wildland fires. Weather is more than a casual topic, the changing face of technology draws comment, good planning is emphasized, and a strong sense of community responsibility rings in.



At the end of the BC forest fire season, Cheryl Ziola chatted with seven individuals in the Ministry of Forests and Range who played key roles in fire suppression this summer. Here is some of what they shared.

On Safety: Heroic images notwithstanding, safety is how they measure success. "We define a good fire season as one that is injury free", says Rick

"You should listen to the little voice"

Kimmerly. His colleague Grant Preston adds, "In all circumstances the assessment made before taking a decision on a fire involves safety." For Larry Nixon, safety is an instinctive preoccupation. Says Nixon, "If a little voice tells you that you shouldn't go there, you should listen to the little voice."



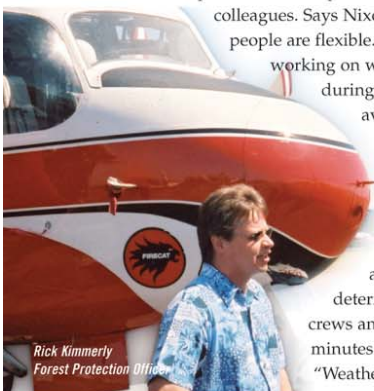
Grant Preston
Forest Protection Officer

On People: A culture that values safety has a special regard for people and the special people needed to do

"You need to see the big picture and respond to it"

the job. Says Kimmerly, "Our people have to be well-organized team players but at the same time they need to be flexible. Nothing is static—everything is constantly changing and you need to see the big picture and respond to it." Bruce Coutanche sees people as the core of the knowledge base, cautioning, "We should never allow technology to cause us to ignore our instincts or the knowledge of people who have been in the organization for a long time." Larry Nixon is proud of the adaptability of his colleagues. Says Nixon, "Our people are flexible. Folks working on weather data during the fire season switch to avalanche control in the winter."

How about this Weather Weather is not just an icebreaker topic. Explains Sue Handel, "We're a weather-driven organization." Forecasts are a planning tool to help us determine resource needs in terms of crews and equipment." It can change in minutes according to Larry Nixon. "Weather extremes are a factor here. A



Rick Kimmerly
Forest Protection Officer



Sue Handel
Fire Information Officer

crew can be working on a fire where it's nippy enough to see your breath and five minutes away by helicopter it can be sweltering."

On Technology

Technology plays an increasing role but the fundamentals of terrain and distance prevail. Nixon explains the relationship. "Sensors tell us where there have been lightning strikes. We mark these with dots on a map. Of course a dot can cover 10 square

"Of course a dot can cover 10 square kilometers"

kilometers." Sometimes nature demands tweaking the technology. Brian Koster explains, "Flame retardant is red. It's more effective than water because it lasts longer. And the colour tells you how you are advancing on the fire line. But now we have red trees because of the mountain pine beetle. So we're looking for a new colour."

Planning is Key

Fire fighting is a year round business. Says Kimmerly, "We plan year-round, keeping an eye on financing, technology developments, training needs, regulatory change and recruitment strategies." But planning can also take seconds according to Grant Preston. "When we get fire reports we have mere minutes to determine the validity, the resources we'll need and the best way to get them there."



Larry Nixon
Forest Protection Technician

Community Connections

Carolyn Mitchell approaches her job with an awareness that the public wants current, accurate information through the media. "I work hard to maintain a trust-based relationship with the media. It's critical. We need them in order to get our message to the public." Sometimes community relations is face to face. Says Koster, "We do a lot of outreach. We'll send our people to a community festival and talk to the organizers."

Not Just a Job.

How is motivation maintained in an organization operating at high risk under high scrutiny? Coutanche explains it this way. "This isn't just a job. It's in your blood and it drives your adrenalin."



Carolyn Mitchell
Forest Information Officer