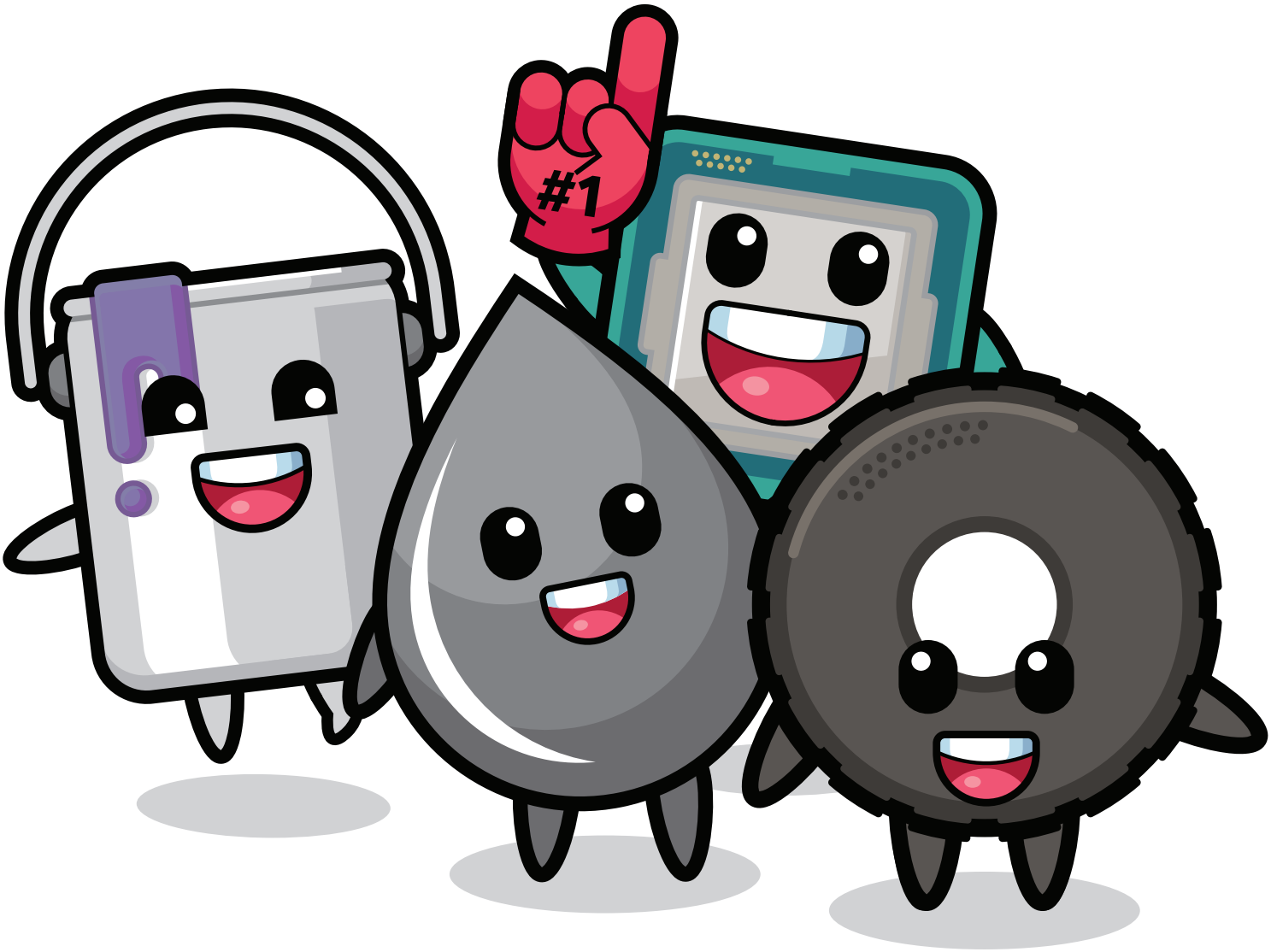
Alberta recycling
MANAGEMENT AUTHORITY

RECYCLING IN ACTION

A Teacher's Resource Guide for recycling electronics, paint, tires, and used oil materials in Alberta.



INSPIRING A FUTURE WITHOUT WASTE

1.0 - 01/2025

WELCOME TO THE **RECYCLING IN ACTION** TEACHER'S RESOURCE GUIDE

This resource provides a fun, engaging way to help your students learn about recycling electronics, paint, tires, and used oil materials—an often overlooked but essential part of environmental responsibility. Alberta Recycling Management Authority (ARMA) lives by is vision of **Inspiring a Future Without Waste.**

This resource contains six activities designed to support Alberta's Grade 4 science curriculum, Waste in Our World. Each activity begins with a teaching moment, allowing students to explore the recycling process for various materials. While most activities can be completed in one class, some may require additional time outside of school.

This guide is intended to supplement other recycling resources, reinforcing the concepts of reducing, reusing, and recycling, with a focus on electronics, paint, tires, and used oil materials.

We hope you find this resource valuable in teaching students about another critical aspect of recycling and its impact on the environment.

For further information on Alberta Recycling Management Authority, please visit our website at **www.albertarecycling.ca**

LEARNING RESOURCE ONE:
AN INTRODUCTION TO ALBERTA RECYCLING MANAGEMENT AUTHORITY (ARMA)

Purpose:

To introduce students to the stewardship materials and how Alberta recycles them. Students will be introduced to Alberta Recycling Management Authority (ARMA) and how stewardship models work. Students will also be introduced to our recycling characters, who will aid the students in learning and will ask for help throughout the learning module.

Background:

The Alberta Recycling Management Authority (ARMA) manages Alberta's recycling programs for electronics, paint, tires, and used oil materials.

Meet the ARMA Recycling Team:

- Chip – Electronics Recycling
- Hue – Paint Recycling
- Tread – Tire Recycling
- Slick – Used Oil Materials Recycling

They are going to help us learn about the importance of recycling these materials.

History:

- Alberta Recycling Management Authority (ARMA) was established in 1992, to manage the recycling of tires in Alberta. Alberta has the second-oldest tire recycling program in Canada.
- In 1997, the used oil materials program started to recycle used oil, oil filters, and containers.
- In 2004, Alberta launched the first electronics recycling program in Canadian history.
- In 2008, the paint recycling program was added.

How It Works:

ARMA works on behalf of the Government of Alberta to manage these programs. Regulations and Bylaws are created. These regulations and bylaws are the rules that everyone who is part of the recycling system must follow.

These recycling programs operate on what is called a stewardship recycling model and everyone helps out by paying a small fee to support the recycling of the material. When someone purchases an item specified in any of these programs, they pay a small environmental fee. This environmental fee helps to support the recycling eco-system, paying for the collection and processing of the material.

When the item is purchased, the environmental fee is collected by the producer. This fee is then submitted to ARMA along with reports of sales. ARMA provides the funds to the Transporter and Recyclers to handle the material. Communities also bear costs (for example, collecting materials from residents and transferring to a recycler), in these instances the municipality is also given funding.

When one of these materials has reached its end-of-life, it can be dropped off at one of over 430 registered recycling depots throughout Alberta. Your parents can find a recycling depot near them using an online depot finder.

ARMA works closely with municipalities and processors across the province to ensure these materials are recycled safely and responsibly so they don't end up in landfills.

This material is collected by registered processors. These processors are the recyclers, who take the material, separate it, and break it down so it can be turned into something else. There are separate processors that handle electronics, paint, tires, and used oil materials.

Recycling is good for the environment because it keeps these materials out of the landfill and puts them to good use. It also helps to build a circular economy.

A linear economy takes natural resources and makes something from them. Once that thing has reached the end of its life it gets thrown out and ends up in landfills, which isn't good for anyone.

A circular economy is like a big loop. When something is made it is called production. Then that item is distributed to stores where it is bought. Consumption is the use of the item. When the item has been used, it could be reused by you or someone else, it could be repaired if broken, or it could be recycled if it has reached the end of life. That item then ends up in the recycling sector, where the materials that it is made of are recycled into new things.

Imagine you have a toy. That toy is made by a manufacturer, shipped to a store, and you buy it. You love that toy but eventually, it wears out or gets broken. In a circular economy, you find a way to reuse, fix, or recycle it. This way, nothing gets wasted, and we keep using things over and over. Can you think of any other items you could fix or recycle instead of throwing it away?

There are many benefits of a circular economy. It reduces waste and conserves resources by reusing materials. It creates new economic opportunities by establishing new markets for recycled materials, and it creates jobs related to recycling facilities, product design, repair and research on new recycling methods.

Procedure:

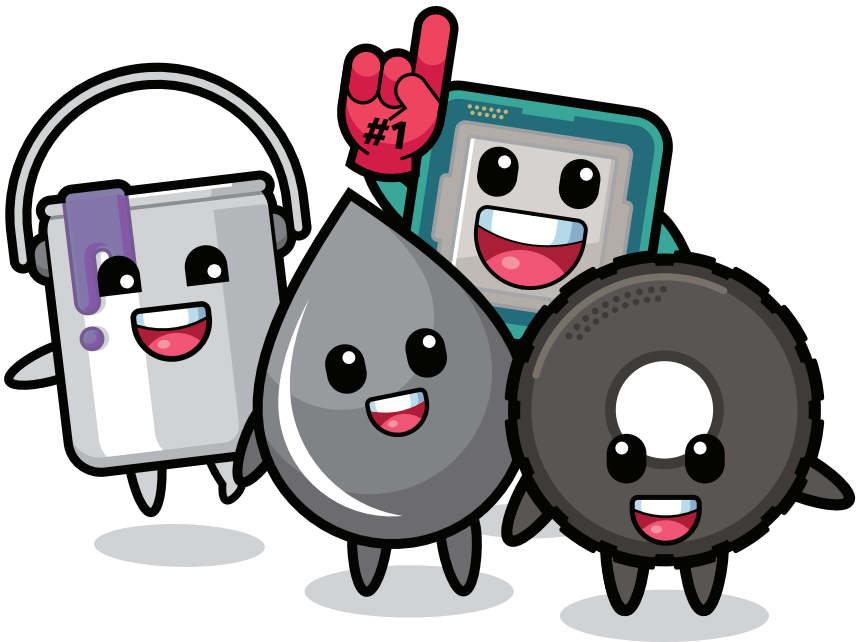
- Introduce the concept of recycling electronics, paint, tires, and used oil materials and play the video for the students.
- Guide students through the presentation and answer any questions.
- Instruct the students to complete the circular economy activity.

Learning Resources:

- Slideshow – Learning for the above concepts.
- Inspiring a Future Without Waste video – will introduce ARMA and the concepts.
- Use the circular economy sheet and fill in the blanks. Then have the students write down some benefits of a circular economy. When they are done, they can colour the diagram if there is time.

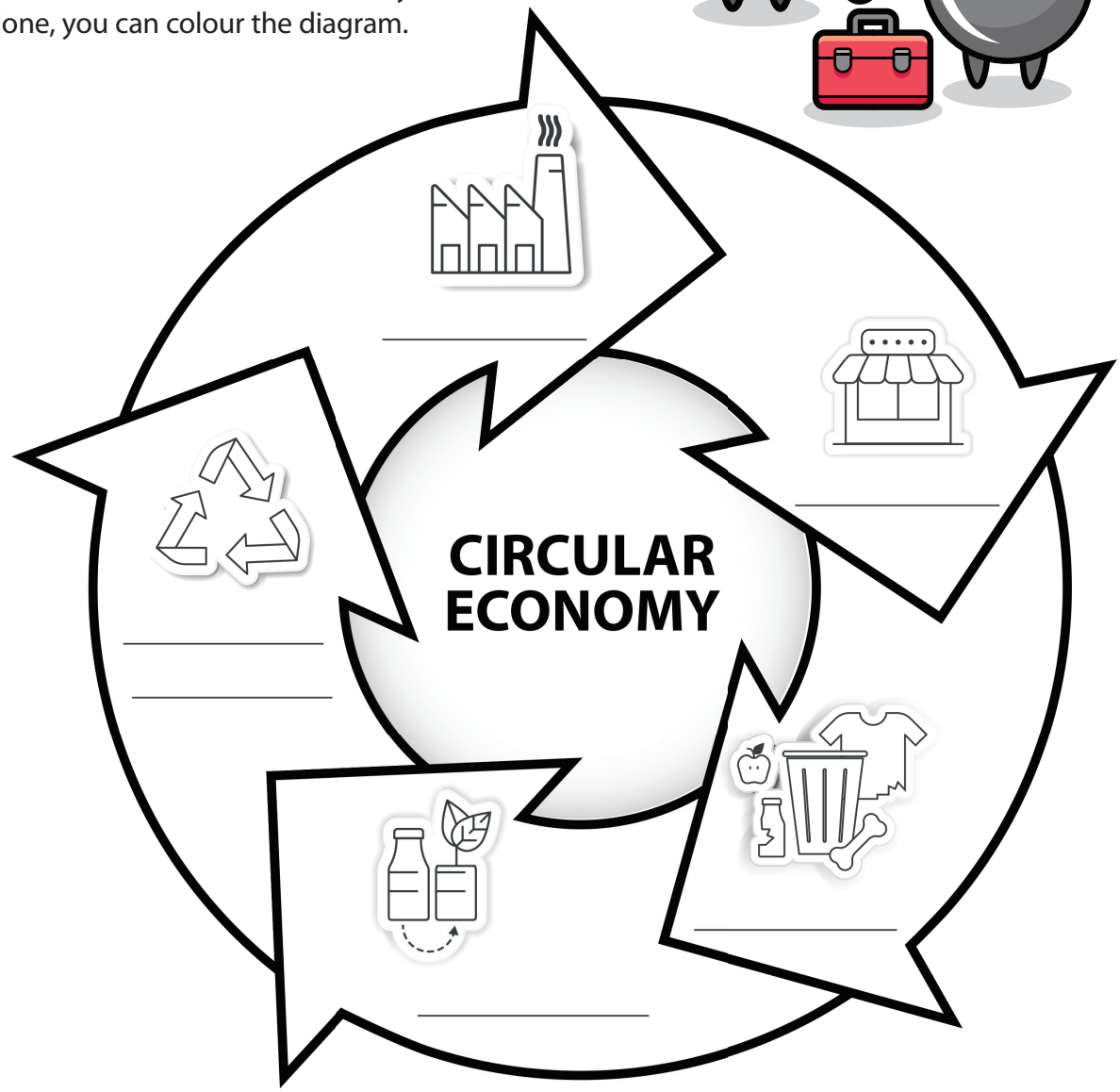
Materials:

- Circular Economy Activity Sheet
- Pencil/pen
- Crayons or colouring pencils



BUILDING A CIRCULAR ECONOMY

Help the recycling team complete the circular economy by filling in the missing blanks for each phase using what you just learned. Then write down some of the benefits of a circular economy. When you are done, you can colour the diagram.



What are some benefits of a circular economy?

_____

_____

_____

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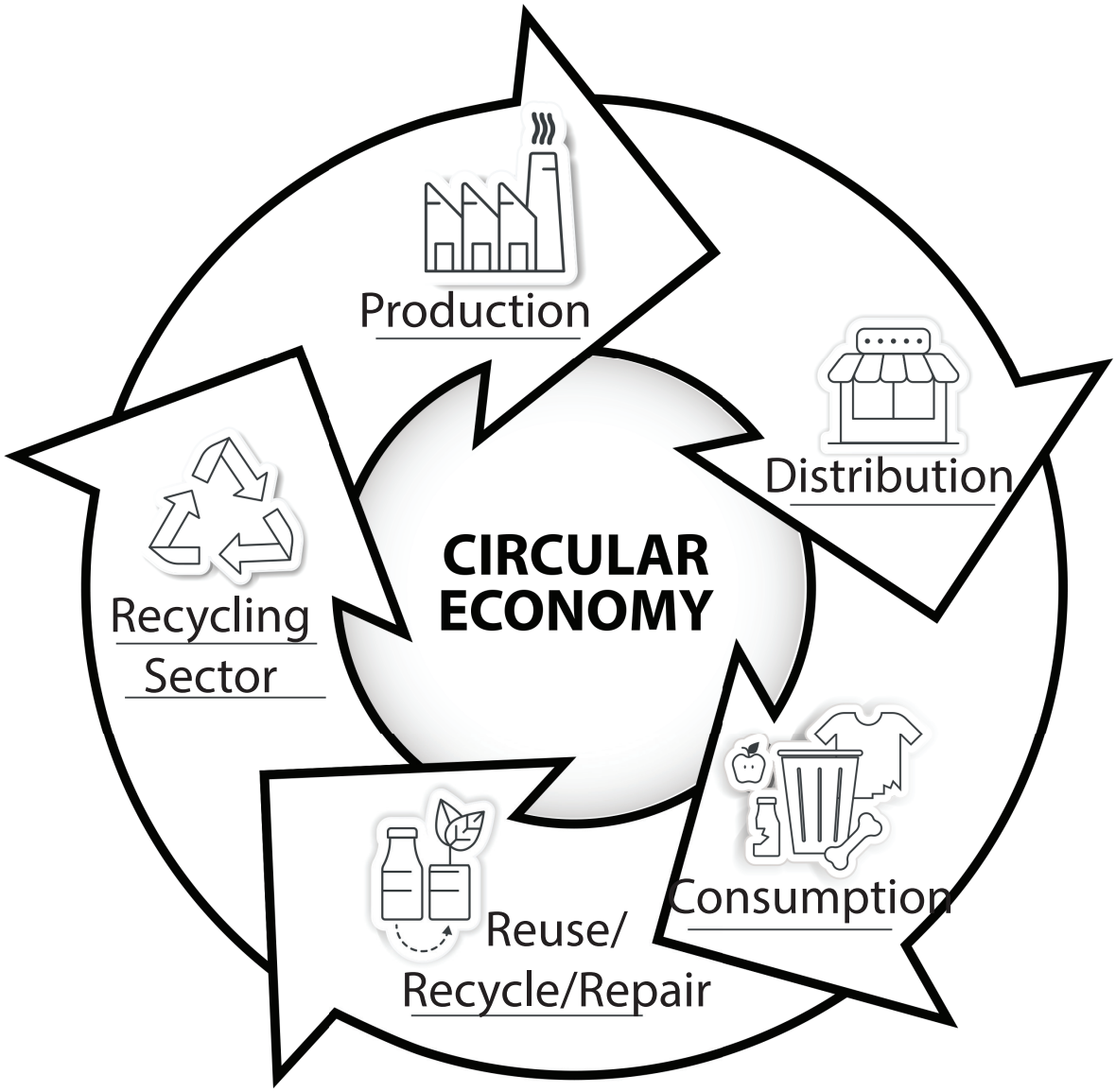
ANSWER KEY:
LEARNING RESOURCE ONE



LEARNING RESOURCE TWO:
RECYCLING TIRES

Purpose:

Teach students about the process and importance of tire recycling.

History:

In Alberta, tire recycling began in 1992. Alberta has the second-oldest tire recycling program in Canada.

Tires should never be abandoned outside or put in the garbage. They can collect rainwater, which can make an ideal place for mosquitoes to grow. They can be hazardous to wildlife because chemicals can leach into the environment over time. They also pose a fire hazard since they will burn for a long time and release hazardous materials in the smoke.

When someone purchases a new tire, they pay a small environmental fee, which is used to pay for the recycling of the tires.

When an old tire is worn out and needs to be replaced, it can be collected by the store or you can take the old tires to a recycling depot.

Processors will pick up the old tires and take them to their recycling facility.

There are various types and sizes of tires which need to be sorted.

Tires are fed into a machine called a tire shredder.

Tires are made up of rubber, steel, and nylon. The blades of the shredder break up the tires, and these materials are separated. Magnets collect the steel, and the nylon fibres are vacuumed off the belt.

The rubber can be shredded into various sizes depending on the end use.

- Large pieces can be used in what is called Tire-Derived Aggregate (TDA). This type of material can be used for drainage in select applications.
- Shredding it further, you can get a rubber mulch that can be used in planters.
- You can shred the material further to create rubber surfaces. You might have seen this in playgrounds or parks.
- Tires can be ground so fine it's just like sand that can be reused in other rubber products like the backs of mousepads.

ARMA is also exploring how to add rubber to asphalt to make more durable roads.

Since 1992, Albertans have recycled over 154.5 million tires! That's enough tires to wrap around the Earth's equator approximately 5.6 times.

Procedure:

- Guide students through the presentation and answer any questions.
- Have students complete the tire maze to help "Tread" get the tires to a recycling depot.

Learning Resources:

- Tire Recycling Presentation
- Tire Maze Activity Sheet

Materials:

- Pencil/pen

COLLECT THE TIRES FOR RECYCLING

Help Tread go through the maze and collect all the old tires so they can be taken to the recycling depot.

START

FINISH

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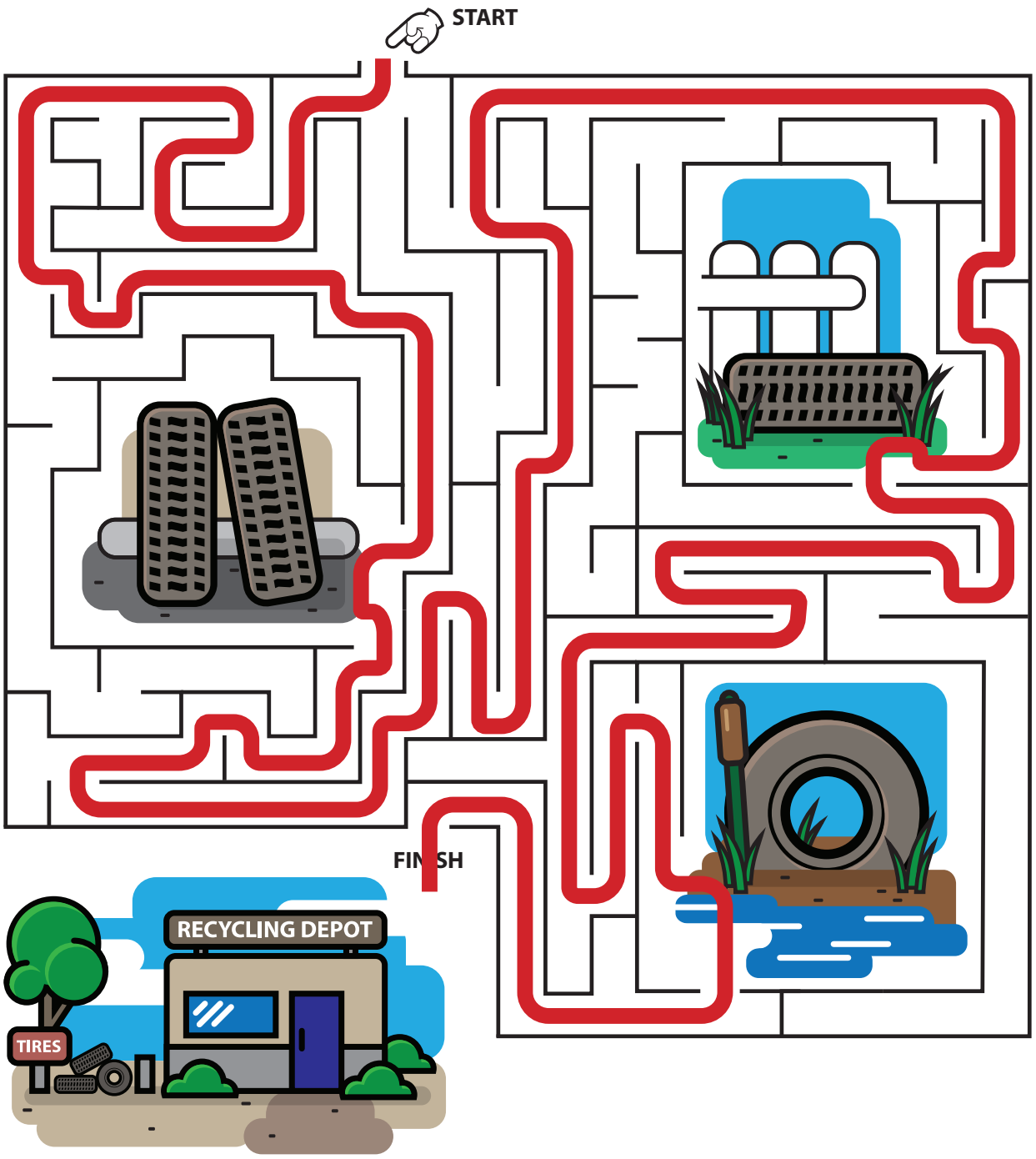
ANSWER KEY:
LEARNING RESOURCE TWO



LEARNING RESOURCE THREE:
RECYCLING PAINT

Purpose:

Teach students about the importance of recycling paint, spray paint, and containers and what happens to the materials.

History:

Alberta's paint recycling program started in 2008.

Paint and spray paint shouldn't be put in the garbage because they contain chemicals that pose a threat to the environment. These chemicals can leak out of paint cans and contaminate the soil or water. The plastic or metal containers can also pose a hazard and won't decompose. Spray paint cans are pressurized and can be dangerous if they are crushed. Also, these materials can still serve a purpose and be turned into new materials.

When someone purchases paint, they pay a small environmental fee which is used to pay for the recycling of these materials.

When someone is done painting, they can drop off the paint and spray paint cans—with or without paint—at a recycling depot.

The paint is put into large plastic containers, to prevent spills, and Processors collect the old paint and take them to their recycling facility.

Suitable Latex paint can be recycled into new paint. This is thanks to a local business that created a made-in-Alberta solution to process and remix the paint where it is sold right here in Alberta for environmentally conscious purchasers.

Oil-based paint is often used in fuel blends to provide alternative fuel sources.

Solid or semi-solid paint is used as feedstock in cement manufacturing.

Spray paint containers, metal paint cans and plastic pails are recycled as metals and plastics. The plastic is shredded up and used to create plastic lumber and other items. The metal is melted and reformed into industrial metals like rebar.

Since 2008, Albertans have recycled over 39.07 million litres of paint! That's enough to paint over 586,500 homes.

Procedure:

- Guide students through the presentation and answer any questions.
- Have students complete the paint crossword to help "Hue" figure out what to do with the leftover paint.

Learning Resources:

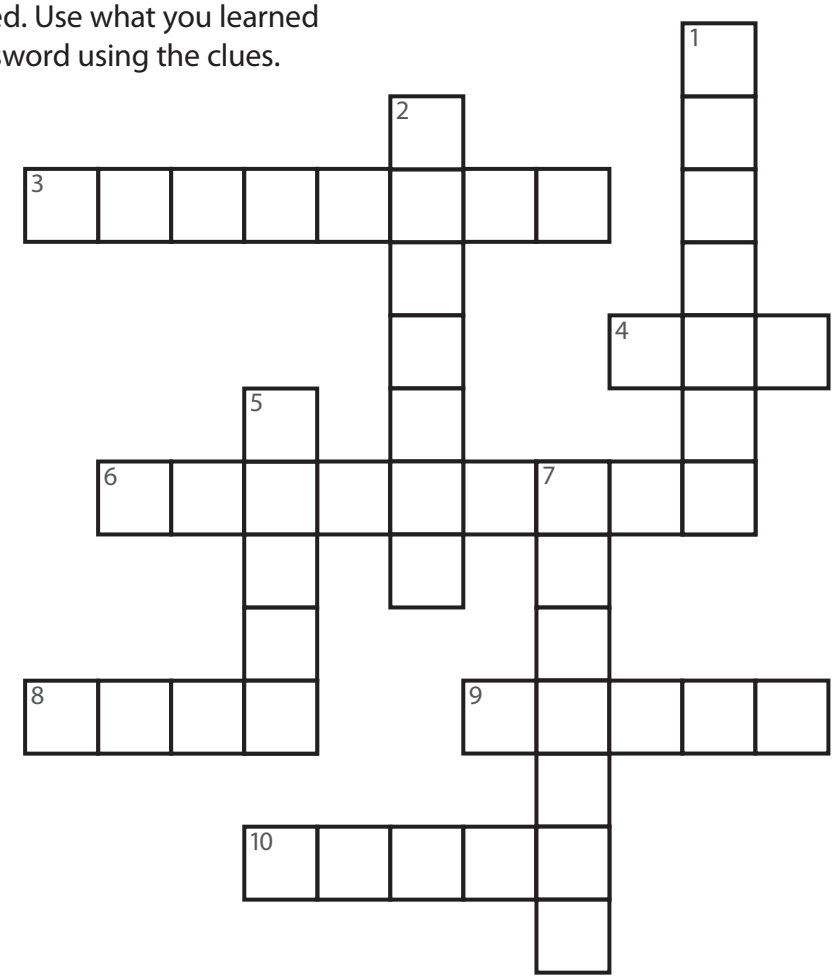
- Paint Recycling Presentation
- Paint Crossword Activity Sheet

Materials:

- Pencil/pen

FILL IN THE BLANKS ABOUT PAINT RECYCLING

Help Hue figure out what to do with the leftover paint and learn what happens to paint material when it is recycled. Use what you learned about paint recycling to complete the crossword using the clues.



Across:

3. Liquid latex paint can be _____ into new paint.
4. When you buy new paint, you pay an environmental ___ that helps support the recycling program.
6. Paint shouldn't be thrown in the garbage because it has _____ that can harm the environment.
8. Oil-based paint can be used as ____ in the energy recovery process.
9. Old paint, spray paint, and empty containers should be taken to a recycling _____.
10. Solid or semi-solid _____ can help make cement.

Down:

1. Plastic paint cans are broken down into small _____ that can be remoulded into new products.
2. Empty _____ paint containers can be used to make new things like plastic lumber.
5. _____ containers can be turned into industrial materials like rebar.
7. Paint has been recycled in _____ since 2008.

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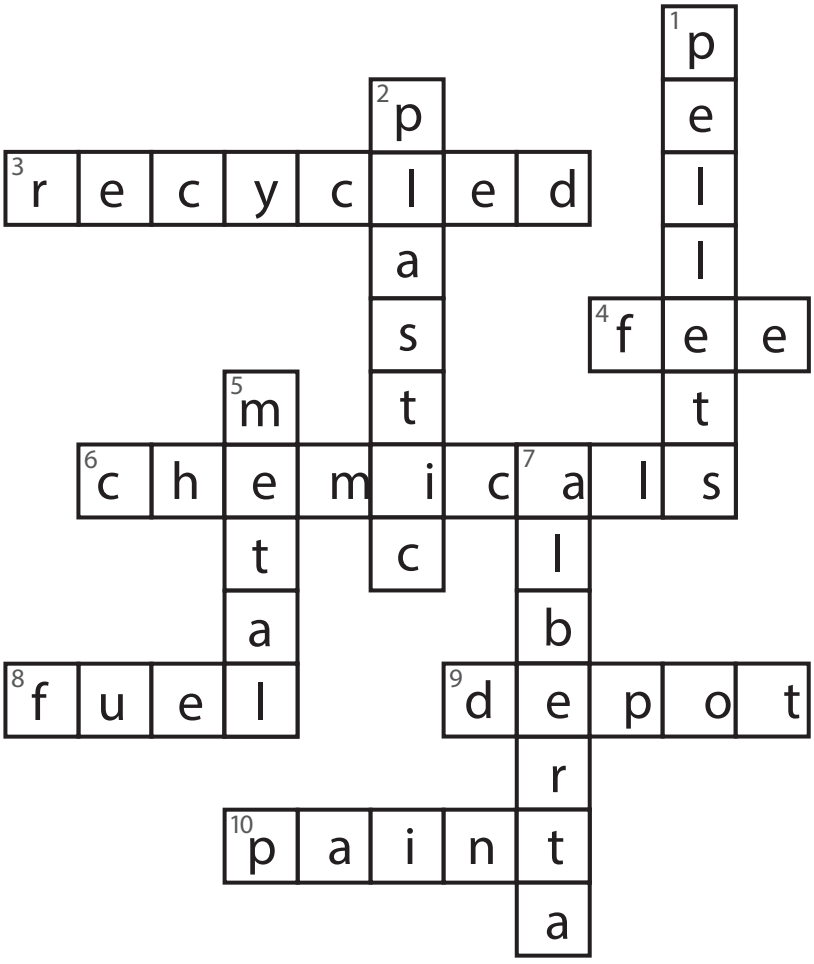
ANSWER KEY:
LEARNING RESOURCE THREE



LEARNING RESOURCE FOUR:
RECYCLING ELECTRONICS

Purpose:

Teach students about the importance of recycling electronics and what happens to the materials.

History:

Alberta's electronics recycling program started in 2004 and was the first electronics recycling program in Canada.

Electronics are one of the fastest-growing waste streams in the world. Technology continues to evolve at an incredibly rapid pace, making electronics easy to replace.

Electronics are made from many different types of materials and shouldn't be put into the garbage because they contain potentially poisonous materials such as lead, mercury, cadmium, and others—which makes them toxic if not dealt with properly. Also, the other materials they are made with still serve a purpose and can be turned into new materials.

When someone purchases certain types of electronics, they pay a small environmental fee which is used to pay for the recycling of these materials.

In Alberta, you can recycle TVs, monitors, computers/laptops, tablets, printers and scanners. You can also recycle mobile phones, audio-visual, electronic toys, games and music, power tools, and small appliances.

When electronics reach the end of their life they can be taken to a recycling depot.

The electronics are put into large cages, so they can be easily sorted later. Processors come and pick up the old electronics and take them to their recycling facility. These processors make sure to securely handle the material to ensure the information isn't at risk of tampering, however, we recommend erasing the memory on electronics as an added layer of security.

These processors safely disassemble the electronics and separate each of the different materials. The materials processed in Alberta's electronics recycling program are handled locally and are not sent to developing countries.

Metals, plastics, and glass are collected and sold to make new products. Recycling is good for the environment because it keeps these materials out of the landfill and puts them to good use. It also helps to build a circular economy.

Electronics contain several valuable materials that can be broken down and reused. The steel, aluminum and copper metal found in the wires, cables, and circuitry can be turned into new products.

The glass from television and computer screens is melted down, separating the lead, and reused to make new products.

The plastic from the cases, keyboards, and mice are processed to produce plastic flakes or pellets that can be used to make new products.

Alberta is also starting to plan recycling programs for solar panels, electric vehicle (EV) batteries and electronics from wind turbines, making it the first province in Canada to recycle these renewable energy products.

Since 2004, Albertans have recycled over 275,404 tonnes of electronics. That's equivalent to over 459,000 moose (average weight 600 kg per moose)

Procedure:

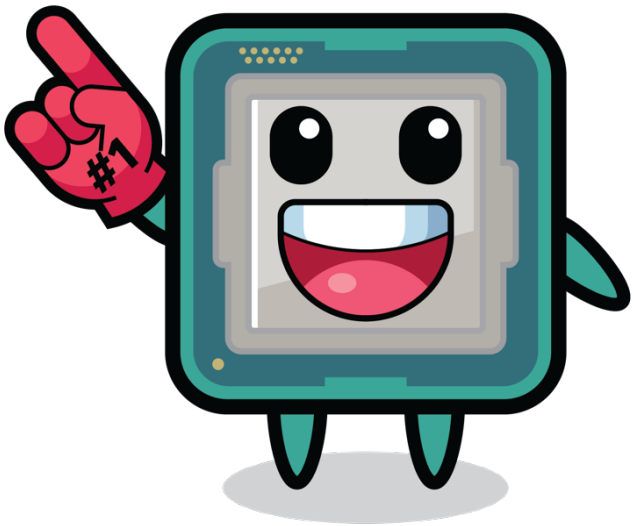
- Guide students through the presentation and answer any questions.
- Have students complete the word search to help "Chip" locate hidden electronics.

Learning Resources:

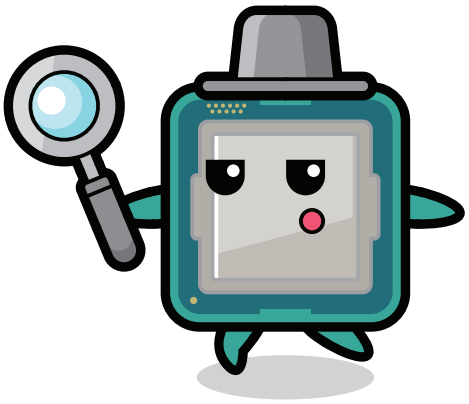
- Electronics Recycling Presentation
- Electronics Word Search Activity Sheet

Materials:

- Pencil/pen



FIND THE HIDING ELECTRONICS



Help Detective Chip find all the electronics listed below so they can be taken to the local recycling depot.
We have already found one.

1. Alarm clock
2. Blender
3. Calculator
4. ~~Camera~~
5. Cell phone
6. Computer
7. Drill
8. Fan
9. Flash drive
10. Game console
11. Hair dryer
12. Hard drive
13. Headphones
14. Iron
15. Kettle
16. Keyboard
17. Lamp
18. Laptop
19. Leaf blower
20. Monitor
21. Printer
22. Projector
23. Remote
24. Scanner
25. Solar panel
26. Speaker
27. Tablet
28. Television
29. Toaster
30. Toy robot
31. Vacuum
32. Webcam

T E L E V I S I O N T N D A U D R I L L
E W W Z L I Q R E M O T E L U S E O Y T
W U D X D J Q R S Z I K Q A H S I A I H
T O A S T E R R C M R V J R W C C M E A
L M V N S X X N G N O A B M P A A B M I
A C A M E R A D A Q N C S C R N L H N R
M H S C N E T V M I R U Q L O N C A Q D
P A O U K D K Q E T D U Z O J E U A T R
X R L K G R E B C H Q M U C E R L M A Y
S D A G G L Y L O T E K D K C F A O B E
P D R I Y A B E N G W A F U T A T N L R
E R P W S P O N S N L W D Y O N O I E T
A I A H A T A D O X P M E P R X R T T O
K V N C G O R E L S R W I B H D R O P Y
E E E D B P D R E F Q J D J C O V R R R
R N L O O C E L L P H O N E G A N F K O
Z G N I H H U M A F T C B O D P M E B B
P R I N T E R U C O M P U T E R F H S O
H F J P G W C L E A F B L O W E R C T T
F L A S H D R I V E Q Z Z Z K E T T L E

Words can go in any direction.
Words can share letters as they cross over each other.

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ANSWER KEY:
LEARNING RESOURCE FOUR

1. Alarm clock
2. Blender
3. Calculator
4. Camera
5. Cell phone
6. Computer
7. Drill
8. Fan
9. Flash drive
10. Game console
11. Hair dryer
12. Hard drive
13. Headphones
14. Iron
15. Kettle
16. Keyboard
17. Lamp
18. Laptop
19. Leaf blower
20. Monitor
21. Printer
22. Projector
23. Remote
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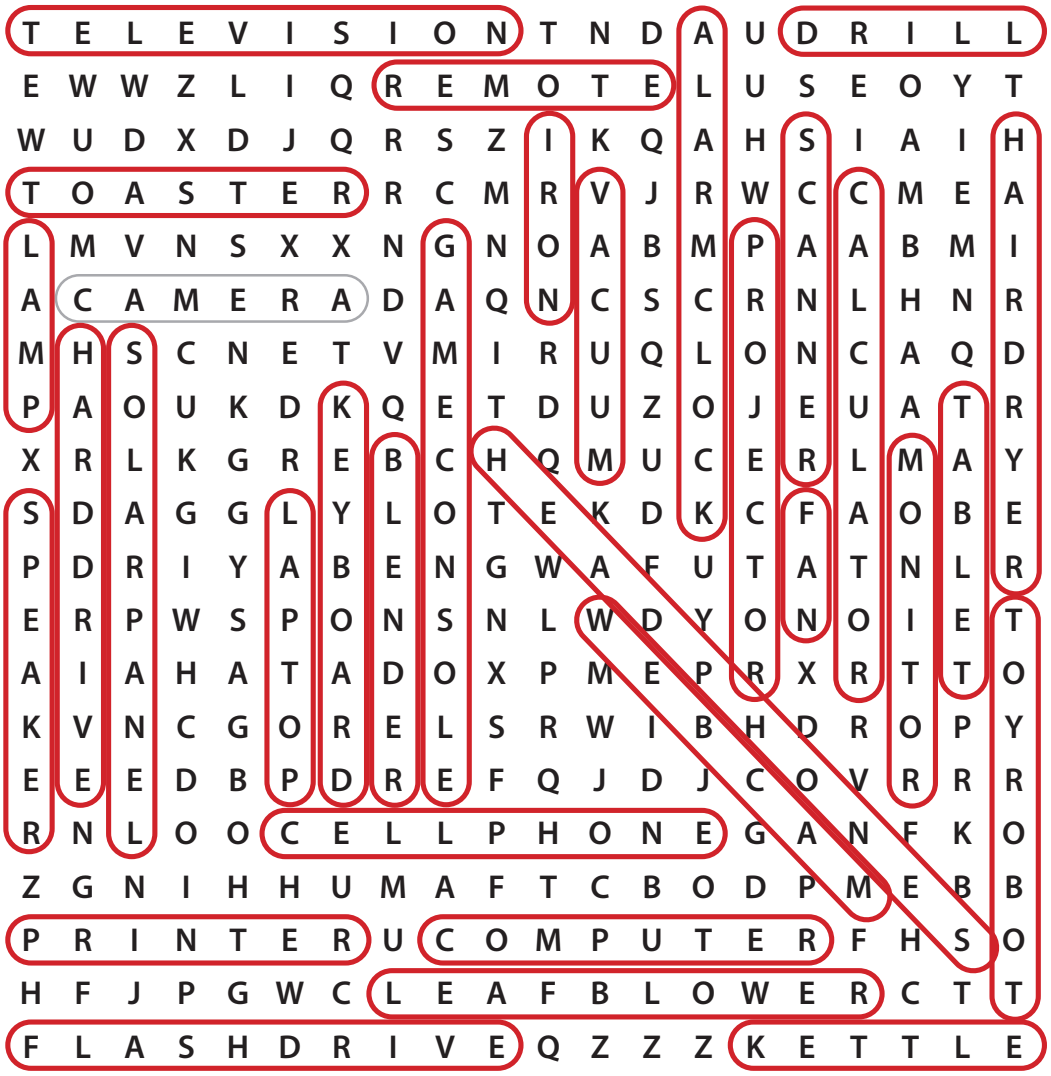


Words can go in any direction.
Words can share letters as they cross over each other.

LEARNING RESOURCE FIVE:
RECYCLING USED OIL MATERIALS

Purpose:

Teach students about the importance of recycling used oil materials (used oil, oil filters, and containers) and what happens to the materials.

History:

Alberta's used oil materials recycling program started in 1997.

Oil substances and materials can cause significant damage to land and water if inappropriately discarded. Oil, filters or containers should never be put in the garbage and should be handled with care so they don't accidentally spill any oil.

When someone purchases oil or oil filters, they pay a small environmental fee which is used to pay for the recycling of these materials.

When your parents get an oil change on their car, the oil, filters and containers are safely stored and collected by a Processor. If your parents change the oil (in your vehicle, lawnmower or other engine) they can drop off used oil, filters and containers at a recycling depot.

The used oil is poured into large metal containers to prevent spills on site. Processors then pump the old oil into a truck for transportation to their recycling facility.

The old oil is tested to see the level of contamination and processed accordingly.

High-quality oil can be re-refined into new lubricating oil. Lower-quality used oil is processed into a fuel that can be used in industrial applications.

Oil filters are crushed (with the residual oil captured) and processed by a metal recycler for manufacturing into construction materials such as rebar and pipe.

Plastic oil containers are shredded and turned into plastic pellets. The pellets are used as feedstock for products such as new containers, guardrails, fence posts, and railway ties.

Since 1997, Albertans have recycled over 2.4 billion litres of used oil. That's enough oil for 510 million vehicles!

Procedure:

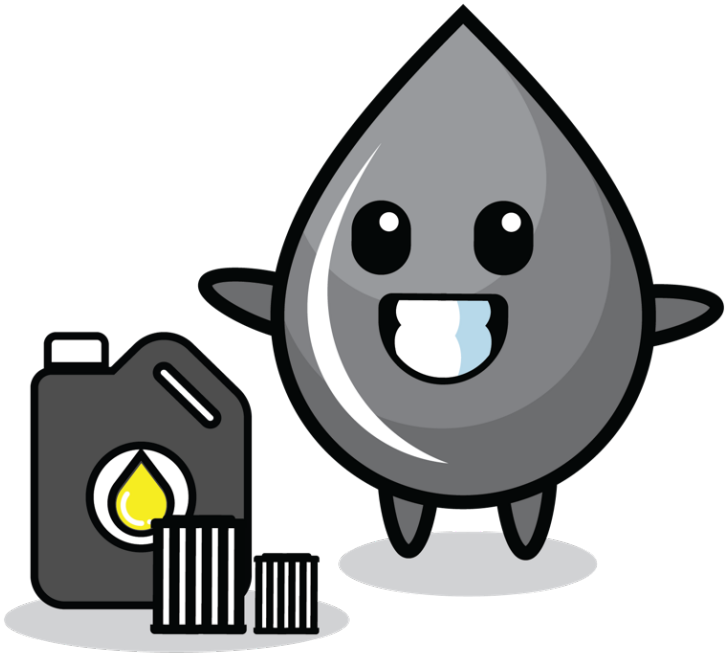
- Guide students through the presentation and answer any questions.
- Have students complete the recycling story and draw a picture about for the recycling team.

Learning Resources:

- Oil Recycling Presentation
- Story About Recycling Activity Sheet

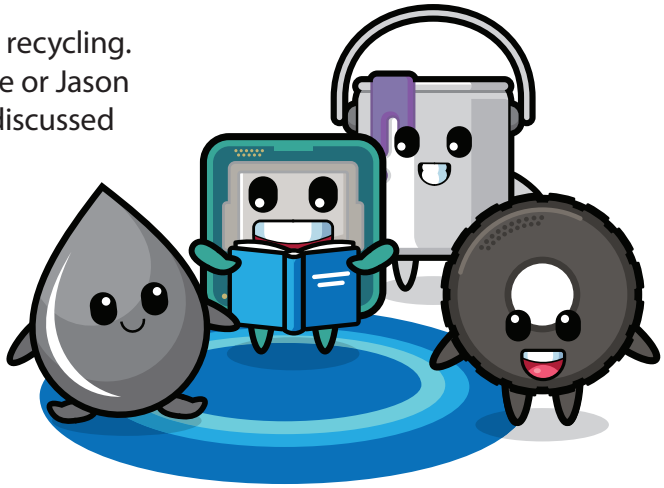
Materials:

- Pencil/pen
- Crayons or colouring pencils
- Loose leaf paper



A STORY ABOUT RECYCLING

Tell the recycling team a story and help them learn about recycling. Read the story below and then pretend that you are Jamie or Jason and finish it. Think about the types of materials we have discussed and describe some of the things they find in and around the shed. Explain why it's important to do something with the junk. What could they do with it? How should Jason's Dad manage these things in the future? Then, draw a picture of how this space could look once it is cleaned up!



THE STORY:

Jamie was visiting her friend Jason at his parent's farm. She was very excited to be in the country and see the animals and nature. After visiting the cows and chickens, they decided to go for a walk near the stream that ran through the pasture. They could hear frogs croaking in the nearby pond and saw a family of ducks in the stream. As they approached a large tree near the stream, they saw an old shed surrounded by a bunch of old tires and other junk.

When they explored further they found a lot of old things both outside and inside the shed. Jamie and Jason had both been learning about waste and that old electronics, paint, tires, and used oil materials could be recycled. They knew that waste could be bad for the environment.

"Why is all this stuff here?" asked Jamie.

"My Dad used this shed to store old things that he didn't know what to do with. I forgot that it was here," replied Jason. "I see a lot of things that could be recycled, like..."

YOUR TURN!

Now it's your turn to finish the story! Think about what Jamie and Jason might find in the shed. Here are some questions to help you:

1. **What items do you think they see?**
2. **Why is it important to recycle these items?**
3. **What can they do with the junk they find?**
4. **How can Jason's dad manage this better in the future?**

After you write your ending, remember to draw a picture of how the shed and the area around it could look once it is cleaned up. Be creative!

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A STORY ABOUT RECYCLING

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LEARNING RESOURCE SIX:
PRACTICING RECYCLING

Purpose:

Utilize what your students have learned and have them put it into practice at home by educating their parents and identifying materials around their home that can be recycled.

Procedure:

- Print off the labels and hand them out to the students.
- Have the students take home the labels. They can cut along the dotted lines and create individual labels.
- Students can educate their parents on the types of materials that can be recycled and invite them to walk around their home searching for materials that can be taken to a recycling depot.
- Students use tape and stick the labels onto the materials that can be recycled. The labels are visual reminders that these items are ready to be recycled.
- The families can make plans to take the materials to the nearest recycling depot where they can see the material being collected.

Learning Resources:

- It's Time to Recycle Activity Sheet

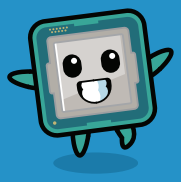
Materials:

- Scissors
- Tape

IT'S TIME TO RECYCLE

Help your parents find outdated electronics, old paint, worn-out tires, and used oil materials that are ready to be recycled. Cut out these labels and use tape to stick them to the items you find around the house. This will remind your parents to take them to the recycling depot!

I CAN'T WAIT TO BE RECYCLED



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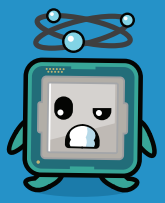
TAKE ME TO THE RECYCLING DEPOT



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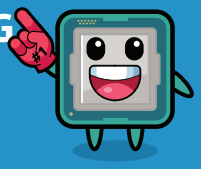
GET EXCITED ABOUT RECYCLING



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I'M READY TO BE RECYCLED

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RECYCLE ME AND MAKE ME USEFUL AGAIN

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QUIT TALKING TRASH AND RECYCLE ME

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LET'S ROLL TO THE RECYCLING DEPOT

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GET READY TO RECYCLE

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RECYCLING KEEPS ME MOVING

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CLEAN ME UP AT THE RECYCLING DEPOT

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RECYCLE THE CONTAINERS AND FILTERS TOO

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LET'S FLY TO THE RECYCLING DEPOT

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INSPIRING A FUTURE WITHOUT WASTE

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