Name: _____

Energy

Section A) Energy Sources

1. Review from the Mackenzie Valley Wetlands activity.
   Use the words below to help you fill out the answers below:

- biodiesel
- solar energy
- garbage
- hydro
- wind energy
- nonrenewable

Fossil fuels, like coal, oil, and natural gas, take millions of years to create so we call them _____ **sources of energy**. We can only use as much gas as we can find under the earth. Once we use it up, we cannot create more.

So, to plan for the future, we need to reduce how much energy we use and when we need energy, to use more _____ **sources of energy** that replenish themselves quickly.

Some options for the future include:

_____ is made from meat or vegetable oils.

_____ is gathered using windmills, or turbines. They work like pinwheels, with blades that spin from the force of moving air.

Heat from the sun is called _____, which can be collected during the daylight hours, and stored for use at night.

Energy created from water is called _____. A waterfall like Niagara Falls is a huge source of power. Canada produces more of this type of power than any other country in the world.

When _____ decomposes, it produces biogas.

Name: _____

> Section B) What's the Best Source of Energy for the Job?

1. *Benefits and Drawbacks of Energy Resources*

   Because we use so much energy, we have to choose the right source for each job. Each energy resource has benefits and drawbacks. Draw a line from each source to the "+" box that best describes its benefits. Then, draw a line from each source to the "–" box that best describes its drawbacks.

+		–
Mined close to the surface of the earth, which is less expensive than mining for other fossil fuels.	**Solar**	Can be very noisy. Amount varies due to unpredictable changes in weather. Can be dangerous for wild birds.
Can be harnessed for heat or electricity. No emissions. Using it doesn't deplete the resource at all.	**Wind**	Shipping this resource is even more expensive than mining it. Mining damages ecosystems. Burning creates air pollution.
One machine can produce enough electricity to power hundreds of homes. One of the fastest growing types of sustainable energy.	**Coal**	We have less of it in the winter. Harnessing and storing enough requires huge amounts of space for panels.
This form of electricity does not produce air pollution. It produces heat that boils water, creating steam that is converted to electricity.	**Biodiesel Biogas**	Currently more expensive to produce than it is to mine for oil and gas fossil fuels. When burned it creates greenhouse gases.
Scraps and chips can be burned to power industries, using less electricity.	**Nuclear**	Burning causes pollution. Mining damages ecosystems. When spilled in water, it harms wildlife.
The oldest type of energy harnessed by humans. Most often used form of sustainable energy. Inexpensive.	**Oil**	If we use too much, we'll deplete our forests quicker than they can grow, which is no longer sustainable. Burning creates pollution.
These cleaner-burning fuels produce less air pollution than fossil fuels and don't require mining.	**Hydro**	Uses uranium, a metal that's mined from the earth, and is not renewable. Produces radioactive waste.
Made from petroleum, used to fuel cars, trucks and airplanes. Also good for heating houses. Can be made into useful items like medicines and plastics.	**Wood**	Mining damages the environment. Burning produces pollution. Fumes are flammable and dangerous if inhaled.
One of the most commonly used forms of energy to heat houses because it burns more cleanly than other fossil fuels.	**Natural Gas**	Dams can have an impact on natural habitats of fish that travel through rivers and waterfalls to spawn.

Canon

Name: _____

2. Sustainable Alternatives

For each of our energy needs listed below, write down the type of energy we currently use to do the job. If it's not sustainable (renewable), list a sustainable type that might also work.

Energy Need	**What You Use Now**	**Sustainable? If not, provide an alternative**
Driving a car		
Heating a building		
Heating water		
Cooking food		
Lights at night		
Powering a computer		
Flying a plane		

Name: _____

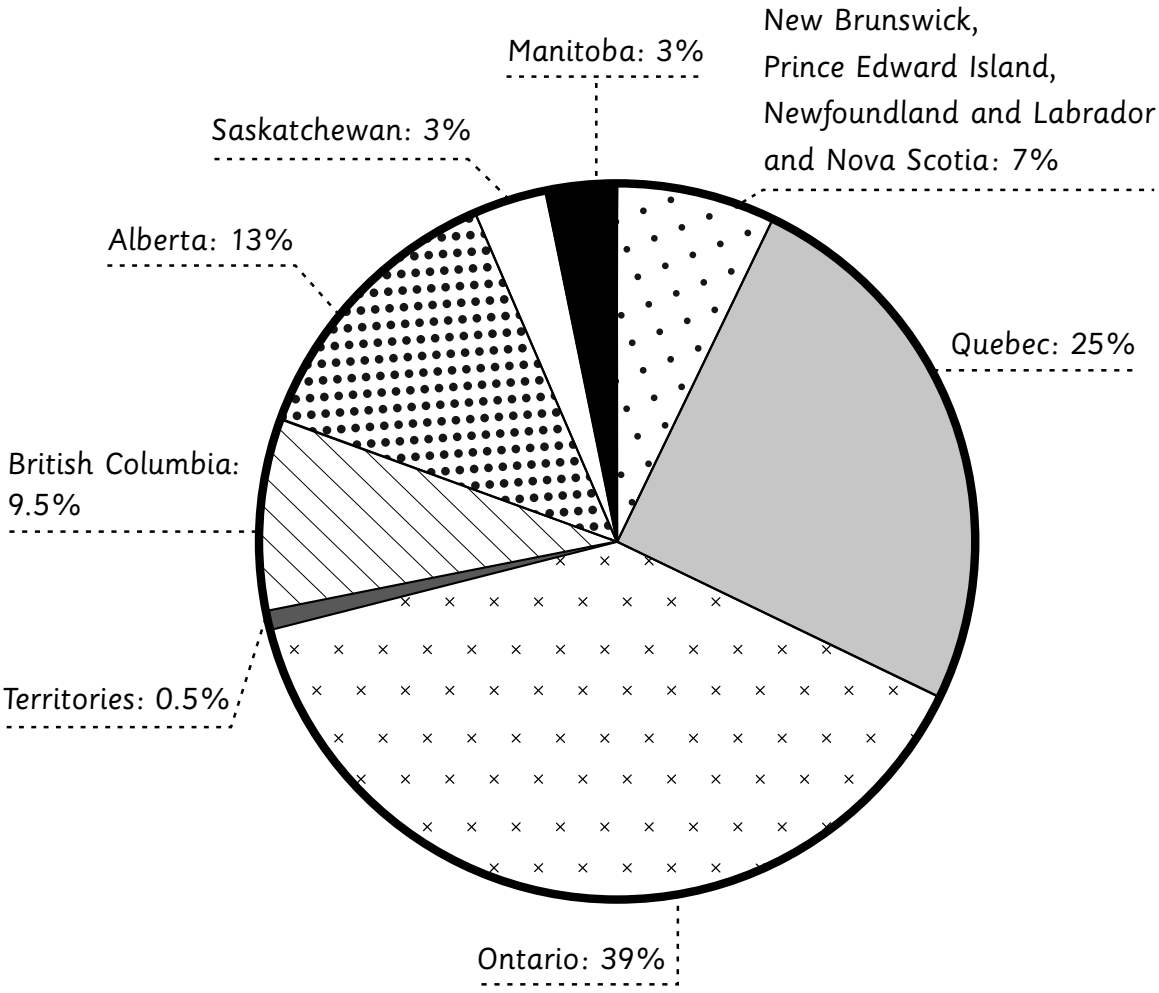
Section C) Energy Consumption and Conservation

How Much Energy Do We Use?

Energy Facts:

- *Per person, Canadians use more energy than any other country in the world. The U.S.A. rates second.*
- *North Americans make up 7% of the world's population. But we use 30% of the world's energy.*

Here's how much each province and territory used of all the energy consumed in Canada in 2004:



Name: _____

Questions

1. Which province or territory used the most energy. Can you think of a reason this might be?

_____

_____

3. Which province or territory used the least amount of energy?

_____

4. How much energy did your province or territory use?

_____

5. Ways to Conserve Energy

   Riding in cars burns fossil fuels and pollutes the atmosphere. What are three other modes of transportation that people can use that will burn less fuel?

   i) _____ iii) _____

   ii) _____

6. Heating and cleaning our water takes a lot of energy. Can you think of three ways to use less water?

   i) _____ iii) _____

   ii) _____

7. Can you think of three ways to conserve electricity in your home?

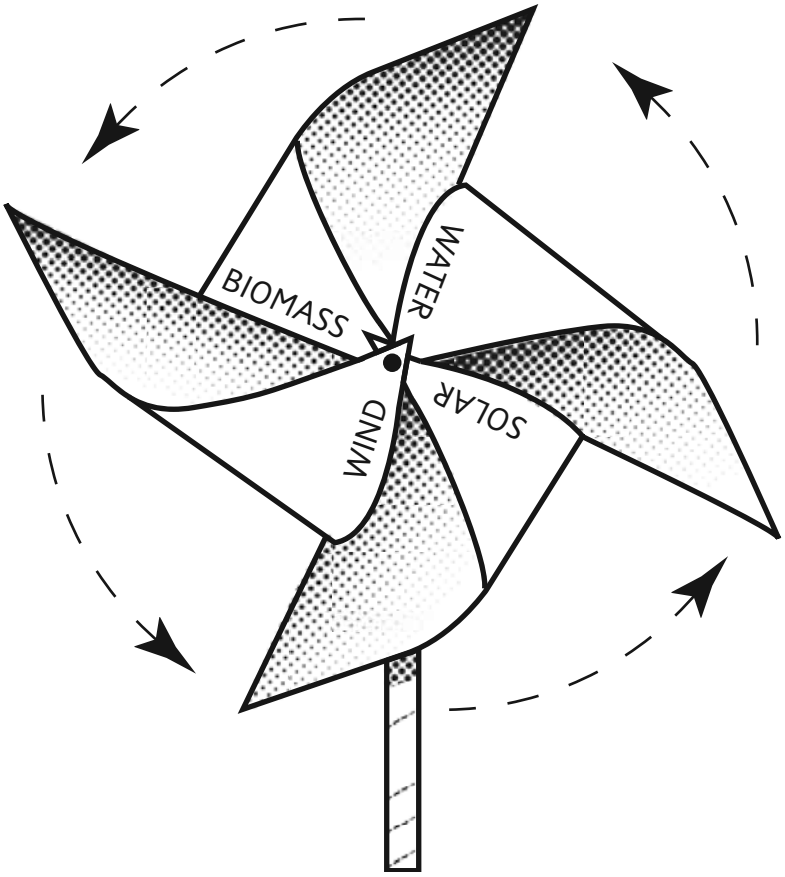
   i) _____ iii) _____

   ii) _____

Name: _____

Section D) Sustainable Energy Pinwheel

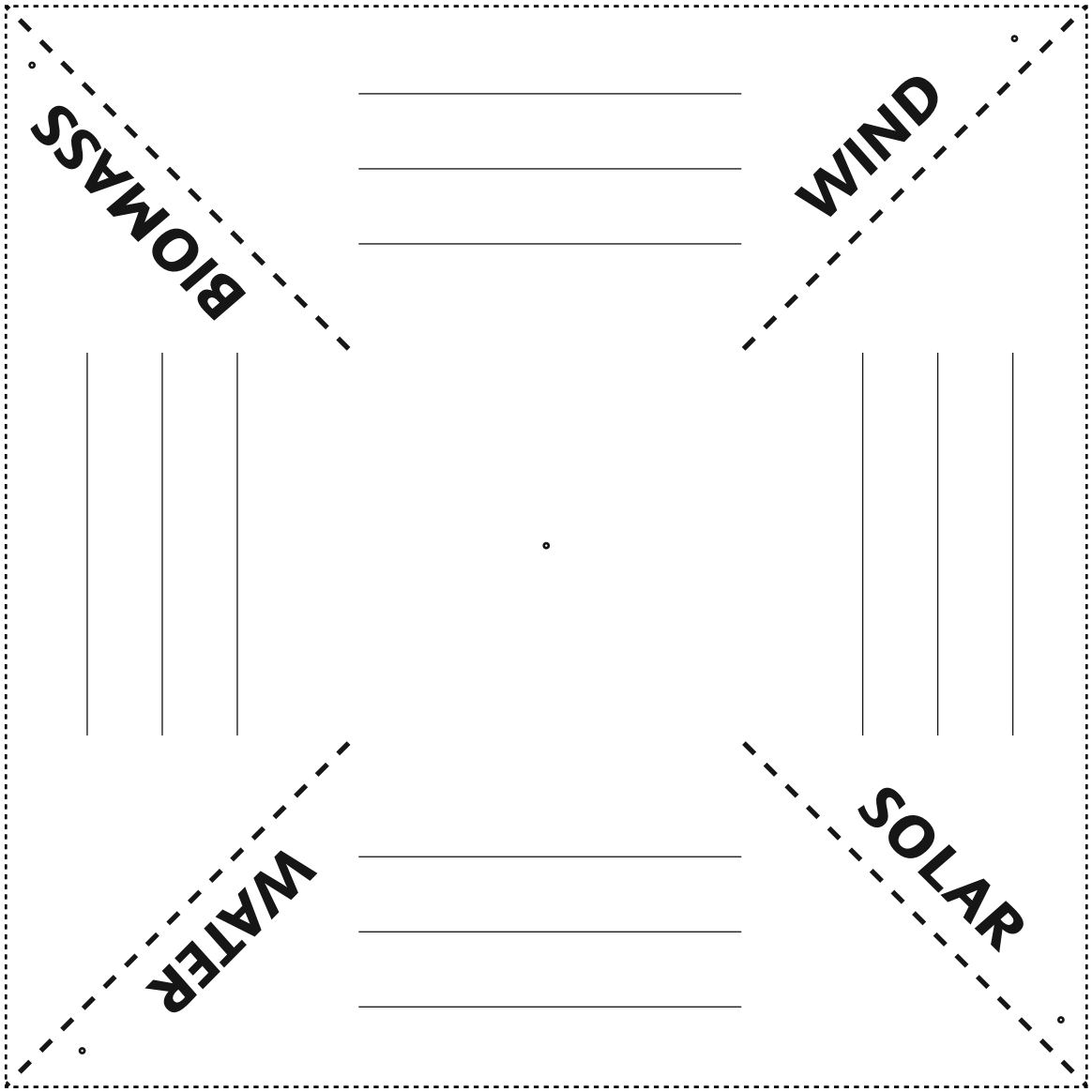
1. *Making a pinwheel*



You will need:

- *One pinwheel, cut from the template provided*
- *One drinking straw*
- *One pushpin with a plastic ball at the top*
- *¼ of an eraser (you can cut it with scissors)*
- *Coloured markers or pencil crayons*
- *Two small beads*

Name: _____



Name: _____

Step 1.

Cut out the square of the template. Then cut along the dotted lines in the four corners.

Step 2.

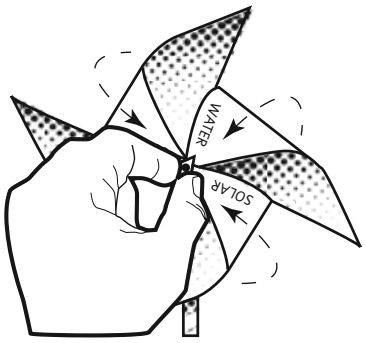
In the "water" quarter, write three facts that you've learned about using water as a source of power. Do the same for the three other quarters: wind, solar and biomass.

Step 3.

Flip the paper over and draw images that represent each of the four types of sustainable energy. (Be sure to draw your images of each type of energy on the flipside of the same quarter that shows the facts for that type of energy.)

Step 4.

With your drawing side up, bring the four points with the words wind, solar, water and biomass into the center, and stick a pin through all four points.

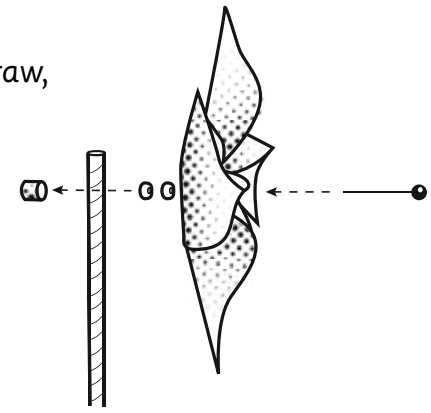


Step 5.

Turn your pinwheel over and make sure your pin pokes through the exact centre point. Wiggle it around a little to enlarge the hole so your pinwheel will spin freely. Thread two beads onto the end of the pin.

Step 6.

Carefully, stick the pin through the straw, about two centimeters from the top. And secure it with your ¼ eraser.



Canon

Name: _____

> Section E) Get Involved!

Put your pinwheels in a box and send them to your member of Parliament with a letter explaining why Canada needs to invest in sustainable forms of energy. You can help spread the word!

To find your member of Parliament: **http://www.parl.gc.ca/**

Answers: Energy

Section A) Energy Sources

1. Fossil fuels, like coal, oil, and natural gas, take millions of years to create so we call them **nonrenewable** sources of energy. We can only use as much gas as we can find under the earth. Once we use it up, we cannot create more.

   So, to plan for the future, we need to use more **renewable** sources of energy that replenish themselves quickly.

   Some options for the future include:

   Biodiesel is made from meat or vegetable oils.

   Wind energy is gathered using windmills, or turbines. They work like pinwheels, with blades that spin from the force of moving air.

   Heat from the sun is called **solar energy**, and can be collected during the daylight hours, and stored for use at night.

   Energy created from water is called **hydro**. A waterfall like Niagara Falls is a huge source of power. Canada produces more this type of power than any other country in the world.

   When **garbage** decomposes, it produces biogas.

Answers: Energy (continued)

Section B) What's the Best Source of Energy for the Job?

1. Benefits and Drawbacks of Energy Resources

+	Source	–
Mined close to the surface of the earth, which is less expensive than mining for other fossil fuels.	Coal	Shipping this resource is even more expensive than mining it. Mining damages ecosystems. Burning creates air pollution.
Can be harnessed for heat or electricity. No emissions. Using it doesn't deplete the resource at all.	Solar	We have less of it in the winter. Harnessing and storing enough requires huge amounts of space for panels.
One machine can produce enough electricity to power hundreds of homes. One of the fastest growing types of sustainable energy.	Wind	Can be very noisy. Amount varies due to unpredictable changes in weather. Can be dangerous for wild birds.
This form of electricity does not produce air pollution. It produces heat that boils water, creating steam that is converted to electricity.	Nuclear	Uses uranium, a metal that's mined from the earth, and is not renewable. Produces radioactive waste.
Scraps and chips can be burned to power industries, using less electricity.	Wood	If we use too much, we'll deplete our forests quicker than they can grow, which is no longer sustainable. Burning creates pollution.
The oldest type of energy harnessed by humans. Most often used form of sustainable energy. Inexpensive.	Hydro	Dams can have an impact on natural habitats of fish that travel through rivers and waterfalls to spawn.
These cleaner-burning fuels produce less air pollution than fossil fuels and don't require mining.	Biodiesel Biogas	Currently more expensive to produce than it is to mine for oil and gas fossil fuels. When burned it creates greenhouse gases.
Made from petroleum, used to fuel cars, trucks and airplanes. Also good for heating houses. Can be made into useful items like medicines and plastics.	Oil	Burning causes pollution. Mining damages ecosystems. When spilled in water, it harms wildlife.
One of the most commonly used forms of energy to heat houses because it burns more cleanly than other fossil fuels.	Natural Gas	Mining damages the environment. Burning produces pollution. Fumes are flammable and dangerous if inhaled.

Answers: Energy (continued)

2. Sustainable Alternatives

Energy Need	What You Use Now	Sustainable? If not, provide an alternative
Driving a car	Gas / oil / diesel	Electric / biodiesel
Heating a building	Oil / gas / hydro / nuclear	Hydro / solar / wind
Heating Water	Oil / gas / hydro / nuclear	Hydro / biogas / solar / wood / wind
Cooking Food	Oil / gas / hydro / nuclear	Hydro / biogas / solar / wood / wind
Lights at night	Oil / gas / hydro / nuclear	Hydro / biogas / solar / wind
Powering a computer	Hydro / nuclear / solar	Hydro / solar / wind
Flying a plane	Gas / oil	Biodiesel

Activity C) Energy Consumption and Conservation

Questions

1. Ontario, answers could include population or industry.
2. High population, urban centre
3. Saskatchewan, Manitoba, British Columbia, Newfoundland and Labrador, New Brunswick, Prince Edward Island, any Territory
4. Open
5. Riding a bike, walking, running, carpooling, public transit, skateboarding, rollerblading, etc.
6. Fix dripping taps, turn off the water while brushing teeth or washing dishes, don't take long showers, etc.
7. Turn off lights in rooms that aren't in use, turn off games and computers when not in use, turn down the heat a little, turn down the air conditioner, insulate windows properly in the winter, etc.