

“My Life as a Tire”

Teachers’ Guide

Student’s Edition



**Instructional Materials for *Waste and Our World*
Grade 4 Science and Meeting Human Needs: Local
*Government, Grade 6 Social Studies, Alberta, Canada***

“My Life as a Tire” Teachers’ Guide, Teachers’ Edition

This Teachers’ Guide has been prepared for *Waste and Our World, Grade 4 Science*, and *Meeting Human Needs: Local Government*, Grade 6 Social Studies, Alberta, Canada.

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INFORMATION SHEETS

“My Life as a Tire”

“My Life as a Tire”

The video, “My Life as a Tire” tells the story about where tires come from and what happens to them after they are no longer useful. In Alberta, there are programs to collect used tires and have them recycled, not burned.

Where Rubber Comes From

Tires are made with rubber, oil, steel, and carbon black. **Rubber** is the only **renewable** part of the tire because it comes from the sap of trees that grow in **Malaysia**. Workers tap the rubber trees

and hang pails where the rubber sap runs out. The sap is then processed and loaded onto ships that carry the rubber to where tires are made.

Where Oil Comes From

An important part of rubber tires is **oil**, which is found in places like Alberta, **Canada**. The oil and gas are in deposits deep below the surface that are found through drilling. Once deposits of oil and gas are found, they are pumped out

to be refined into useful products. The liquid is crude oil, which is used to make motor oil, gasoline and is a part of rubber tires. Oil is a **non-renewable resource** because once it is used up there is no more

The Steel in Tires

The **Steel** in tires come from **Canada** because the iron needed to make steel is mined here. **Iron** is the fourth most common element found in the earth’s crust. The steel is used in the tire radials

that keep the treads on the track. The rims are also made of steel. Steel is made from a natural resource that is mined. Steel is a non-renewable resource.

Carbon Black

Carbon Black is a re-enforcer in the rubber and is also used as an electrical conductor. Carbon Black is made in Georgia, in the **United States of**

America. Burning, heating, blending and pressurizing oil makes **Carbon Black**. Because carbon black is made from oil, it is non-renewable.

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Making Tires

Tires are made with oil, rubber, and carbon black that are put together and vulcanized into the hard black rubber in the shape of a tire. **Vulcanized** means that the three substances oil, rubber, and carbon black are heated and blended together under pressure to become the hard rubber in tires that cannot be taken apart again. The vulcanized rubber in

tires is like a cake; once the all the parts have been baked together you cannot separate the parts like flour and sugar. When the tires are moulded into the size and shape we see on our cars and trucks there is a steel radial belt in it to provide stability and hold the tread in place.

Recycling Tires

Each time someone buys a new tire in Alberta they pay a fee to support the tire recycling activities in the province. **Tire Recycling Alberta** administers the recycling of tires. Tire Recycling Alberta used to be named the Tire Recycling Management Authority. Both the Tire Recycling Alberta and Electronics Recycling Alberta are included in the Alberta Recycling Management Authority. The Alberta government does not want any **stockpiles** of tires to get too large and burn. When tires burn they cause the contamination of the soil and ground water. Poisonous **particulate** materials are released in the smoke or **emissions**.

Allowable emissions are specific amounts of substances that are allowed to be released into the air during burning. Rubber tires have been declared a **designated material**, which means that they have to be recycled, not buried in a landfill. Once tires have been used and are no longer useful on a vehicle, they are called **post-consumer** material and are ready to be recycled.

Once the tires have been gathered and moved by the municipal government to recycling facilities like Champagne Edition, which was seen in the video, *My Life as a Tire*. The tires are shredded into one and two inches pieces. **Conveyor** belts then move these pieces of tire to where they can be made into new useful products. The shredded bits are broken up so that the steel that made up the **radial belts** in the tires are **extracted** and picked up by powerful magnets. The steel is then gathered so it can be recycled later. The rubber, oil and carbon black are still vulcanized together, which means they cannot be separated. The vulcanized tire pieces with steel still in it is called shred, but once the steel is removed the pieces are called crumb. The crumb is sorted into specific sizes for different uses in recycling. The vulcanized crumb are then used to make things like **Cow mattress, bricks, rubberized asphalt** for roads, **rubberized roofing tiles, mats, and rubber pads**.

Name: _____

ACTIVITY ONE

Vocabulary

The words in this list are from the video “*My Life as a Tire*.” Watch the video carefully and then fill in the sentences below with the right word. If you need a little help with this, check the information sheet that tells about the making of tires.

rubber
extracted
renewable
radial belts
oil
designated material

steel
post-consumer
iron
allowable
carbon black

vulcanized
stockpiles
emissions
particulate
conveyor

“My Life as a Tire”

1. _____ is the only _____ part of the tire because it comes from the sap of trees that grow in Malaysia.
2. An important part of rubber tires is _____, which is a non-renewable resource found in places like Alberta, Canada.
3. The iron needed to make _____ is mined in Canada. The fourth most common element found in the earth’s crust is _____.
4. _____ is made in a process of burning, heating, blending and pressurizing oil.
5. _____ means that substances including oil, rubber, and carbon black become the hard rubber in tires that cannot be taken apart again.
6. _____ belts are used in the recycling plant to move these pieces of tire shred to where they can be made into new useful products.
7. The Alberta government does not want any _____ of tires to get too large and burn.
8. Poisonous _____ materials are released in the smoke or _____.
9. _____ emissions are the specific amounts of some substances that are allowed during burning of materials
10. The shredded bits of used tires are broken up so that the steel that made up the _____ in the tires is _____ and picked up by powerful magnets.
11. Once tires have been used and are no longer useful on a vehicle, they are called _____ material and are ready to be recycled.
12. Rubber tires have been declared a _____, which means that they have to be recycled, not buried in landfills.

Name: _____

ACTIVITY TWO

Map

Using a map of the world place the correct names of the places that were mentioned in the video, *“My Life as a Tire.”* Under each place name write down what comes from that place.

“My Life as a Tire”



Name: _____

ACTIVITY THREE

Focus Discussion

Here are some things to discuss now that you have had a chance to watch the video “*My Life as a Tire.*”

1. What are four things used in making tires?

2. What happens to the steel in the tires during the recycling process?

3. What does the steel do in tires?

4. How is the recycling of tires paid for in Alberta?

5. What organization manages the recycling of tires in Alberta?

6. Why can't the rubber, oil, and carbon black be separated and reused in making new tires?

7. Why don't they just burn the old tires?

8. Name two recycled products that are made from the tires that you saw in the video.

9. What are some savings the municipality would see by moving the tires less?

“My Life as a Tire”

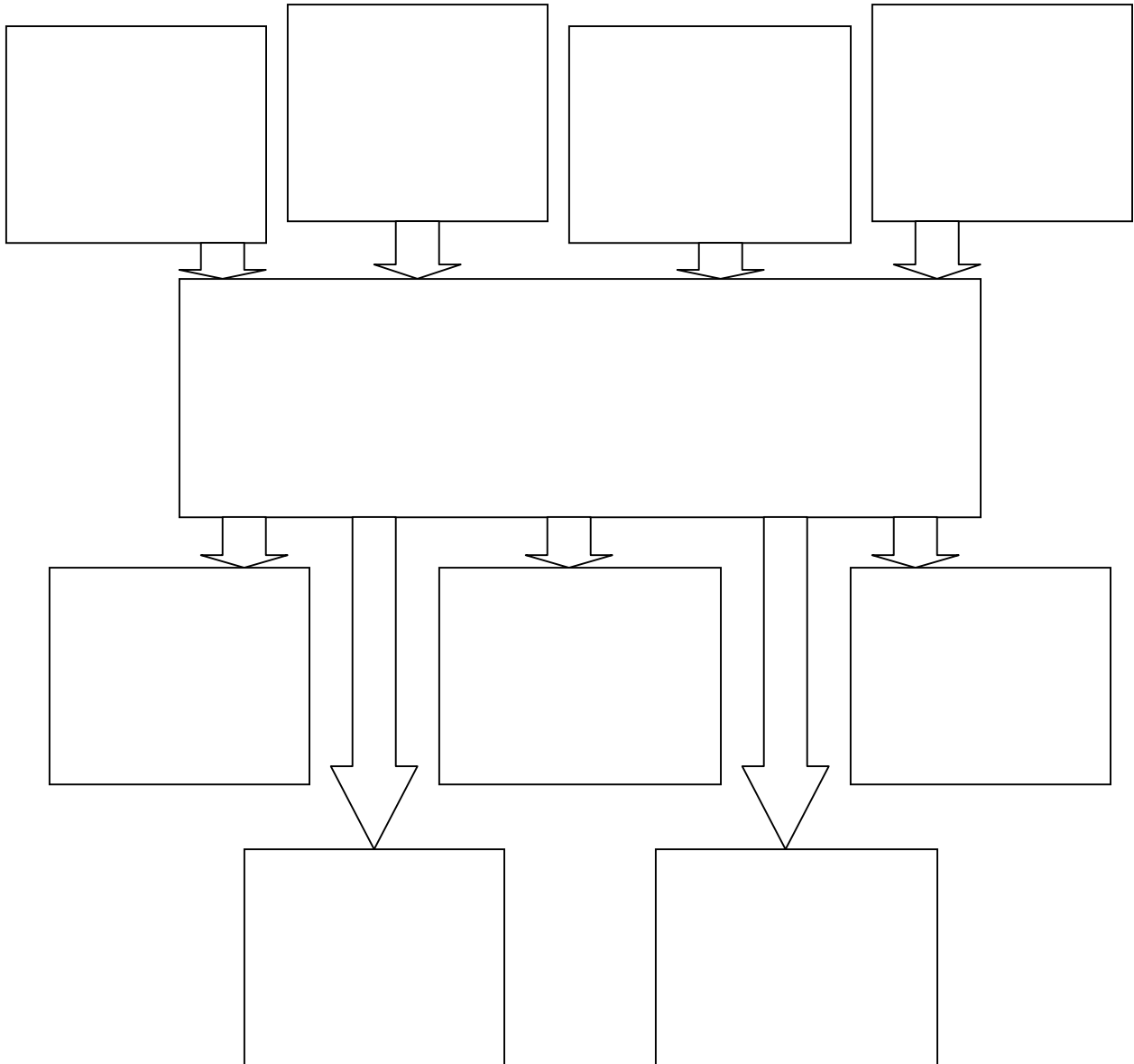
Name: _____

ACTIVITY FIVE

Draw the Story

After you have watched the video *“My Life as a Tire”* use the boxes to draw in the following items in the correct order. Draw the parts that make up a tire, the tire in use, and five of the things that are made from tires when they are recycled.

“My Life as a Tire”



Name: _____

ACTIVITY SIX

Discussion

1. How does recycling waste products slow down global warming?
2. How many emissions can be saved by these activities; not idling your car for ½ hour; not running a gravel truck, like in the video, for one hour, which is the distance from Smith to the Regional Landfill.
3. What three things can you do right away in your home to recycle, reuse, or reduce wastes?
4. What can be done to make products more easily recycled?
5. What kind of recycling activity could be set up in your school that you could participate in? If your school has a recycling program already, how could it be improved?
6. What is composting? Is there a way you could get more people to compost their wastes?
7. Should there be more organizations like **Tire Recycling Alberta**? What other Recycling Authorities would you set up? What would they do?

“My Life as a Tire”



Name: _____

ACTIVITY SEVEN

Municipal Government

The municipal government takes care of the wastes for the community. That means the municipal government runs the landfill site, recycling programs for things like tires and other items. It is the municipal government that also collects and then sends used tires to the recycling facilities like the one seen in the video, *My Life as a Tire*. **Tire Recycling Alberta** provides the funds for the recycling of tires and sets out what has to be done to the tires so that they do not end up in large stockpiles. Tire Recycling Alberta doesn't want large stockpiles of tires because they may accidentally burn.

As you saw on the video, *My Life as a Tire* the tires are collected, stored, and then moved to recycling plants by the municipal government. Answer the following questions about what you saw:

Were there any really large stockpiles of tires?

Were there any unneeded things done to the tires after they were used?

Were the tires moved too many times?

What could be done to make the handling of the tires more efficient?

“My Life as a Tire”

Name: _____

ACTIVITY EIGHT

Recycle Art

There are all kinds of things that you can do with the items that you find around your home. One way to reuse an item is to use it to make art. Spend some time looking around your house and find things to bring to school that would otherwise be thrown out and clean them. They could include plastic bottles, cardboard boxes, string, milk jugs, aluminium and plastic food trays and many more.

Plastic bottles can have the tops cut off and made into funnels that can be decorated. Two plastic bottles can be used to make an hour glass by filling one part way with sand and taping the other, opening to opening together. Once the two opening have been taped firmly in place tip the sand filled bottle on top and watch as it flows to the one below.

Cardboard boxes can be used for many items. To make a mobile, draw the shapes you want to use like stars, butterflies, or other things and cut them out. On the top of each shape make a hole for the string to be tied on. Attach the shapes to sticks or other cardboard cross pieces and hang up.

Rows of cups cut from an **egg carton** can be painted and decorated to make an organizer for small items.

Milk cartons can be used to make model houses or buildings with the top providing the roof shape. Construction paper or paint can be used to decorate the building by adding windows and doors.

Glass Jars can be decorated in many ways including paint or gluing on other recycle items like bowtie noodles or macaroni and painting the design to create an attractive storage container. Construction paper can also be used to decorate the jar.

Old magazines are a great source for colourful pictures and shapes that can be used to make a collage. The pictures and shapes can be used to make a recycling poster.

Plastic bottle lids, corks, empty spools, or old CDs can be used to decorate other projects or can be painted and used to make mobiles.

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Name: _____

SAFETY

1. How many people are allowed in a vehicle?

2. What did the two members of the camping family who couldn't fit into the tow truck do? Discuss ideas with safety in mind such as hitchhiking, calling a cab, walking, etc.

3. Personal Protective Equipment (PPE) should always be worn during waste management efforts. Give some examples of PPE and who used it.

4. Who didn't use PPE?

5. Another safety issue; tires on the purple flatbed truck. How could they have been secured?

6. What might have happened because the tires were not properly secured on the truck?

Discussion:

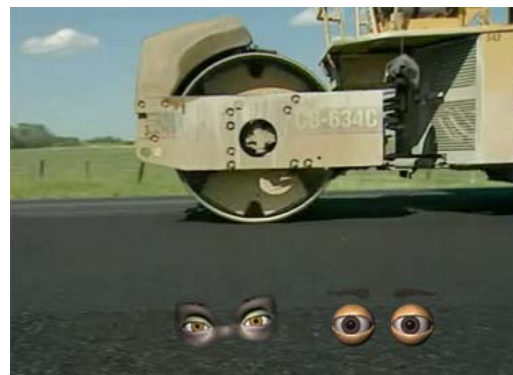
During the early tire board scene, when the Environment Minister says, “If that happened here, we would be in big trouble”, she is talking about the massive tire fire in Hagersville, Ontario. In 1992, when the Tire Board formed in Alberta, the City of Calgary had a big stockpile of used tires right next to the downtown core. Looking at a map of Calgary, discuss the probable number of people that would need to be evacuated if there was a tire fire right downtown. Talk about safety plans at your school, potential environmental dangers to your community and what sort of plan would you need to keep people safe.

RECYCLING FACTS

“My Life as a Tire”

The following facts are about the benefits of recycling.

- Plastics make up between 5% and 7% of municipal solid wastes by weight or 25% – 30% of municipal solid waste by volume.
- Average residential vehicle emissions are 6 tonnes per 20,000 km = 300 kilogram per 1,000 km (Environment Canada). Triple this for the gravel truck.
- Recycling just the steel part of one tire saves as much energy as it would take to keep a 60-watt light bulb on for 79 hours.
- Recycling steel is 75% more energy efficient than getting it from the rocks. At the same time there is a 86% reduction in the amount of air pollution, 76 % reduction in water pollution, and 97% reduction in mining wastes.
- Enough energy is saved by recycling one aluminium can to run a television set for three hours or to light one 60-watt bulb for 35 hours.
- Recycled aluminium creates 95% less pollution than making it the first time.
- One tonne of recycled paper uses 64% less energy to produce than paper made directly from wood. This same tonne of recycled paper saves 24,000 gallons of water and 1.7 tonnes of lumber and creates 74% less air pollution. A tonne of recycled paper needs 5 times more jobs than one tonne of paper produced from virgin trees.
- It takes about 25 recycled soft drink bottles to make one fleece jacket and 5 recycled 2-litre bottles to make enough fibrefill for one ski jacket.
- Over 46,000 pieces of plastic debris float on every square mile of ocean
- Recycling plastic saves two times more energy than burning it.
- One tonne of crushed recycled glass saves 1.2 tonnes of raw materials including sand, soda ash and limestone, and saves 25% of the energy used to make glass.



Name: _____

WORD SEARCH 1

“My Life as a Tire”

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

Find the following hidden words:

Rubber
extracted
Renewal
radial belt
tire
landfill

oil
fee
asphalt
designated
material
transport

trash
water
poison
resource
live on
truck

Name: _____

WORD SEARCH 2

Carefully look for the words in the list below in the puzzle. The words are arranged in all directions including backwards.

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

“My Life as a Tire”

Find the following hidden words:

Steel
Recycle
Malaysia
post-consumer
Iron
brick

Allowable
Carbon Black
Alberta
Reduce
Nails
Chance

Climate
Transfer Site
Energy
Mat
Shredded

Name: _____

WORD SEARCH 3

Carefully look for the words in the list below in the puzzle. The words are arranged in all directions including backwards.

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

“My Life as a Tire”

Find the following hidden words:

Vulcanized
Canada
municipal
government
Reuse

Cow mattress
Stockpile
burn
emissions
particulate

Conveyor
Sap
Tree
Percent
Wastes
Smoke