



BRITISH COLUMBIA
FireSmart™

Education Program

(Grades 7-9)



Lesson One

In this lesson, students will explore trends in the intensity, size, number, and frequency of wildfire behaviour to decide how much wildfires have changed over time. Students use bar graphs and an infographic to illustrate how much wildfires have changed.



Lesson Question:

How much have wildfires changed?

Lesson Challenge:

Create an infographic to describe the degree to which wildfires have changed over time.

Big Ideas

- Evolution by natural selection provides an explanation for the diversity and survival of living things. (Science 7)
- Earth and its climate have changed over geological time. (Science 7)
- The biosphere, geosphere, hydrosphere, and atmosphere are interconnected, as matter cycles and energy flows through them. (Science 9)

Suggested Materials

- **Activity Sheet A:** How Much Have Wildfires Changed? (one copy for each student)
- **Activity Sheet B:** Assessing Wildfire Change (at least one copy for each small group)
- **Briefing Sheet:** The Changing Nature of Wildfires (at least one copy for each small group)
- **Activity Sheet C:** Create an Infographic (one copy for each student)



Start the Thinking



1. Begin the lesson by sharing or displaying a headline describing recent wildfires across Canada. For example
 - “Canadian wildfires burning at record pace”
 - “Canadian wildfire smoke puts around 70 million US residents under air quality alerts”
2. Provide each student with a copy of Activity Sheet A. Reflecting on recent wildfire events, ask students to decide which graph best shows how much wildfires have changed over time (students can also create their own graph to show the changes). Prompt students to note their decision in their Thoughtbook.
3. Introduce the lesson question and challenge. Briefly explain that recent headlines make it seem that wildfires are very different than they were in the past. In this lesson students will use information from different sources to design an infographic to describe and show how much wildfires have actually changed.

Grow the Thinking



1. Invite groups to share their decisions and thinking from Activity Sheet A with the class. As they share, discuss the various ways in which the behavior or characteristics of wildfires may have changed. Use their suggestions to co-construct the aspects that may be used to compare changes in wildfire behaviour, such as:
 - Size
 - Frequency
 - Timing
 - Number
 - Duration and length of season
 - Impacts
 - Causes
2. After discussing the various ways in which the behavior or characteristics of wildfires may have changed, ask students to describe how they decided which aspects were the most important in deciding how much wildfires have changed. As they share, use their ideas to co-develop or present the criteria for an important change. The importance of a change can be measured or assessed by examining
 - **Breadth:** How many parts of the environment and society are impacted by the change in wildfires?



- **Depth:** How deeply felt or serious are the impacts of the change in wildfires?
 - **Duration of impact:** How long will this change in wildfires be felt or noticed?
3. Organize students into small groups and provide each group with at least one copy of Activity Sheet B: Gathering Relevant Wildfire Data. Direct groups to note the aspects or ways that wildfires can change in the left-hand column.
 4. Provide each group with at least one copy of the and the Briefing Sheet: The Changing Nature of Wildfires. Briefly explain that the task is to find evidence that describes to what degree wildfires have changed in each of the aspects or ways (alternatively, consider assigning each group one of the aspects). Prompt groups to explore the briefing sheet and other sources that describe the changing nature of wildfires:

BC Government: All About Wildfires

www2.gov.bc.ca/gov/content/safety/wildfire-status/wildfire-response/about-wildfire

BC Government: Wildfire Averages

www2.gov.bc.ca/gov/content/safety/wildfire-status/about-bcws/wildfire-statistics/wildfire-averages

BC Government: Wildfire Season Summaries

www2.gov.bc.ca/gov/content/safety/wildfire-status/about-bcws/wildfire-history/wildfire-season-summary

National Fire Database (Canadian data)

cwfis.cfs.nrcan.gc.ca/ha/nfdb

National Forestry Database

nfdp.ccfm.org/en/data/fires.php#tab312

Natural Resources Canada Fire Behaviour (Head Fire Intensity Maps (2000 to present))

cwfis.cfs.nrcan.gc.ca/maps/fb?type=hfi&year=2023&month=6&day=1

CBC Report How Wildfires are Changing in Canada

www.cbc.ca/news/climate/canada-wildfire-data-change-1.6854186



CTV News Wildfires in Canada: What role does climate change play?

<https://www.ctvnews.ca/climate-and-environment/experts-explain-link-between-wildfires-and-climate-change-1.6444990>

Global News A Look at Canada's wildfires in numbers and graphics over the decades

<https://globalnews.ca/news/8045796/canada-wildfires-yearly-trends/>

Macleans The Age of Wildfires

<https://macleans.ca/longforms/burned-out-how-b-c-is-learning-to-live-with-wildfires/>

5. Invite groups to share their evidence and ratings with the class. Guide students in thinking about the changes in wildfires by asking questions such as:
 - Was there any evidence or scores that were unexpected or surprising?
 - What did the relative scores reveal about the changes in wildfire behaviour?
 - Which changes are the most concerning?
 - What word or phrase best describes the overall differences?
6. Prompt students to revisit Activity Sheet A and their initial decisions about which graph best represents the changes in wildfires. Ask students to work on their own to make a final selection or create a final draft of a bar graph that best reflects the changes in wildfires. Encourage them to record or note the most important evidence that supports their thinking.
7. Provide students with Activity Sheet C: Create an Infographic and review



Reflect on the Thinking



the instructions. Instruct students to use ideas from Activity Sheet A and evidence from Activity Sheet B to help them create an infographic that illustrates how much wildfires have changed. Remind them of the requirements for an effective infographic:

- Includes a title
 - Uses a labelled bar graph or other image to show how much wildfires have changed over time
 - A short description or phrase that describes key changes and supporting evidence
8. To conclude the lesson, invite students to share their infographics with the class. Lead a discussion about the changes in wildfire by posing questions such as:
- How helpful do you think the graph is in visualizing the changes in wildfire behaviour? What was most helpful? What was least helpful?
 - How might wildfires change in the future? Which aspects might change the most? The least?
 - What actions could communities and other organizations take to address changes in wildfires?



Activity Sheet A: How Much Have Wildfires Changed?

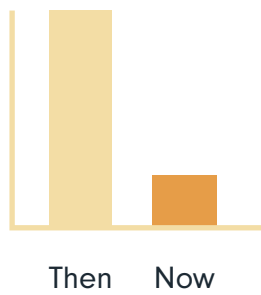
Which graph best shows how much wildfires have changed over time?

My initial thoughts

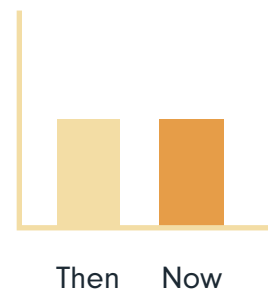
Graph A



Graph B



Graph C



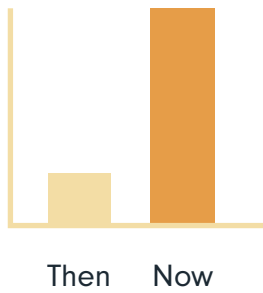
My graph

Reasons for my decision

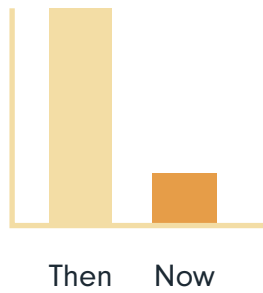
Which graph best shows how much wildfires have changed over time?

My final thoughts

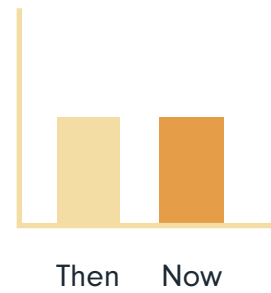
Graph A



Graph B



Graph C



My graph

Reasons for my decision



Activity Sheet B: Assessing Wildfire Changes

Changes

(the various aspects or ways wildfires can change)

Breadth

How many parts of the environment and society are impacted by this change in wildfires?

Depth

How deeply felt or serious are the impacts of this change in wildfires?



Evidence:



Evidence:



Evidence:



Evidence:



Evidence:



Evidence:



Changes

(the various aspects or ways wildfires can change)

Duration

How long will this change in wildfires be felt or noticed?

Overall Importance of the Change



Evidence:



Key evidence:



Evidence:



Key evidence:



Evidence:



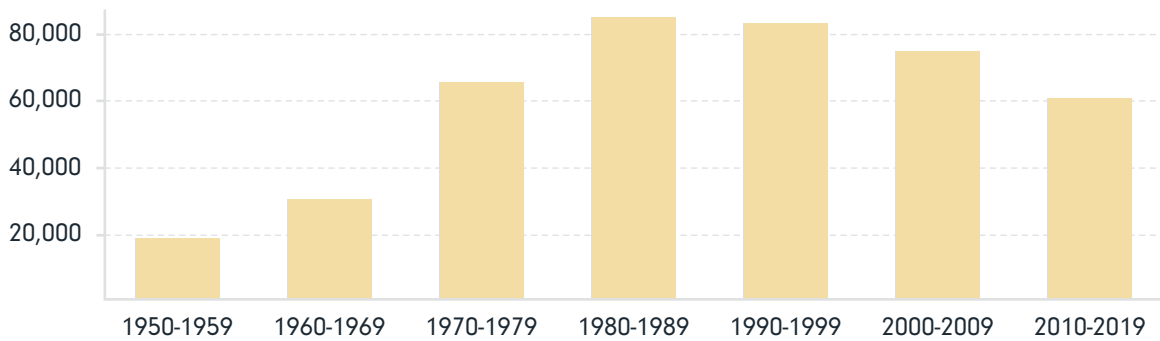
Key evidence:

Briefing Sheet: The Changing Nature of Wildfires

Number and Size of Wildfires

- Since 2017, there had been a steady decline in area burned, but that trend has now been reversed. In July 2021, a total of 3,925 wildfires were recorded—which was above the 10-year average. The total area burned was 1,250,348 hectares, which was below the 10-year average. This was 450 per cent higher than in the previous year. In 2023, there were more than 1.5 million hectares burned, with 1,554 fires by July.
- “... the fires that break out now tend to burn more territory. Overall, the area burned annually by wildland fires has more than doubled since the 1970s, according to a recent federal report” (Shingler and Bruce, 2023).

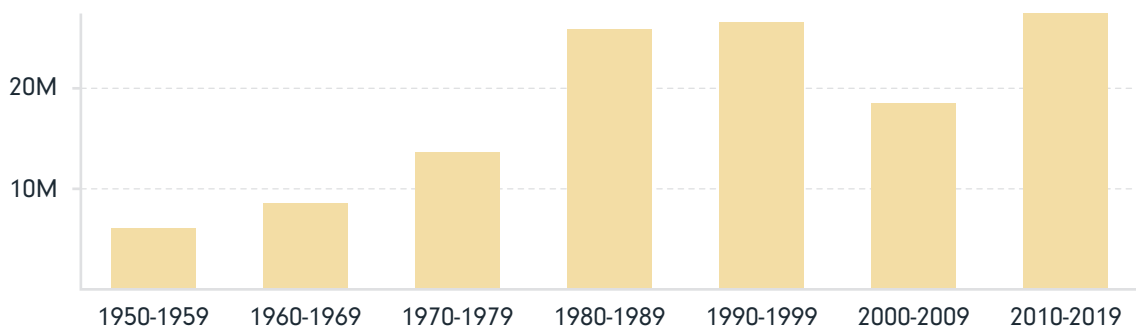
The number of wildfires has decreased - Number of wildfires in Canada, by decade



Source: Natural Resources Canada(Graeme Bruce/CBC)

The amount of area burned in wildfires has increased

Hectares burned in wildfires in Canada, by decade



Source: Natural Resources Canada(Graeme Bruce/CBC)

Causes

- There has been a significant increase in the number of lightning strikes that cause half of Canada's fires. During 2021, more than 710,000 lightning strikes were recorded in British Columbia and western Alberta. This was up from a five-year average of 8,300.
- The number of human-caused fires is declining. In British Columbia's 2021 fire season, just 35 percent of fires were caused by people. Human-caused wildfires—ignited by cigarette butts, downed power lines, or arson—cause about half of all fires.
- Wildfires can create their own firestorms and even more lightning (McBride, 2022).

Length of Fire Seasons

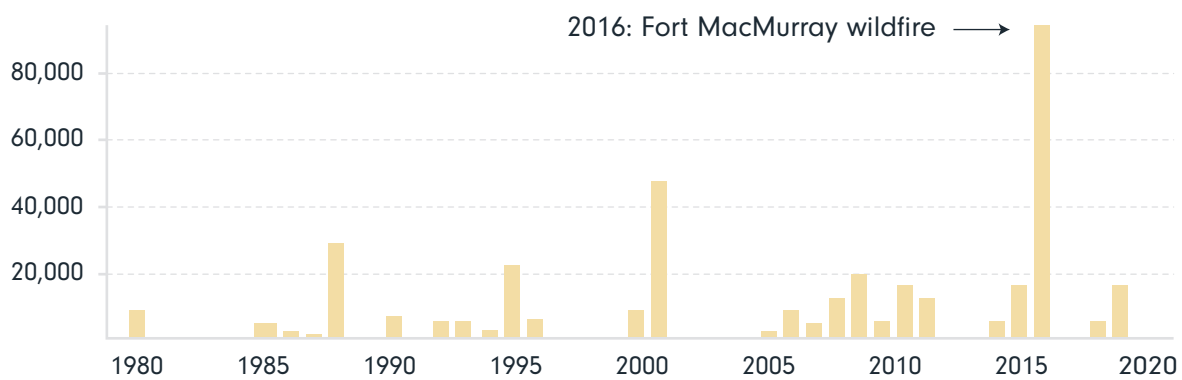
- "The wildfire season in Canada typically starts in April, hits its peak in July, and ends in October. But more recently, there seems to be a shift in the timelines, researchers have noticed. 'We are seeing an increase in fire activity – more area burning, more fires burning, a much longer fire season,' said Lynn Johnston, a forest fire research specialist at the Canadian Forest Service" (Aziz, 2022).

Impact on People and Property

- "... the biggest change over time ... has been the impact on people and property, said David Martell, a professor at the University of Toronto's Institute of Forestry and Conservation. 'There are more communities being threatened in recent years than there have been, say, 10 and 20 years ago,' Martell said" (Aziz, 2022).
- "... a rise in major wildfires has also led to more evacuations, given the fires' growing size and the growing population."

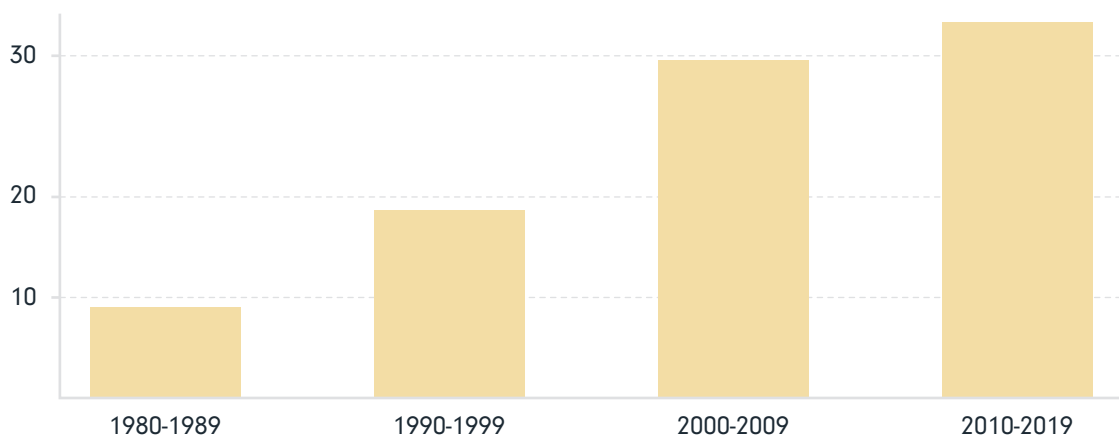
- "... experts use another category, "fire disasters," to indicate especially significant fires. Fire disasters must meet at least one of these conditions: 10 or more people killed; 100 or more people injured, relocated, infected, displaced, or homeless; authorities appeal for national or international assistance; historical significance; causes significant damage to a community. Fire disasters are on the rise, with more than three times as many between 2010-19 and the three decades prior." (Shingler and Bruce, 2023)

Number of evacuations due to wildfires has increased



The number of disastrous wildfires has increased over time

Number of wildfire disasters



Note: Data includes disasters that meet one of the following criteria: 10 or more people killed; 100 or more people affected; An appeal for national/international assistance was issued; Deemed historically significant; or significant damage or interruption of normal processes were such that the community affected cannot recover on its own.

Wildfire Averages

Wildfire activity in British Columbia, 2008–2022 (British Columbia, n.d.):

Year	Total Fires	Total Hectares	Total Cost (estimated)	Human-caused (%)	Lightning-caused (%)
2022	1,801	135,235	\$411.9 million	578 (32%)	1,200 (66%)
2021	1,647	869,300	\$718.8 million	633 (38%)	970 (59%)
2020	670	14,536	\$193.7 million	395 (59%)	275 (41%)
2019	825	21,138	\$182.5 million	450 (55%)	375 (45%)
2018	2,117	1,354,284	\$615 million	628 (30%)	1,489 (70%)
2017	1,801	1,216,053	\$649 million	580 (43%)	773 (57%)
2016	1,050	100,366	\$129 million	564 (54%)	486 (46%)
2015	1,858	280,605	\$277 million	621 (33%)	1,237 (67%)
2014	1,481	369,168	\$297.9 million	664 (45%)	817 (55%)

2013	1,861	18,298	\$122.2 million	564 (30%)	1,297 (70%)
2012	1,649	102,122	\$133.6 million	708 (43%)	941 (57%)
10-year average (2012 to 2022)	1,483	407,373	\$316.9 million	581 (42%)	866 (58%)
2011	653	12,604	\$53.5 million	444 (68%)	209 (32%)
2010	1,672	337,149	\$212.2 million	680 (41%)	992 (59%)
2009	3,064	247,419	\$382.1 million	881 (29%)	2,183 (71%)
2008	2,023	13,240	\$82.1 million	848 (42%)	1,175 (58%)

Sources

Aziz, S. (2022, July 21). A look at Canada's wildfires in numbers and graphics over the decades.

Global News. <https://globalnews.ca/news/8045796/canada-wildfires-yearly-trends/>

British Columbia. (n.d.). Wildfire averages.

<https://www2.gov.bc.ca/gov/content/safety/wildfire-status/about-bcws/wildfire-statistics/wildfire-averages>

McBride, J. (2022, July 12). The age of wildfires. Maclean's.

<https://macleans.ca/longforms/burned-out-how-b-c-is-learning-to-live-with-wildfires/>

Shingler, B., & Bruce, G. (2023, May 25). How wildfires are changing in Canada. CBC News.

<https://www.cbc.ca/news/climate/canada-wildfire-data-change-1.6854186>

Activity Sheet C: Create an Infographic

Use information from Activity Sheets A and B to create an infographic that illustrates how much wildfires have changed.

An effective infographic

- includes a title
 - uses a labelled bar graph or other image to show how much wildfires have changed over time
 - includes a short description or phrase that describes key changes and supporting evidence
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