WOW

WASTE IN OUR WATERSHED

A TOUR OF THE LIQUID AND SOLID WASTE STREAMS IN CAMROSE

TEACHERS GUIDE

ACKNOWLEDGEMENTS

Camrose is a Blue Dot community, dedicated to the health and conservation of our land, water and people. Through this curriculum-linked tour of local facilities, grade 4 students will learn about the solid waste that leaves their homes, as well as the water they consume and the wastewater they produce. Students will also visit a Camrose green space, and will come to appreciate nature's recycling processes. By the end of the tour, students will better understand the waste produced in Camrose, and be able to take action on conservation and waste reduction.

What is Blue Dot?
Initiated in 2015, it recognizes people's right to clean water, fresh air and healthy soils. City Council declared Camrose a Blue Dot community in the fall of 2015.

Funding for this program is provided by:

Battle River Community Foundation
Helping you make good things happen.

COMMUNITY FOUNDATIONS OF CANADA

Since 1995 the Battle River Community Foundation (BRCF) has worked to make a difference in the Battle River area. It serves a large area starting from Camrose west to Gwynne, south to Bashaw and Alliance, east to Hughenden and north to Highway 14. Individuals and organizations from all areas are encouraged to consider the Foundation as a source of funding for projects and activities related to education, health, arts and culture, recreation and more. BRCF provides services to help donors connect their generosity with the needs in their community, creating better places to live, now and in the future. (www.brcf.ca)

Alberta Environment and Parks

Environment and Parks (AEP) are proud stewards of the air, land, water and biodiversity. They lead the achievement of desired environmental outcomes and sustainable development of natural resources for Albertans (www.aep.alberta.ca). The AEP and BRWA work together to achieve the Government of Alberta's *Water for Life* strategy for: (1) Safe secure drinking water supply, (2) Healthy Aquatic Ecosystems, (3) Reliable, quality water supplies for a sustainable economy.

PARTNERS

Alberta Health Services (AHS) is Canada's first and largest province-wide, fully-integrated health system, responsible for delivering health services to the over four million people living in Alberta, as well as to some residents of Saskatchewan, B.C. and the Northwest Territories. They bring together 12 formerly separate health entities in the province including three geographically based health authorities, Alberta Alcohol and Drug Abuse Commission (AADAC), Alberta Mental Health Board and Alberta Cancer Board. Ground ambulance service was added to the responsibilities of AHS in an announcement from Alberta Health and Wellness on May 30, 2008. The services were moved from municipalities to AHS effective April 1, 2009. The province also has an extensive network of community-based services designed to assist Albertans maintain and/or improve health status. (http://www.albertahealthservices.ca/about/about.aspx)

We are landowners, business people, researchers, and decision makers. We are the people that live, work and play in the Battle River and Sounding Creek Watersheds. We are the people that will ensure a stable economy, healthy natural areas and resilient communities in this place that we love. We connect people to place for action. The Battle River Watershed Alliance (BRWA) is an inclusive, collaborative and consensus-based community partnership that is working to guide, support and delivers actions to sustain or improve the health of the Battle River watershed. We are a group representing four orders of government (First Nations, municipal, provincial and federal), watershed groups, environmental organizations, industry, academia and private citizens in a collaborative initiative to plan for the sustainable management of land and water resources in the Battle River Watershed.

We're all part of a watershed, and what we do impacts downstream and future users.

The City of Camrose is committed to being a leader in responsible environmental stewardship and encourages all citizens to do their part. The Municipal Solid Waste (MSW) collection, diversion, and disposal operations are the responsibility of the municipal government, while the province is responsible for approvals, licensing, and monitoring of operations. The most environmentally sound management of MSW is achieved through a co-ordinated mix of practices that include recycling, composting, source reduction, and disposal.

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Waste in Our Watershed

Tour Schedule, at a Glance

The Waste in our Watershed tour is broken into two parts:
AM: Water and Wastewater
PM: Solid waste and recycling

Stop	Timeline*	Location/Topic
	8:45am	Meet at School- students load bus
	9:00am	Leave School
1	9:15-9:30	Wastewater Treatment Lagoon *Where does our wastewater go?*
2	9:40-10:00	Aberhart Bridge *Dried Meat Lake- our water cycle*
3	10:15-11:00	Water Treatment Plant *How do we clean our drinking water?*
4	11:10-11:30	Lunch- Jubilee Park
	11:30-11:50	Green Spaces- Jubilee Park *How natural world recycles*
	11:50-12:10	Closing the loop- Jubilee Park *Recap on Camrose water cycle*
5	12:20-12:50	Center Cam Recycling Centre *Action: Reduce, Reuse and Recycle*
6	1:00-1:30	City of Camrose Landfill *Our last resort: where does our waste go and what happens to it?*
	1:40pm	Return to School
	1:45-2:00	Solid Waste Wrap Up *Solid waste relay*

**All times are approximate*

Preparing for the Field Trip

What to Expect

- This field trip will proceed despite any weather conditions.
- We will be on and off of the bus frequently throughout the field trip.
- There will be washrooms available at different points on our route (stops 3, 4 and 5).
- We will be eating our lunch outside at a park that has picnic shelters.
- Be prepared to learn about how waste is handled within our community.
- Students will be filling out a small workbook. If possible please bring a class set of clipboards.

Roles and Responsibilities

- Teachers are responsible to book the bus for the field trip. Please book the bus to be at the school to board the students at 8:45 a.m. We plan to return to the school by 2:00 p.m.
- Have the bussing invoice for the trip sent to: Battle River Watershed Alliance, Attn: Sheila Logelin, Re: WOW Tour, Box 16, 4825 – 51 Street, Camrose, AB T4V 1R9
- Teachers and adult supervisors are responsible to monitor and respond to the behaviour of all students.
- 1-3 parent volunteers are welcome, but not required.
- Teachers should print off the student work sheet for each student (attached at the end of the manual).
- The facilitators from the Battle River Watershed Alliance and the City of Camrose are responsible for the content of the program and for facilitating the activities of the field trip.

Important to Note 

- We will be staying on the bus for stop 1 (wastewater) and stop 6 (landfill).
- Stop 3 (water treatment) and stop 5 (recycle) are active sites. Please proceed with caution.
- There are washrooms available at: stop 3 (water treatment), stop 4 (lunch) and stop 5 (recycle).

Reminders for Students:

What to Bring

- Dress for the weather. Wear comfortable shoes and clothes as we will be active.
- Try to bring a litterless lunch and a litterless snack.
- Bring a reusable water bottle. Please put your name on it.
- Bring something with which to write (a pencil and eraser would be best).
- A clip board or something to write on.

What Not to Bring

- Do not bring any electronic devices. Exceptions made for cameras.

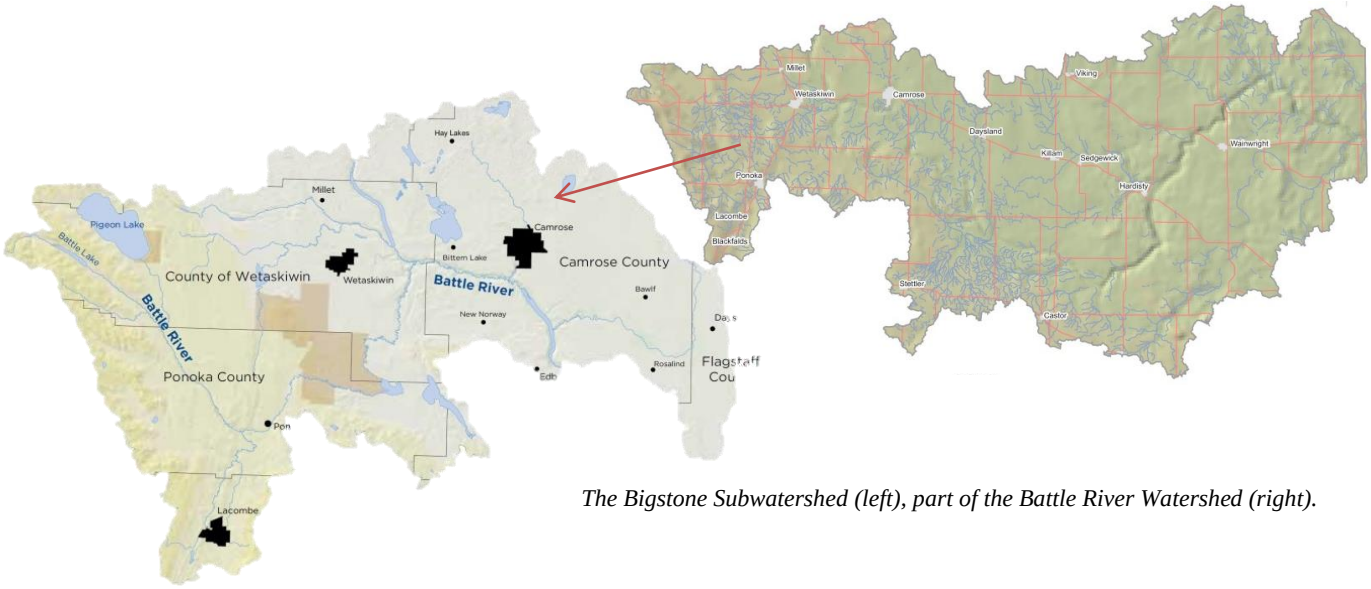
Background Information: Water

What is a Watershed?

A watershed is a large area of land that catches precipitation and drains to a particular watercourse or body of water (such as a marsh, stream, lake or river).

Battle River Watershed

Camrose is the largest municipality within the Battle River Watershed (BRW). The Battle River starts at Battle Lake, and flows south through Ponoka before heading in a north-easterly direction by Maskwacis, Gwynne and Camrose.



The Bigstone Subwatershed (left), part of the Battle River Watershed (right).

Along the way, Bigstone Creek, Coal Lake and Stoney Creek feed into the river. Dried Meat Lake is a naturally wide section of the river, which has been dammed to create a water reservoir for the City of Camrose. Eventually, the Battle River flows into the North Saskatchewan River in Battleford, Saskatchewan. This water then makes its way into Lake Winnipeg, and then Hudson Bay on its way to the ocean.

The BRW is **prairie-fed**, meaning that the water supply comes entirely from rain and snow runoff (instead of glaciers and mountain snowpack). As a result, the amount of water in the BRW varies widely from year to year, and even month to month.

Camrose is one of many municipalities in the BRW that draw their water and deposit their wastewater within the watershed's borders. The City of Camrose's drinking water is withdrawn from Dried Meat Lake, a reservoir on the Battle River. Dried Meat Lake is also the receiving waterbody of the City's wastewater. The drinking water intake is located downstream from the wastewater outfall. We are literally downstream of ourselves! This puts Camrose in a unique position to ensure that our wastewater outputs are as clean as possible, so that our drinking water source remains safe.

Stop 1: Wastewater Treatment Lagoon

WOW Tour	Learner Expectations *	Topic A
What is in wastewater?	2. Identify and classify wastes that result from human activity.	Waste and Our World
What is in wastewater? Where does it come from?	4. Distinguish between wastes that are readily biodegradable and those that are not.	
Where does the treated wastewater and solid waste go?	6. Identify methods of waste disposal currently used within the community.	
How can we reduce the wastewater we produce?	8. Identify alternative materials and processes that may decrease the amount of waste produced.	

The wastewater that leaves the homes, schools and businesses in the City of Camrose goes to the Wastewater Treatment Lagoon. Wastewater includes water and added wastes from our toilets, sinks, showers, dishwashers, washing machines and more! This is a lot of water!

How wastewater treatment lagoons work:

After wastewater leaves our homes, schools and businesses, it is transported by pipes to the wastewater treatment lagoon. In fact, there are 160km of pipes that remove the wastewater that we flush down our sinks, drains or toilets! All of this wastewater must undergo treatment before being returned to Stoney Creek. The treatment process takes approximately one month. After treatment, water is stored in a lagoon for up to six months. The license to operate, granted by Alberta Environment allows two discharges annually (once in the spring and once in the fall). The water is tested before, during, and after the discharge, at the discharge point and again downstream. (www.camrose.ca).

Stop Host:
Battle River Watershed Alliance

Nathalie Stanley Olson,
Education and Outreach Coordinator

Nathalie has worked with the BRWA for over 5 years. Her role is in engaging students and community members of all ages and stages to love and protect this place.

**These learner expectations are taken from the grade 4 Alberta Education curriculum*

The largest challenge the City of Camrose faces in treating the wastewater is reducing the high nutrient levels in the water. The City is currently undertaking upgrades to reduce nutrient levels, and meets federal wastewater standards.

Did you know?

No chemicals are added to the water. Instead, an aeration system is used to enhance the naturally occurring bacteria in the wastewater to break down organic compounds into carbon dioxide, nitrogen gas and a sludge that contains nitrogen and phosphorus.

What about the sludge?

Solids that settle down in the wastewater aeration tanks get collected every 2-3 years. Once removed, the excess waste that is rich in nutrients is farmed and cultivated into local agricultural fields.

Notes:

Stop 2: Aberhart Bridge & Dried Meat Lake

Students will learn about the Battle River watershed and be able to see where Camrose's wastewater and storm water go. This is also where Camrose gets its drinking water.

WOW Tour	Learner Expectations	Topic
Where does the treated wastewater and untreated storm water go?	6. Identify methods of waste disposal currently used within the community.	A: Waste and Our World
What cannot be cleaned out of wastewater and storm water and goes into Stoney Creek/Dried Meat Lake and the Battle River?	7. Identify kinds of wastes that may be toxic to people and to the environment.	
Where would the wastewater and storm water go if Stoney Creek did not exist? Would there be a Camrose without it?	4.1.1 Appreciate how land sustains communities and quality of life.	Social Studies 4.1: Alberta: A Sense of Land
The Battle River Watershed is an important geographic region. The Battle River and Dried Meat Lake are important local water sources that provide many environmental and societal functions.	4.1.2 What are the major geographical and natural vegetation regions, landforms and bodies of water in Alberta?	

Where does our wastewater and storm water go?

Once the wastewater has been treated to provincial standards, water from the lagoons is biannually released into Stoney Creek (in spring and fall). Stoney Creek carries this treated water, as well as untreated storm water, into the Battle River and Dried Meat Lake.

The Battle River flows into Dried Meat Lake south-east of the Aberhart Bridge. From the bridge you can see the lake to the south-east. Dried Meat Lake is a naturally wide section of the river, which was damned in 1950 to create a water reservoir for the City of Camrose.

Stop Host:
Battle River Watershed Alliance

Sarah Skinner, Watershed Management

Sarah has worked with the BRWA for over 6 years. As the lead staff person in watershed management planning, she works with stakeholders to develop and implement beneficial management practices to keep our watershed clean and healthy for us and future generations.

What is found in the wastewater and storm water? Where does it come from?

Many types of waste/pollution are found in our wastewaters. Although some may be naturally occurring, having too much can be a bad thing. This chart shows some of the most common pollutants, their sources and problems.

Pollutant	Natural Sources	Human Sources	Problems
Sediment/Soil	Spring runoff	Construction Tree removal City streets	Increases turbidity, affecting aquatic organisms
Nutrients; phosphates and nitrates	Organic debris like decomposing plants	Fertilizers Detergents	Causes algal blooms and decreases oxygen
Garbage		City streets via storm drains Wind	Unsightly Harms animals
Bacteria	Animal waste	Domesticated animal manure Untreated sewage	Health hazard. Must be treated before consumed Can harm animals
Petroleum Products		Motor oil Gasoline from cars or boats	Disrupts food chain Depletes oxygen Harms birds and mammals

These common pollutants and how we keep them out of our water systems will be discussed at this stop, as well as stop 4 when the students learn about storm water.

Why is it called Dried Meat Lake?

Abundant with Saskatoon berries, the shores of Dried Meat Lake were a common gathering place for this area's First Nations people to dry their bison meat and prepare pemmican.

Aberhart Bridge on the Battle River

Notes:

Caution: Active Site!

Bathroom at location

Stop 3: Water Treatment Plant

Students will learn about our water consumption, how our drinking water gets treated, how much water Camrose uses and how we can help conserve water. The City of Camrose staff that work at the water treatment plant will take students around the facility to show them the steps they take to ensure Camrose water is clean and safe for our consumption.

There will be 3 groups at this location (~10 minutes each per location):

- Group 1 will begin in the control room
- Group 2 will begin in the laboratory (completing a titration)
- Group 3 will begin touring the facility

The groups will be led by their tour guide through all three stations.

WOW Tour	Learner Expectations	Topic A
What is being removed from the drinking water?	7. Identify kinds of wastes that may be toxic to people and to the environment.	Waste and Our World
How can we use water wisely? How can we reduce the amount of water we use?	3. Describe alternative methods of disposal, and identify possible advantages and disadvantages of each.	

Water is an important valuable natural resource, and the water that we receive from our taps in our homes, schools and businesses first goes through the water treatment plant.

Where does Camrose get its drinking water?

The City of Camrose receives its drinking water from Dried Meat Lake.

What treatment does the drinking water undergo?

It goes through nine steps, in order to remove contaminants from our drinking water. For each drop of water that enters the treatment system, it takes approximately 5 days to treat and distribute. (www.camrose.ca)

Stop Host:
City of Camrose
Water Treatment Plant Operators

Allan Baier

Did you know? On average, 279 litres of water is used in Camrose per person per day! Ideally, this number should be less than 200 litres.

Water Conservation!

- How can we use water wisely?
    - Never run the water while brushing your teeth
    - Keep your showers short
    - Water your lawn early in the morning or late in the evening
    - Collect rainwater to water your gardens
    - Check for leaks in your home
    - Install low-flow toilets and tap aeration systems

Notes:

Bathroom at location

Stop 4: Lunch & Camrose Green Space

Stop Host:
City of Camrose

Chris Clarkson, Parks Director
Chris has worked at the City of Camrose for 29 years and has worked with Parks for 24 years. Chris has lived in Camrose since 1987, and has a B.A in Recreation Administration from the U of A.

Lunch Break!

When we arrive at Jubilee Park, students will have time for free play and then lunch.

After Lunch…

Chris Clarkson will start the green space tour with a brief discussion about storm water movement. While walking along the shoreline of Stoney Creek, he will explain how nature recycles its nutrients, what is (and isn't) biodegradable and how the City tries to build and maintain a healthy shoreline.

WOW Tour	Learner Expectations	Topic
What is storm water and where does it go?	6. Identify methods of waste disposal currently used in the community.	A: Waste and Our World
How are plant and animal wastes recycled in nature?	1. Identify plant and animal wastes, and describe how they are recycled in nature.	
What is biodegradable? How does litter impact parks and animals?	4. Distinguish between wastes that are readily biodegradable and those that are not.	
Wildlife habitat: how are healthy shorelines important to humans and wildlife?	1. Describe the importance of plants to humans and their importance to the natural environment.	E: Plant Growth and Changes

History of Camrose's Green Space and Parks

Camrose has been listed as one of the nicest cities in Western Canada. One of the reasons for this is because Camrose is abundant in natural green spaces and parks. Council approved the Green Space Master Plan in August 2014, which will protect and grow our green spaces for years to come. These parks and green spaces play a vital role in the quality of life in the City of Camrose.

The purpose of the Green Space Master Plan is:
"To develop and express the City's policy on green space allocation, development, management and protection within the boundaries of the City of Camrose."

The plan can be accessed at: camrose.ca/608/Green-Space-Master-Plan

The Other Wastewater: Storm Water

It's important to note, rain or snow melt from Camrose's streets does not get treated at the wastewater lagoon! This water goes from storm sewers into local water bodies, including Mirror Lake and Stoney Creek. This water often picks up wastes off our streets such as motor oil, salt and garbage, or waste off our lawns like excess fertilizer.

The importance of a healthy shoreline!

Along the river, you can see soil, trees and plants, which we will refer to as a shoreline. These plants and trees like to get their feet wet. It is important that shorelines remain healthy!

Why? Shorelines:

-Keep our water clean
-Store water for us (the shoreline performs both of these functions for us for free!)
-Are important during a flood or drought event
-Provide a habitat for wildlife
Without these shorelines, water quality and ecosystem health can be negatively impacted.

Natural Space and Nature's Recycling

Nature has the amazing ability to create no waste! Every bi-product of one process (like animal poop) will be used by something else (like food for bugs!).

Camrose Water Cycle Tag

After Chris' talk we will first wrap up the water section of our day. Students will have the chance to run and play, while integrating the Camrose Water Cycle with the "Camrose Water Cycle Tag" game. When completed and debriefed, students will get back on the bus to travel to stop 5- Centra Cam Recycling!

Background Information: Waste and Compost

City of Camrose Waste Streams:

Recycling	Returnable*	Compost	Landfill wastes	Reusable*
E-Waste Papers Plastics Metal	Beverage containers	Yard waste Cold Ashes Food soiled paper towel, napkins, paper egg carton, pizza box, etc. Fruits and vegetables Coffee grounds, filters and tea bags	Large Appliances Household garbage Hazardous Waste	Working appliances, clothes, furniture, toys, etc. can be taken to the Re-Store, Centra Cam, or the Thrift Store.

**These waste streams will be mentioned but not extensively covered in this tour.*

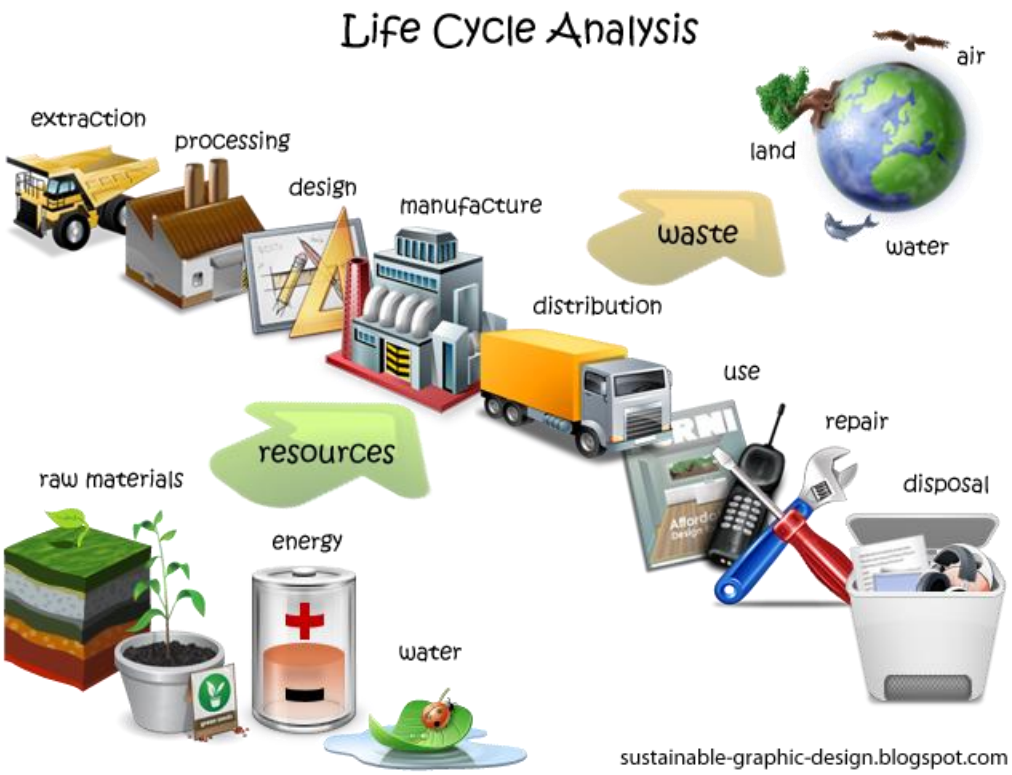
Waste and Compost

Approximately 40% of Camrosians' waste is compostable. City-wide composting pick-up started in 2011, green carts were distributed to city residents in April 2016 and the automated waste program started on May 2. It's important to know what can actually go in your green cart!

Accepted Items for your Green Cart	NOT Accepted Items for your Green Cart
• Leaves, shrubbery, twigs • Cold ashes (from UNTREATED wood) • Food soiled paper towel, napkins, paper egg carton, pizza boxes • Fruits, vegetables and their peelings • Coffee grounds, filters and tea bags • Weeds and grass clippings	• Plastic (no plastic bags!) • Pet or animal waste • Meat or dairy products • Diapers

Life Cycle Analysis

The products that we use every day have a life cycle. They are made from raw materials that have to be extracted from the earth. The materials are processed into products, which uses energy and creates wastes that may be released into the air, water or land. There is often a large distribution network (especially for things made overseas!) which can also cause significant pollution. When things finally do come into our homes and schools it is our responsibility to use them the best we can! It is hard to buy single use items when you see the whole life cycle for a single item!



Plastic Bags-Did you know?

Worldwide, every year, a TRILLION plastic bags are used. This means approximately 2 million plastic bags are used every minute around the world (www.earth-policy.org, 2014). Only small portions of these plastic bags are recycled and often they end up in bodies of water, harming the freshwater or marine animals and ecosystems!

What's the solution? Use reusable shopping bags! It can take up to 500 years for a plastic bag to biodegrade. Each reusable cloth bag could replace 100-1000s of plastic bags. When you think of all the energy that goes into making, transporting, distributing and using plastic bags and wastes that get produced (see the life cycle analysis chart above), using reusable bags just makes sense!

Caution: Active Site!

Bathroom at location

Stop 5: Centre Cam Recycling

Staff at Centra Cam will take students through the site to show them the materials that are recycled. They will also discuss what items are the best to recycle and what they are converted into.

Stop Host:
Centra Cam

Lynn Horsman, Production Worker

Lynn has worked at Recycle with Centra Cam for 5 years. Lynn says, "I love my job because I believe I am doing a good thing for the environment." Her goal: to make sure there are lots of green trees for the future grade four students!

WOW Tour	Learner Expectations	Topic A
Visit and learn about the various disposal options for different items.	6. Identify methods of waste disposal currently used within the local community.	Waste and Our World
What are some of the pros and cons of recycling?	3. Describe alternative methods of disposal, and identify possible advantages and disadvantages of each.	
How might certain packaging benefit a consumer, but not the environment? Can we have packaging that benefits both?	5. Compare different kinds of packaging, and infer the relative advantages and disadvantages of that packaging.	
Are there items that the students notice that could have been reused?	9. Identify ways in which materials can be reused or recycled, including examples of things that the student has done.	

History of "Recycle with Centra Cam"

The "Recycle with Centra Cam" Collection Depot is run by Centra Cam under a contract with the City of Camrose. City and County residents are able to drop off their recycling 24 hours a day, 7 days a week. Recycling with Centra Cam has been in operation since 1986. Since then they have diverted 15-20% of waste (NOTE: this

includes diversion from the landfill stops). The money they make on the recycled items they collect and sell, keeps the recycling depot open, and helps to support other community programs offered by Centra Cam.

What does Centra Cam collect?

Centra Cam collects: paper (cardboard, magazines, phone books, office paper etc.), plastics (#1, #2, #3, #5, #7), tin cans, paint, electronic waste, clear glass, and fluorescent tube.

Did you know? If a Tyrannosaurus weighs 10,000 pounds, Centra Cam ships 112 Tyrannosaurus' of cardboard per year!

The Importance of Recycling

Recycling is extremely important as it reduces the amount of waste entering the landfill and the amount of 'raw' materials needed to manufacture goods. However, recycling still uses a lot of energy and is considered the "3rd R" after Reduce and Reuse.

Notes:

Stay on Bus

Stop 6: City of Camrose Landfill

WOW Tour	Learner Expectations	Topic A
Visit and learn about the various disposal options for different items.	6. Identify methods of waste disposal currently used within the local community.	Waste and Our World
Discuss human and environmental impacts of different waste streams.	3. Describe alternative methods of disposal, and identify possible advantages and disadvantages of each.	
Learn more about Camrose's compost program and what should and should not be composted.	4. Distinguish between wastes that are readily biodegradable and those that are not.	
What can you do to reduce the amount of waste that you produce?	11. Identify actions that individuals and groups can take to minimize the production of wastes, to recycle or reuse wastes and to ensure safe handling and disposable of wastes.	

History of the landfill in Camrose

The City of Camrose has been using this landfill since 1983. The landfill was designed to last 35-40 years. However, with increasing the landfill's size and decreasing the waste we produce, it has been estimated that this landfill will be open for approximately another 32 years.

Last Chance to Recycle!

The City and its residents do their best to reduce waste going to the landfill. However, there are still many materials produced that have nowhere to go except the landfill. There are 7 areas of the landfill that we will be visiting.

Stop Host:
City of Camrose

Mark Barrett, Director Infrastructure Services

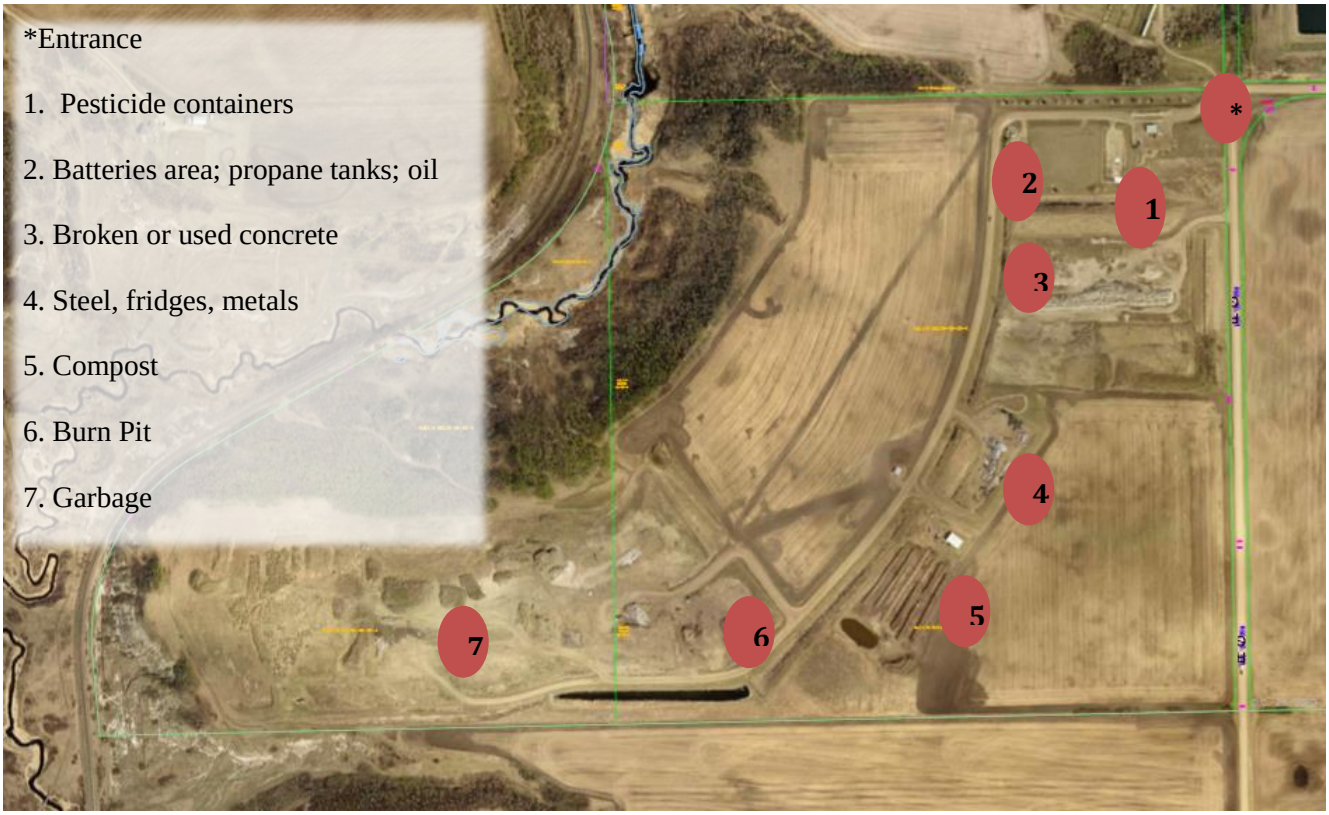
Mark has worked in the Engineering Department (City of Camrose) for 25 years, and has a diploma in Civil Engineering Technology from NAIT. Mark has been involved in Waste Management for about 20 years.

Did you know? Only the last point at the landfill is waste that has no other home! At this point it is prohibited to remove anything. Before this last point, we can think of the locations as a "last chance to recycle".

How much waste do we produce in a day?

About ten large bus loads!!

Areas of the Landfill



Return to School

Once we get back to the school we will play one more game outside in the school yard to debrief the waste components of the afternoon and integrate what students can do to reduce their waste.

Solid Waste Relay Activity: Can you identify what is recyclable, compostable or garbage in your lunch? Could you reduce your waste footprint?

THE END!

EXTRA ACTIVITIES

Possible Next Steps:

(A) Develop and implement a plan to reduce waste, and monitor what happens over a period of time.

(B) Develop a flow chart for a consumer product that indicates the source materials, final product, its use and method of disposal.

(C) How much material has been saved from the landfill?

Recycled Materials in Kilograms.

Item Quantity	2010	2011	2012	2013	2014
Paper and Cardboard	1,739,540	2,017,907	1,854,770	1,730,920	1,694,000
Glass	45,130	82,136	38,000	39,000	42,000
Tin Cans	42,500	33,480	27,763	44,688	29,780
Plastics	12,930	29,640	55,353	Nothing shipped*	139,180
E-Waste	119,823	146,550	151,810	145,350	119,000
Total	1,959,923	2,309,713	2,127,696	1,959,958	2,023,960

**quantities are of items that have been shipped - NOT what was brought into the centre.*

Additional Student Questions for after the field trip

1. Explain in your own words, what a "watershed" is?
2. Where does Camrose receive its drinking water?
3. What is storm water? Does it go to the wastewater lagoon?
4. List two reasons why having a healthy shoreline along Stoney Creek is important.

** Write 2-3 paragraphs on what YOU can do to reduce your waste footprint, or your water footprint.

Other Resources

Reduce your food-print: http://www.greenafricadirectory.org/staggering-impacts-food-waste-natural-resources/

Woman living very close to zero waste: http://inhabitat.com/this-woman-can-fit-two-years-of-trash-in-one-small-mason-jar/

Compost Information (Camrose): http://www.camrose.ca/195/Composting

Inside Education: http://www.insideeducation.ca/

GLOSSARY

Algal blooms: a rapid increase in the abundance of algae in a water body.

Compost: Composting is nature's way of recycling. Composting breaks down organic waste (food waste, leaves, grass, paper, wood) and converts it to a valuable organic fertilizer.

Decompose: Break down or decay of organic materials.

Nitrogen and Phosphate: chemical elements, which are important nutrients for plants and animals.

Organic: an organic compound is a carbon-based compound, produced by or derived from living things.

Pollution: introduction of a harmful substance to the environment.

Recycle: Is the third R in the three R's. Waste is converted into reusable material. For example: plastic, paper, cardboard, etc can be recycled, instead of extracting raw materials.

Reduce: Reduce is the first R from the three R's. It is the most effective component of the waste hierarchy (to reduce the amount of waste created).

Reuse: Is the second R from the three R's. Examples of reusing: purchase a refillable water bottle instead; use a cloth bag instead of a plastic bag. (Using an item more than one time.)

Shoreline/ Riparian: The lands adjacent to streams, rivers, lakes and wetlands, where the vegetation and soils are strongly influence by the presence of water. It is the transition area from the water to the adjacent land.

Storm Water: is water from rain or snow that flows from streets, parking lots, roof drains on buildings, etc. that flows into storm drains (the grated drains on the streets), which directly flows into creeks, streams or rivers.

Waste Water: is water where the quality has been adversely impacted by anthropogenic (human) influence. It is the flow of used water discharged from homes, businesses, industries and commercial activities.

Wastewater Lagoon: is used to treat wastewater. Chemicals are not added to the system. Instead, an aeration system is used to enhance the naturally occurring bacteria in the wastewater to break down organic compounds into carbon dioxide, nitrogen gas and a sludge that contains nitrogen and phosphorus.

Storm Drains: carry the rain mentioned above (storm water). They are designed to carry rainfall runoff, snowmelt from our city streets. Any litter or pollution on the streets, yards or driveways can end up in these storm drains, and directly discharges untreated into local streams, rivers, and other surface water.

Watershed: a large area of land that catches precipitation and drains to a particular watercourse or body of water (such as a marsh, stream, lake or river).

Water Conservation: means using less water or recycling used water so that it can be used again.

Water Treatment Plant: converting used water to water that can be used, or water that can be consumed.

WOW

Student Activity Sheets

Waste in our Watershed

NAME:_ _ _ _ _ _ _ _ _ _ _ _

STOP 1: Wastewater Treatment Lagoon

1. What is in wastewater?

List 3 things found in wastewater:

_____

_____

_____

2. What do we add to the lagoons to make the bacteria more active?

_____

3. Circle what items should NEVER go into wastewater:

- **Shampoo**
- **Floss**
- **Kleenex/tissue paper**
- **Human waste**
- **Medicine**
- **Soup**
- **Cleaners (like bleach)**
- **Bacon grease**
- **Laundry soap**
- **Paint**

Building Blocks of Life: Nitrogen and Phosphate

PROS

- Essential for life
- Helps plants grow
- Breaks down naturally
- Feeds plants and other animals

CONS

- Algal blooms in a water body
- Fish kills

This is what TOO MUCH nitrogen and phosphate looks like (LEFT LAKE).

The lake on the left is unhealthy and has an algal bloom.

4. Where can we find nitrogen and phosphate? Circle what items contain nitrogen and phosphate, cross out the items that do not.

- **Human waste**
- **Fertilizers**
- **Plastics**
- **Humans**
- **Paint**
- **Car oil**
- **Plants**
- **Animals**

STOP 6: CAMROSE LANDFILL

Can these items be reduced, reused, recycled, composted or is it garbage? Write A,B,C,D or E beside the picture:

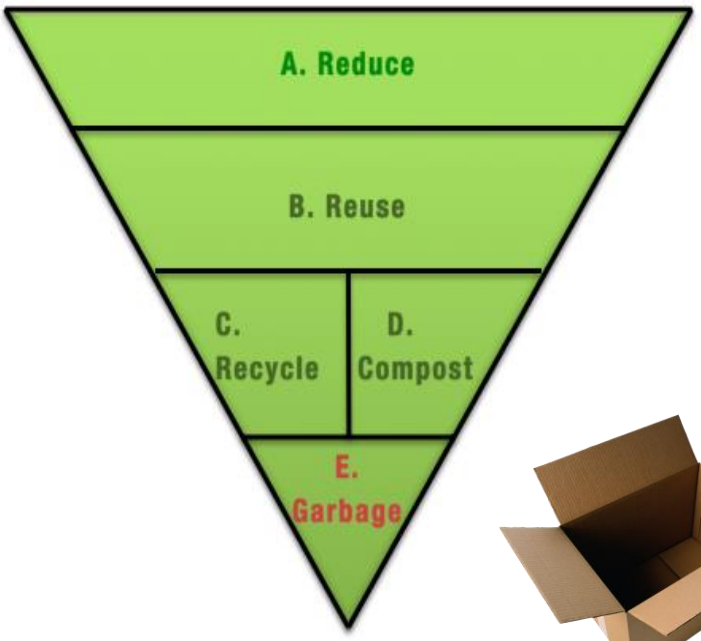
- **A. Reduced**
- **B. Reused**
- **C. Recycled**
- **D. Composted**
- **E. Garbage**

Styrofoam ____

Refrigerator____

Batteries____

Banana Peel____



Cardboard____

Paint____

Apple Core____

2. What are three things you can do to reduce the waste you produce?

a)_____

_____

b)_____

_____

c)_____

_____