

Beluga Whale

Trash Talk Hero Inspiration

Belugas are at the top of a deep ocean food chain. They eat fish, crabs and other small animals. If there is a **contaminant** in the environment, tiny plants and insects can absorb it. Over their lifetime, fish eat millions of these small plants and insects, and the contaminants can concentrate in the fish; this is called **bioaccumulation**. When belugas eat fish, they are actually eating lots of contaminants, too! Scientists call this process **biomagnification**. Many contaminants also float in on air currents, polluting Arctic ecosystems.



Beluga Whale

NWT contaminants fact sheets.



SMART Board / Promixa Ready



Northern Resources

Gr.7 Keep Our Habitat Safe

TRASH TALK

OBJECTIVE : Students will learn about litter, the effects of bioaccumulation and about some of the strategies in place to help us protect the environment.

When too much of something dangerous enters an ecosystem, that environment can become polluted or contaminated. Small actions or small amounts of something dangerous can build up over time. This includes litter and also toxins. Citizens are not the only perpetrators of waste in the environment; businesses and industries also produce waste. If we want individuals, businesses and industries to make proper waste management a priority, we must first understand what we stand to lose by not preventing waste in the environment.

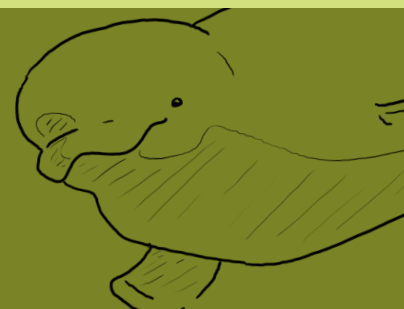
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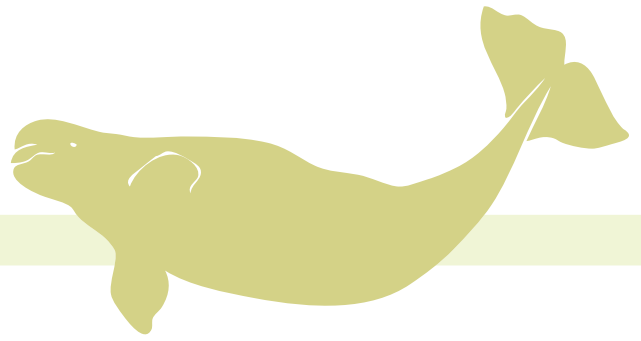
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CURRICULUM Links



Grade 7 Science

Part A: Interactions and Ecosystems - Outcomes 1,2,3,4

Part B: Plants for Food and Life - Outcomes 1,2,3,4

Grade 7 Social Studies

Attitudes (embedded throughout), Geography of the Circumpolar World, Changes in the Circumpolar World, Current Events

Grade 7 English Language Arts

General Outcome #1: Specific Outcomes: 2.2, 2.4

General Outcome #2: Specific Outcomes: 1.1, 1.2, 2.2

General Outcome #3: Specific Outcomes: 1.1, 1.2, 1.3, 1.4, 2.1, 2.2, 2.3, 2.4

General Outcome #4: Specific Outcomes: 4.3

General Outcome #5: Specific Outcomes: 2.3

Dene Kede

Part 2: Fish Camp

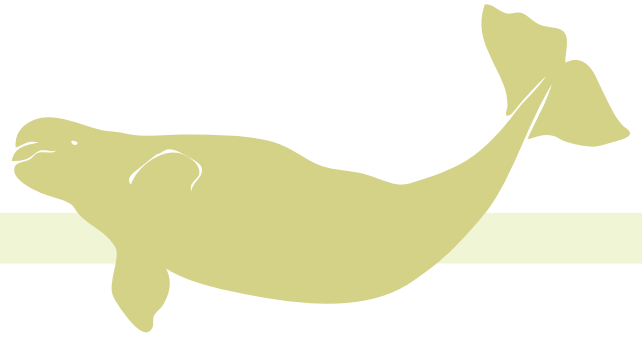
Part 4: My People, My Identity

Innuqatigiit

Relationship to the Environment Themes:

Land, Water, Whales

TEACHER'S Resources



Videos

Cold Amazon: The Mackenzie River Basin (23:00)

<http://vimeo.com/88658987>

Village of Widows (52:00)

<http://lindumfilms.com/villageofwidows>

This film is available from the Prince of Wales Heritage Centre in Yellowknife. This documentary recounts the tragedy of the people of Deline, who were employed by the Canadian Government to transport uranium during World War II.

Websites

NWT Stewardship Strategy

<http://nwtwaterstewardship.ca>

The Canadian Boreal Initiative

<http://www.borealcanada.ca>
http://www.borealcanada.ca/documents/MackenzieReport_2010.pdf

AANDC

<http://www.aadnc-aandc.gc.ca>
Aboriginal Affairs and Northern Development Canada (formerly known as Indian and Northern Affairs)

Reports

Mercury in the NWT factsheet

http://www.aadnc-aandc.gc.ca/DAM/DAM-INTER-NWT/STAGING/texte-text/ntr_pubs_fsh_1330461911572_eng.pdf

The Real Wealth of the Mackenzie Region: Assessing the Natural Capital

http://www.borealcanada.ca/documents/MackenzieReport_2010.pdf

Values of a Northern Boreal Ecosystem: The Canadian Boreal Initiative

<http://www.borealcanada.ca/research-cbi-reports-e.php>

Big Picture 2010: Contaminated Sites in the NWT

<https://www.aadnc-aandc.gc.ca/eng/1362175540271/1362175765271>

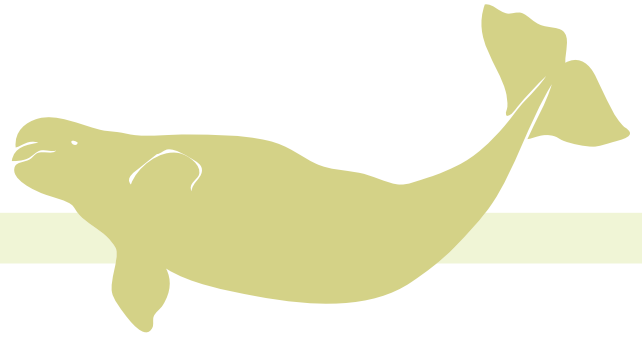
Northern Voices, Northern Waters: NWT Water Stewardship Strategy

http://www.enr.gov.nt.ca/sites/default/files/strategies/nwt_water_stewardship_strategy.pdf



© naturepl.com / Angela Giampiccolo / WWF-Canon

LESSON Plans



Lesson 1: Too Much Trash in the News!

15 minutes

Ask your students if they have heard about waste in the news recently. Share the photo and news story “Spanish sperm whale death linked to UK supermarket supplier’s plastic” with the class.

1. *What are these two stories about?* Small bits of trash have killed this bird and whale. “If you don’t pick it up, they will”
2. Locate where each animal is from on a map. Write a list on the board of all the types of trash that were found in each animal.
3. *Have you seen these types of trash around our community? How would trash like this make its way into the ocean?* Wind blows trash into water bodies, most communities’ water drain into the Mackenzie River and travel north to the Arctic Ocean, where ocean currents take the debris to unexpected places.
4. Discuss how, over time, even small amounts of things that don’t seem very dangerous can add up to be deadly to wildlife!



© Chris Jordan / Endangered Wildlife Trust

A photo of an albatross chick taken in 2009 on Midway Island in the middle of the North Pacific. This photo depicts actual stomach contents of a baby bird in the world’s most remote marine sanctuary, more than 2,000 miles from the nearest continent!

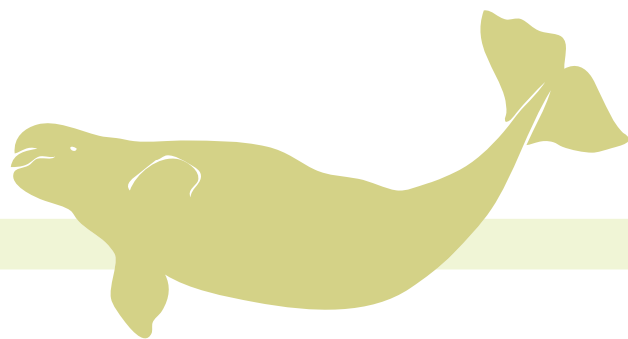
[Bird Island - Plastic Vs Nature \(4:00\)](#)

Watch the trailer

[Spanish sperm whale death linked to UK supermarket supplier’s plastic](#)

The Guardian, UK

LESSON Plans



Lesson 2: Hazardous Waste

1 class period.

Small amounts of anything can add up and become dangerous over time. That's true of litter, and it is also true of toxins and chemicals. There are many things in our houses, communities and camps that are actually hazardous waste!

Inquire about hazardous waste

What are some examples of household hazardous waste? Paints, fuel, oil, antifreeze, car batteries, rechargeable batteries, expired medication, fluorescent bulbs, thermostats, propane tanks, aerosol cans, household cleaners... If your community has an annual household hazardous waste collection, they might have more information.

Household Hazardous Wastes

GNWT Environment and Natural Resources
Household Hazardous Wastes pamphlet.

Hand out the Hazardous Waste student handout on the next page or project it on a SMART Board and read as a class.

Project *Why Hazardous Waste Matters* sheet onto a SMART Board and uncover each photo one at a time.

1. Visualize one litre of oil and 1,000 litres of water
2. A litre of oil will contaminate 1,000,000 litres of water
3. Visualize one thermostat and 1,000 litres of water
4. A thermostat will contaminate 5,000,000 litres of water

How can contaminating water affect the rest of the environment? Write the following on the board:

DDT (pesticides), PCBs (industrial chemicals), dioxins (contaminants). What are these? Persistent Organic Pollutants (POPs), which are toxic substances released into the environment through human activities. POPs tend to concentrate in colder climates such as Canada's North! POPs are very stable and can last in the environment for decades and bioaccumulate, meaning they can concentrate in living organisms.

Important Note: Country food should be promoted!

Although there have been concerns about mercury in the environment, it is very important to stress that country food (traditional foods harvested from the land) are very healthy. When faced with the decision to eat healthy local food over highly processed imported foods, fish from our rivers and lakes are better for us as long as the portion guidelines are followed in places where there is concern. The main thing to stress in this lesson is that we need to learn about what the dangers are and make sure we continue to monitor our environment. See the following news article

Country food reassurances offered at Kakisa workshop

Extension

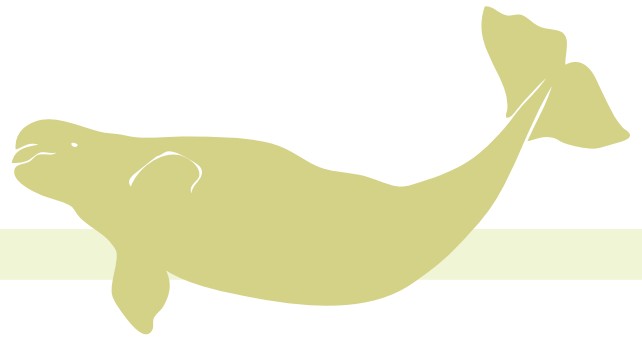
Discuss ways that you can help stop litter or hazardous waste from entering the environment. Have the students make their own poster that communicates the hazards of litter or hazardous waste in the environment!

20 Most Creative Environmental Ads

Print off some examples here.



HAZARDOUS Waste



Hazardous waste is material that is considered a dangerous contaminant when it is no longer being used for its intended purpose. These wastes have the potential to harm human health or the environment and range from paints, oils and solvents to acids, heavy-metal containing sludges and pesticides. Despite the image of the North as a pristine environment, there is a history of hazardous waste and contamination. By learning more about what materials are hazardous and the history of our area, we can help protect our land by changing how we dispose of these materials.

Electronic waste (or **e-waste**) includes TVs, cell phones, computers and laptops and is the fastest growing waste stream in Canada. Many provinces have regulated e-waste recycling programs in place. It is important to properly recycle e-waste because it contains hazardous chemicals, heavy metals and also precious metals that can be recovered.

Many NWT communities have begun to collect electronic waste. Once there is enough material, it will be shipped to Shanked Computer Recycling in



© Kim Rapati / Ecology North

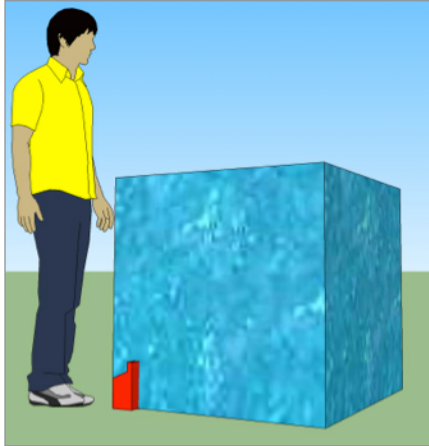
Edmonton where the components will be shaken apart and properly disposed of – screens that contain lead will be safely discarded, gold and rare earth metals will be captured and reused in new electronics.



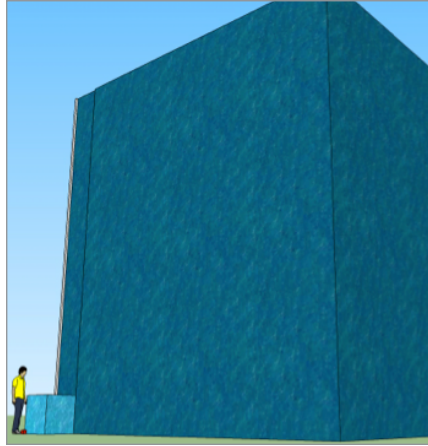
© Kim Rapati, Electronic waste pile at the Fort Smith landfill.



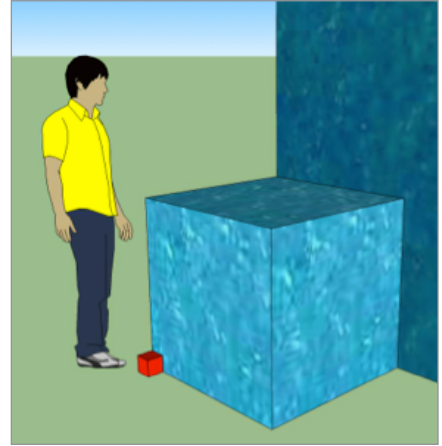
HAZARDOUS Waste Matters



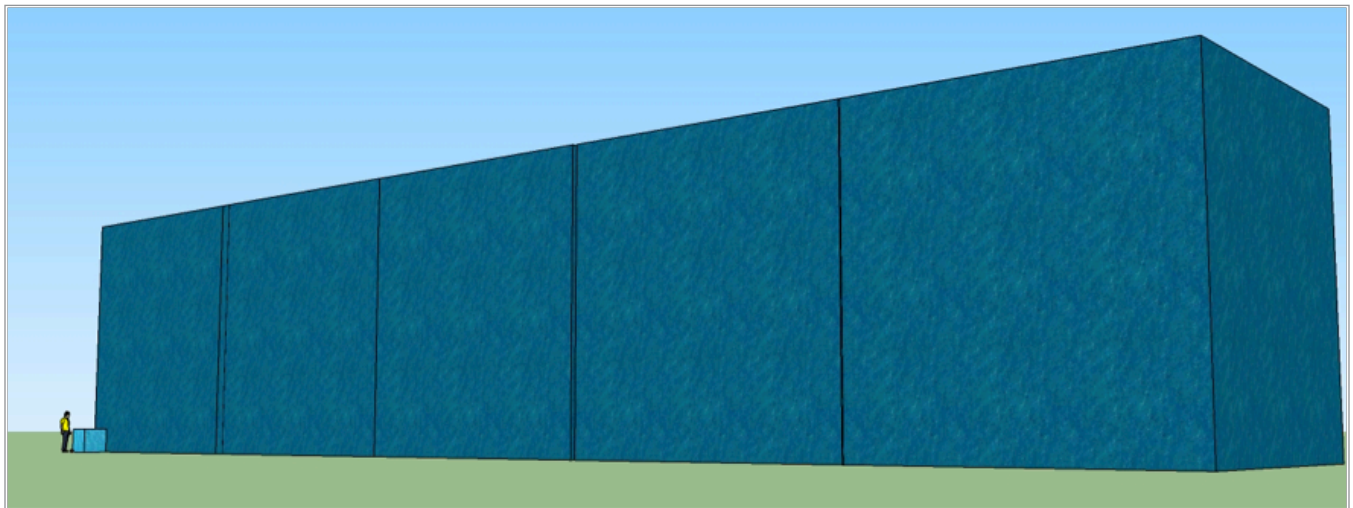
Visualize a litre of used oil and 1,000 litres of water.



One litre of Used Oil will contaminate one million litres of drinking water 1,000,000 L



Visualize one thermostat and 1,000L of water. 1 thermostat contains 3-5 grams Mercury.



1 thermostat will contaminate 5 million litres of drinking water.



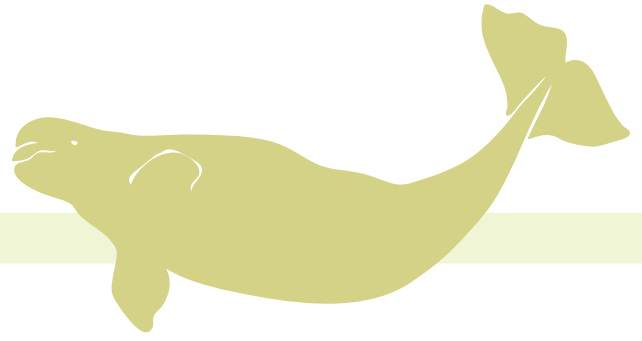
HAZARDOUS Waste Matters

Other types of hazardous wastes are often collected during community hazardous waste collection events. *Does your community have one?* These events collect household hazardous waste, which are items that can be flammable, corrosive, explosive or toxic, which we do not want to end up in our landfills. Household hazardous waste includes household cleaners, paint, batteries, solvents, oil, pesticides, fertilizers, mercury items and aerosol cans.

Why are these materials so important to divert from our landfills and send to proper recycling facilities? There are many ways that hazardous material can harm us and the environment. For instance, one litre of used oil will contaminate 1 million litres of drinking water! The amount of **mercury** in one thermostat will contaminate five million litres of drinking water (the Canadian Drinking Water Quality Guidelines for mercury are 0.001 mg/L)!

Substances that contain **heavy metals** and/or **persistent substances** can be dangerous because they can biomagnify or **bioaccumulate** and become riskier to higher order species such as predatory fish, birds and mammals. Mercury is an example of a persistent toxic substance that bioaccumulates in our environment. The most important pathway for mercury bioaccumulation is through the **food chain**. In the water, **plankton** can absorb mercury through passive surface absorption and is generally not harmful. However, when other organisms consume lower life forms, they will absorb the contaminants their food sources contained and eventually may acquire dangerous levels in their bodies. In Ekali Lake in the Dehcho, high levels of mercury have been found in Northern pike and walleye. To lower the health risk to humans there is a guideline from Health Canada to eat smaller fish or ones lower on the food chain, like whitefish and grayling, from that lake.

Lesson Plans



Bioaccumulation Game

This is an activity about food chains, which is based on one living thing in the ecosystem eating another. Play with the mayfly, Arctic grayling and beluga whale, or choose some other animals.

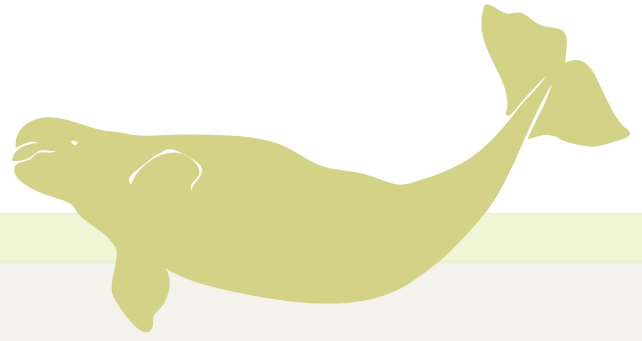
You'll need

- Different coloured pipe cleaners (approximately 30 for each student, one third must be a special colour)
- One paper bag per student
- Coloured armbands or headbands to identify what animal they are

Steps

1. Divide the students into three groups, with the ratio being 1:3:6 (i.e.: 2 belugas, 6 Arctic graylings, 12 mayflies)
2. Give each student a paper bag (their "stomach")
3. Have all the students help to scatter the pipe cleaners outdoors in the play area or in the gym. The pipe cleaners represent their food!
4. Explain the rules of the game: the mayflies will be feeding first, and will try to gather as many pipe cleaners as possible. Next, the predators who join the fray. When a mayfly is tagged by a grayling, the mayfly gives the grayling their stomach bag and waits at the sideline. At some point, the big predators, the belugas, will come out to feed on the grayling!
5. Yell out "mayfly feeding time" or have a music cue to let the mayflies go. They will collect as many pipe cleaners as possible. After about 2 minutes, yell "grayling hunting season is on!" and let the graylings run after the mayflies. After another few minutes yell "beluga hunting time" and have the belugas chase the grayling. End the game when there is only one mayfly and one grayling left.
6. Gather the students together. Announce that there was a toxic spill in their feeding ground and all of a certain colour of pipe cleaner represents poisoned food. (If you had 9 colours of pipe cleaners, you can choose 3 colours to be poisonous.)
7. Have the students "dissect" their bellies to see how much poison they have accumulated. Any mayflies with poisoned pipe cleaners are now dead and any grayling with more than half of their food poisoned dies, too. The beluga with the highest amount of poison will not die, but it won't be able to reproduce!
8. You can play again if you have time, changing student roles and the colours of the poisoned pipe cleaners.
9. Back in the classroom, have the students make a chart with # of toxins along one axis and type of animal along the other. Explain how in older and bigger animals, the amount of toxins can build up over time.

Lesson Plans



Lesson 3: Who's Responsible for Our Hazardous Waste?

1 class period.

- ?** Have a class discussion about the responsibilities of hazardous waste.

What can WE do about dangerous trash in our environment? Some examples; don't buy products that contain hazardous materials, store hazardous materials properly, pick up litter and pack out...

- On the overhead projector, show a photo of a camp with trash. Have the students point out all of the trash and discuss what could be done with it. This could also be modified to be a wall poster for your classroom.

Are there any times when we can't control waste or hazardous things entering our environment? What happens then? Some examples; mines or businesses that have polluted communities and left, municipal/landfill...

This question will lead you to the Waste Reporter activity (right column).

Have students investigate

1. *What industry is involved in this situation?*
2. *What groups are raising issues about the situation?*
3. *What are the main concerns with what has happened?*
4. *Has the issue been resolved?*
5. *What's the response from government or industry?*

Extension

The Great Canadian Shoreline Cleanup

The Great Canadian Shoreline Cleanup, presented by Loblaw Companies Limited and a joint conservation initiative of Vancouver Aquarium and WWF, promotes an understanding of shoreline litter issues by engaging Canadians to rehabilitate shoreline areas in their communities through cleanups. A national cleanup takes place every September, engaging tens of thousands of Canadians in every province and territory. A schools cleanup takes place every May, providing the perfect opportunity for teachers and students of all ages to get their gloves dirty, their feet wet and make our aquatic ecosystems cleaner, healthier and safer for all living things.

Extension

▶ Village of Widows (52:00).

Discuss the legacy of industry in the NWT. This film is available from the Prince of Wales Heritage Centre in Yellowknife. This documentary recounts the tragedy of the people of Deline, who were employed by the Canadian Government to transport uranium during World War II.

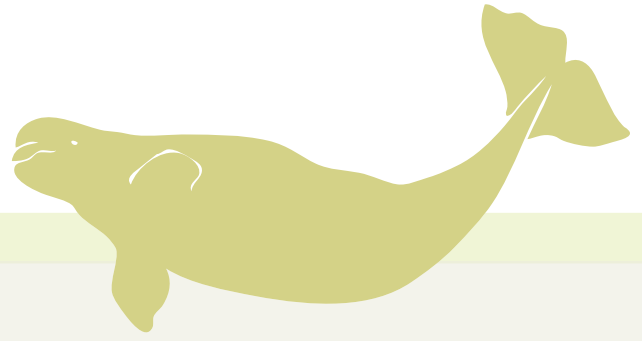
🔍 Waste Reporter

Have students look for a recent article about waste. Key words to search include: Alberta tar sands, coalmine spill, Pine Point mine and fracking in the Sahtu. If you don't have access to a computer lab, bring in a few recent newspapers with these types of articles.

📖 What WWF Is Doing

Find out how WWF is working with governments, industry and communities to promote the responsible development of Arctic resources.

Lesson Plans



Lesson 4: How Do We Protect Our Environment?

1-2 class periods.

Now we understand some of the issues and why it is important to protect our environment from residential, industrial and commercial hazardous waste. But how do we make sure this message is heard?

[Cold Amazon: The Mackenzie River Basin](#) (22:46)

What is being done in the NWT right now to protect the Mackenzie River Basin?

Let's discuss what "stewardship" means. Write *how we can be stewards of the land* on the board and add ideas under it. *What do you do if you are a good steward of the land?* Research issues, get involved in politics, do your best, communicate what you know to others...

Let's communicate!

Review some things we can do to protect our environment from trash and write them on the board. *How do many things get communicated these days?* Advertisements; in print, on the radio or on TV. Have the students break into groups and create an ad to show on TV about protecting the environment. Give them a topic if they need help: picking up litter, remembering to recycle, bringing your reusable bag to the store, not dumping hazardous waste... Give students 15 minutes to come up with their ad and then have them perform it in front of the class.

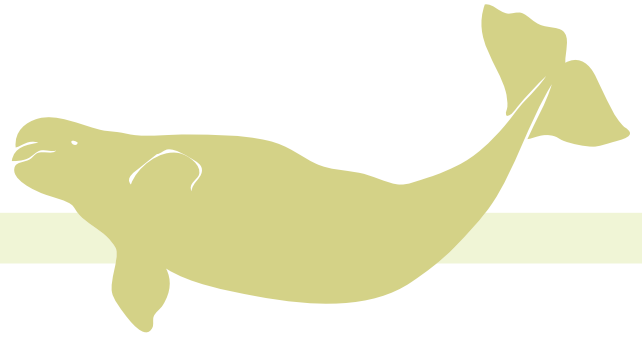


© Terry Domico / WWF-Canada

Waste Investigator

Choose a contaminated site from the **Big Picture 2010** report (see **Teacher's Resources**) and task students with creating a presentation about waste in the environment. Students should outline the issue, how it is being managed and the plans to prevent damage in the future. This can be assigned to small groups as well. If working in small groups, ensure that the students have a plan to divide the project fairly.

WILD Ideas



Great Canadian Shoreline Cleanup

Participate in the Great Canadian Shoreline Cleanup, an annual event that encourages thousands of Canadians in every province and territory to cleanup their local shoreline. There are curriculum-linked lessons and activities for Grade 7 available here.

Stay Local

Pinpoint a local environmental issue that needs your help. Once you have selected a topic, you can

- Talk to your local politicians (local, territorial and federal levels)
- Plan an activity to raise awareness locally (movie screening in your library or recreation centre, presentation to city/hamlet, bring a presenter to your school district)
- Contact your local paper. They are always interested in learning about youth concerns and actions.

Goodbye Honey Buckets

Students will investigate arctic geology and hydrology as well as tundra ecology as they consider options for sewage treatment. Public safety, environmental impact, and issues of construction and engineering will be explored.

Canol Trail Youth Leadership Hike

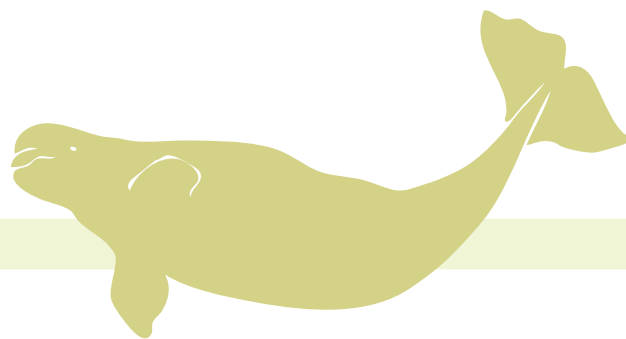
The Canol Trail was part of the CANOL (Canadian Oil) Project, which was a partnership between the United States and Canada during World War II to provide oil from Norman Wells to American Forces stationed in the Pacific. A road, pipeline, maintenance camps were all built in April 1944 but one year later, the project was abandoned. Remnants of the project remain in the NWT from Norman Wells 372 km southwest to the Yukon border. Similar to the DEW Line sites, we did not know as much about environmental contamination when this project was started. Leaking oil at points has created hydrocarbon contamination, there are asbestos-containing material, lead-containing paint, crude oil storage tanks, hazardous fluids associated with abandoned vehicles and physical debris like dilapidated buildings, bridges, drums, communications wire, abandoned pipeline and rusty vehicles. Now, remediation options are now being considered by the Government of the Northwest Territories, local communities and organizations. This trail is also used in the Canol Trail Youth Hike program, which has been completed by over 30 youth from the Sahtu region and teaches wilderness skills and leadership while learning about history and traveling in the ancestral footsteps of the Shotagotine and Kaska Dene. Apply to take part in the hike here:

<http://garthwallbridge.com/canol-trail-youth-hike/>

Extension

What makes this project so difficult to remediate? What does “heritage value” mean? Research the proposed Doi T’oh Territorial Park, which will include the Canol Trail.

URLS



Some hyperlinks have been embedded throughout the **Keep Our Habitat Safe** resource. If a link appears to be broken, try visiting the homepage or keying in the URL as it's written below.

Beluga contaminants fact sheet

http://www.aadnc-aandc.gc.ca/DAM/DAM-INTER-NWT/STAGING/texte-text/ntr_pubs_blg_1330460839751_eng.pdf

Bird Island movie trailer

<https://www.youtube.com/watch?v=ulkY7mOkdqs>

GNWT hazardous waste pamphlet

http://www.enr.gov.nt.ca/sites/default/files/brochures/household_hazardous_wastes.pdf

Creative environmental ads

<http://scribol.com/art-and-design/20-most-creative-environmental-ads/0>

Great Canadian Shoreline Cleanup

<http://schools.wwf.ca/GetInvolved#GeneralContentArticle41>

Village of Widows film

<http://lindumfilms.com/villageofwidows>

Country food reassurances offered at Kakisa workshop

http://www.nnsi.com/frames/newspapers/2013-09/sep5_13RET.html

Cold Amazon film

<http://vimeo.com/88658987>

GNWT environmentally friendly household cleaners pamphlet

http://www.enr.gov.nt.ca/sites/default/files/brochures/environmentally_friendly_household_cleaners.pdf

WWF work with governments in conservation efforts

<http://www.wwf.ca/conservation/arctic/whatwwfisdoing/>

Great Canadian Shoreline Cleanup lessons

<http://schools.wwf.ca/lessons/grade/7/97>



ECOLOGY NORTH



WWF is Canada's largest international conservation organization, working to build a future where people live in harmony with nature. The Schools for a Living Planet program empowers educators and students of all ages with the tools they need to lead us into a sustainable future. Schools for a Living Planet is grounded in the principles that make WWF a global success - including strong science and a focus on solutions.

Ecology North is a charitable, non-profit organization that has engaged Northerners in hands-on learning opportunities in the Northwest Territories since 1971. Our mission is to bring people and knowledge together for a healthy Northern environment. Education, public engagement and youth involvement are integral to all of our program streams that include climate change adaptation, watershed protection planning, waste reduction, food sustainability and alternative energy promotion.

This project was made possible with the financial support of CIBC. For more information, visit www.cibc.com.

WWF-Canada and Ecology North would like to thank the classroom teachers across the Northwest Territories who contributed many of the ideas presented here, especially Richard McKinnon, Holly Norris and Shawn Mosey. This resource is available as a free download from WWF Canada Schools for a Living Planet. Visit schools.wwf.ca. © 1986 Panda symbol WWF-World Wide Fund For Nature (also known as World Wildlife Fund). ® "WWF" is a WWF Registered Trademark.