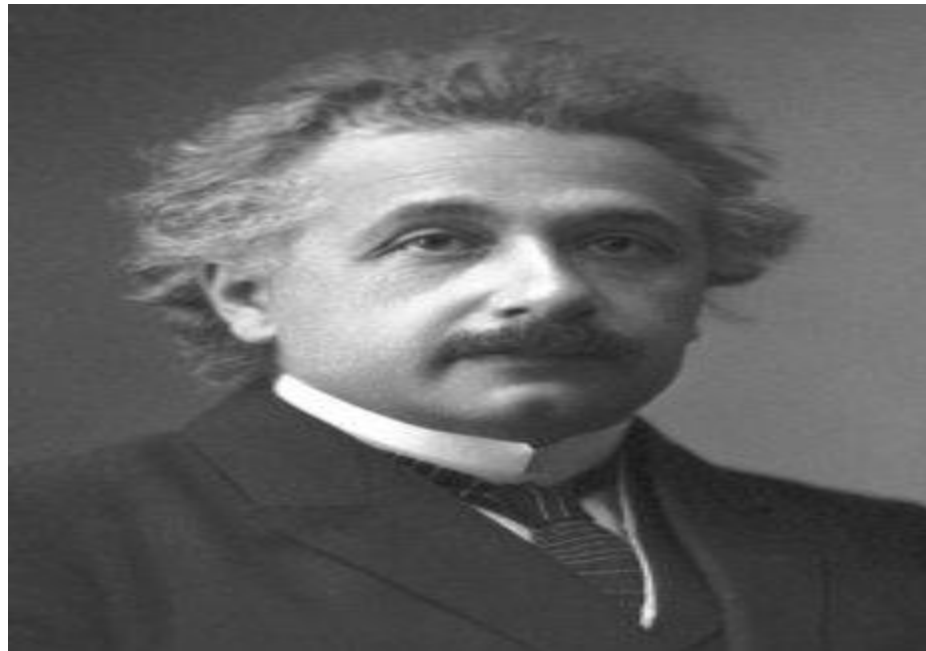


An intelligent person resolves a problem. A wise person avoids it.” - Albert Einstein



# THE 4R's



# THE 4R's



REDUCE



REUSE



RECYCLE



RECOVER

Reduce, Recycle, Recover, Reuse

The order is important.

Key. E – S – S – E – N – T – I – A – L !

Applying the 4Rs means consuming intelligently, thus making substantial savings (in terms of money, time, pollution, waste and energy)

# 4R'S

- DO YOU KNOW THAT
- FOR EVERY TON OF CONSUMER PRODUCTS MADE, 5 TONS OF WASTE IS CREATED.



# Reduce



- **WHY REDUCE?**

We must reduce waste production at the source. This means reducing the quantity of waste during production, distribution, purchasing, use and elimination.

First, before buying something, ask yourself if you really need it. If the answer is yes, and if possible, try to:

Replace your **consumption** of disposable objects and products by reusable ones. For example?

Cloth napkins (washable) instead of paper napkins (disposable);

Eliminate throw-away razors, lighters, non-rechargeable batteries, etc.

Buy used; Buy recycled or recyclable products; Buy products that aren't over-packaged;

# Reduce



# Reduce...



## Plastic bags:

A plastic bag takes 200-450 years to decompose.

Plastic bags are made primarily of petroleum.

Twelve million barrels of petroleum are needed to make 100 billion plastic bags.

Nine plastic bags contain enough fossil fuel to make a car run for a kilometer.

Plastic bags are among the 10 most frequently found items on Beaches.

Plastic bags caused major flooding in Bangladesh when they blocked the sewer system in the capital city.

Every year, more than a million sea birds, 100,000 marine mammals and an incalculable number of fish are intoxicated, strangled, infested, suffocated or have their intestines blocked by plastic bags.

# Reduce...



REDUCE

Turtles, dolphins and whales confuse bags floating in the ocean with jellyfish. When they swallow bags, these animals choke and die since the plastic blocks their digestive Systems

Birds, turtles and fish get tangled in bags, getting caught and eventually choking





# Reduce...



Every year, 24,000 metric tons of plastic end up in the ocean.

According to the Worldwide Home Environmentalists' Network, 120,000 pieces of plastic of all sizes float on each km<sup>2</sup> of the oceans! In the Pacific ocean, a little island of plastic waste,

## Over-packaging

Let's calculate the quantity of waste produced when we buy a grocery item. Let's take a box of chocolate cookies as an example:

- The box packaging (recyclable);

(Sometimes a plastic film around the box to preserve "freshness," non-recyclable);

- 

A plastic tray that holds the cookies (recyclable);

- 

(Sometimes another plastic film around the tray to preserve "freshness"; non-recyclable);

- 

(Often cookies, biscuits, muffins and other cakes are wrapped individually; non-recyclable);

- 

The receipt (recyclable);

- 

A bag to carry your purchase home (non-recyclable, but reusable);

# Reduce...



Do you recycle everything you can when you buy cookies? Do you reuse the plastic grocery bag or do you use a cloth shopping bag? A food item is over-packaged when it is wrapped in more packaging than necessary. Avoid food in individual portions and that sold per unit: small fruit juices, cheese sticks, small yogurts, etc. These sizes are systematically more expensive than larger ones or bulk food. And, they come in containers or packaging that can't be reused (at least they can be recycled). Do an experiment: For one month, save all the packaging from all the products you buy. After several days, you may already be able to imagine the mountain that you will accumulate over a month's time.

# Reduce...



- Buy bulk whenever possible
- family packs. Family pack means a large container of yogurt instead of many small ones or two litres of juice instead of eight 250-ounce ones. Family packs cost much less (you get more for your money) and make for much less waste (reusable, recyclable or not). And, you can reuse containers for leftovers, lunches, storing small items, etc.

# Reduce...



- Diaper:
- A disposable diaper takes 200 to 500 years to decompose. A cotton diaper only takes six months, but that's not its only advantage:
- It can be used 200 times. It even becomes more absorbent with time; It makes for savings of \$750.

# Reduce...



- According to the CAA, the average annual cost of owning your own car is as much as \$7,080/year, or about \$20/day, when you calculate a average functioning of ¢12.5/km (gas at ¢92.5, for a daily distance of less than 16 km), insurance, license, registration, depreciation and loan financing included.
- ALTERNATIVE TRANSPORTATION

Walking

Walking

Did you know that with every kilometre you walk you reduce your chances of obesity by 5%? And that every hour you drive increases this same risk by 6%? What's more, walking is an energizing activity that oxygenizes the brain and lowers stress. You will be more concentrated and effective at work and in class! Other advantages? Walking reinforces the cardiovascular system, lowers blood pressure, strengthens bones and firms and "rejuvenates

# Reduce...



## **Bicycling**

By using a bicycle seven months out of the year, you can save as much as \$4,500! Like walking, cycling will get you in better shape and increase your concentration and performance at work and in school. It also has a positive effect on your mood, self-confidence, self-esteem, and anxiety and stress levels.

Although at first glance, biking seems just to work your thigh and calf muscles, it actually works your whole body, especially your heart, lungs, muscles and bones. And, unlike jogging, it doesn't strain your Joints.

## **Carpooling**

Canoe vs. motor boat

Canoes don't cost money for gas, oil or mechanical problems; Get in shape; No air pollution; No noise...

# Reduce...



And what about planes?

Whenever possible, replace air travel with train or bus, carpooling or telephone conferencing. Air travel produces more per-kilometre greenhouse gases per passenger than all other means of transportation. For every kilometre in the air, a passenger emits CO<sub>2</sub>: 35 X more than by train; 4 X more than by bus; 2 X more than by car.

- **REDUCE YOUR GAS CONSUMPTION**

Avoid abrupt stops and starts. Not only will you save the wear and tear on your breaks and tires, you could save up to 40% on every tank of gas. Don't drive too fast: Going from 90km/h to 100km/h increases your gas use by 10%; from 100km/h to 120km/h = 20% more! Gas consumption is optimal at 60-70 km/h.

# Reduce...



- Turn off your engine as soon as you are parked or stopped for more than 10 seconds. Leaving your engine to idle for 10 seconds uses more gas than stopping and restarting your vehicle (restarting your car several times has little impact on the battery or the starter; the resulting use may be less than \$10/yr;
- o
- Idling dirties your spark plugs, and can cause a 4-5% increase in your gas use;
- o
- In winter, keep warming the car to a minimum--idle for no more than 30 seconds before you start driving. The transmission, tires, bearings and other mobile parts can only warm up when the vehicle is moving;
- o
- When you start moving, don't accelerate quickly or drive fast for the first five kilometres. The vehicle will warm up optimally and you will keep gas costs to a minimum...



# Reduce...



- Keep tire pressure up. Just one under-inflated tire could increase your gas consumption by 4%, without even mentioning that its
- lifespan may be reduced by 15,000 kilometres;
- Remove any unused, heavy items from your vehicle. 100 pounds (~ 45 kilos) can increase your gas consumption by 2%.
- Do regular oil and filter changes will help you save up to 50% in gas!
- Do preventive tune-ups. Poor maintenance can increase your gas consumption up to 15%.

# Reduce...



- Air conditioning can increase your gas consumption by 20%! Open your windows, go for a sunroof or tint your windows;
- ○
- Before turning off your car, turn off all energy-consuming accessories: radio, telephone battery chargers, conditioning systems, etc. By doing so, you will reduce the demand on the engine and thus on the gas use the next time you start your car;
- ○
- A car with a manual transmission has better gas mileage than one with an automatic transmission (Note: the engine works more efficiently and uses less gas in the higher gears--4th and 5th);
- ○
- A motorized vehicle with four wheels uses 5-10% more gas than a motorized vehicle with two wheels;
- ○
- When buying a vehicle, make sure to ask about its consumption. Gas use of 10 litres/100 km instead of 13 litres/100 km makes for savings of 2,000 every five years!
- First Nations of Quebec and Labrador Sustainable Development Institute

# Reduce...



- Use cruise control to maintain a stable speed on straight highways and improve your gas mileage :
- 4,000 km = 1 ton of greenhouse gas emissions = the volume of a two-storey, three-bedroom house
- Gas is a hazardous material. Other than its huge flammability, gas fumes are toxic and carcinogenic.
- Gas contributes to smog and to air pollution in general, causing asthma and cardiac disease.
- They often say that children are more vulnerable to air pollution. Why? Because they breathe faster and inhale more air for their body weight than adults do. Elders and people with respiratory problems are also more sensitive to air pollution;
- Gas also contributes to acid rain Imagine: In some areas of Canada-- particularly the Maritimes--the rain can be as acid as vinegar or lemon juice21!
- Leaving your engine to idle pollutes 20 times more than driving at 50km/hr;

# Reduce...



- In the winter, emissions from cold engines are more than double normal emissions. Idle for a maximum of 30 seconds to heat your car before driving. Your car will heat more quickly;
- Recent vehicles emit 98% less pollution than your average vehicle made 15 years ago.
- Exposition to pollution emitted by a vehicle is much greater inside than outside. Again, avoid idling and don't tailgate;
- Even a very small amount of gas (1 litre) can pollute huge quantities of water (2 million litres), and thus threaten all forms of life.
- "The term smog comes from 'smoke' and 'fog.' It refers to a mix of gas and atmospheric particles in the air that are noxious to your health"

# Reduce...



- Water Use;
- The human body is made up of at least 60% water. Blood contains 83% water. Clean drinking water is essential to our wellbeing and health.
- Drinking water is a precious resource that is becoming more and more rare on Earth.
- "Every eight seconds, somewhere in the world, a child dies from a illness connected to dirty water" or lack of water
- 2.6 billion people don't have access to a reliable water source.
- **Remember: a person can survive a month without food, but only five to seven days without water.**
- Although oceans cover 71% of the Earth's surface, only 3% of the planet's water is fresh:
- Less than 1% of freshwater can be found in lakes and rivers;
- The Canadian average is 350 litres (three bathtubs a day), while the world average is 137 litres per person per day. In India, an individual uses an average of only 25 litres.

# Reduce...



- Bottled Water:

Tapping, treating, bottling and transporting this water to consumers, then "eliminating" the bottles all have major environmental costs. The biggest? A plastic bottle takes 100-1,000 years to decompose. Of the 300 billion bottles sold in 2006 on the planet, 9 out of 10 weren't recycled. They were thrown in the trash...

It takes 1.5 million barrels of oil just to manufacture the bottles Americans buy every year.

# Reduce...



- **Rainwater collectors :**
- The idea is simple: Collect rainwater to water plants (inside and out), water your garden and wash your car. All you need is gutters that lead to a rain barrel that you can buy or make (using a trash can, for example). For every metre<sup>2</sup> of roof, you can collect an average of 600 litres of water.
- During construction, it is now possible to install a rainwater collector to bring water into the home (for the toilet, washer and dishwasher). The advantages for your appliances, for the environment and for community infrastructure are many:

**Waste:** Such materials which can not be reduced, reused or recycle is known waste material.

## Classification of Wastes according to their Properties



### Types of waste:

- a. **Degradable Waste** (e.g. paper, wood, fruits, vegetable peels etc): such waste degrade naturally or natural way.
- b. **Non Degradable Waste** (plastic, bottles, old machines and etc): such waste cannot degrade naturally or natural way.



# Classification of wastes according to their origin and type

**Municipal Solid wastes:** It includes household garbage, rubbish, construction materials and residues etc. are managed by any municipality.

**Bio-medical wastes: It includes** Solid or liquid wastes like anatomical body parts, Blood, dead tissues and biotech/microbiological waste etc.

**Industrial wastes:** Liquid and solid wastes are major parts of industrial waste it includes oil, greas, chemicals etc. which are generated by various industries.

**Agricultural wastes:** It originate from the agriculture fields or farming activities. These substances are mostly biodegradable.

**Radioactive wastes:** These wastes are very harmful, originate from the radioactive materials or byproducts of nuclear processes.

**E-wastes:** Electronic wastes generated from any modern establishments. It includes discarded electrical or electronic devices.

# Solid waste effects

- 1. Impacts of solid waste on human health:** Increase in hospitalization of diabetic residents living near hazard waste sites
- 2. Effects of waste on animals and aquatics life:** Plastic found in oceans ingested by birds and mercury in fish due to disposal of mercury in the rivers.
- 3. Impacts of waste on Environment:** Change in climate and destruction of ozone layer due to waste biodegradable

# Solid waste management with 4 R



## **Reduce Waste:**

**Try to Reduce paper waste in offices by implementing a formal policy to duplex all draft reports.**

**Redesign packaging to eliminate excess material while maintaining strength**

**You can reduce waste by using a computer! Most newspapers and magazines are available online. Instead of buying the paper versions, you can find them on the Internet. Also remember that you should print out only what you need**

# Reuse..



- Reuse is about thinking before getting rid of an object. It means that reuse is extending life or giving second life (without modifying it) to something that we previously considered as garbage. You are reusing each time you go to library, rental store, repair shops, electronic help desk, garage sales, furniture refinishers, used book and cd stores, computers and home appliance stores..

## Why I reuse:

- To reduce your consumption and therefore avoid unnecessary spending.)
- To reduce your production of waste and disposal of wasting.
- To preserve the environment, its resources and raw materials.
- Reuse helps reduce not only the content of garbage cans but also that of your recycling bins.
- All you need is to extend the life of a product by using it more than once or to be creative by giving it a second life.

# Reuse..



## What can I reuse:

- **By buying used, recycled and recyclable products or products with recycled material, you reuse something that has already been consumed or used.**
- **Use a reusable plastic or cotton bag for your purchases.**
- **Buy family packs whenever possible. Family pack means a large container of yogurt instead of many small ones or two litres of juice instead of eight 250-ounce ones. Family packs cost much less (you get more for your money) and make for much less waste (reusable, recyclable or not). And, you can reuse**
- **containers for leftovers, lunches, storing small items;**
- **Use both sides of a sheet of paper by printing on both sides**

# Reuse..



- **Charitable organizations would love to have your old clothes, jewelry and other accessories; or you can put them on a table for your annual garage sale. You can even use them to make your children and grandchildren happy at Halloween. Or why not open a second-hand-clothing store? Otherwise, your old clothes will take one to five years to decompose**
- **Try to Reuse office furniture and supplies, such as interoffice envelopes, file folders, and paper.**
- **Encourage employees to reuse office materials rather than purchase new ones.**
- **Don't throw out clothes, toys, furniture, and other things that you don't want anymore. Somebody else can probably use them. You can bring them to a centre that collects donations, give them to friends, or even have a yard sale**

# RECYCLE



## Recycle

Like reuse, recycle means recovering an object and giving it a second life by making it a raw material like paper goes back to pulp, plastics are melted and moulded into new products etc. What was once considered waste becomes a resource thus breaking with the linear extraction-production-consumption-destruction logic. With this an environmentally friendly cycle and sustainable development are established that reduces consumption and its negative impact.

After collection, recuperate material head to a recycling center where paper cardboard, plastic and metals are just sorted. Each material is then compressed in a cubic tonne and sold to companies that do the actual recycling.

## Why Recycle:

Minimizing forest and mining activities.

Preserves huge amount of water

Reduces energy demands during manufacturing

Reduces Pollution (Each tonne of recycled materials save 2.8 tonnes greenhouse gases.)

# RECYCLE



- **Recycle is the technique which help to management the solid waste (in this technique waste material convert into another products). Many of the things we use every day, like paper bags, soda cans and milk cartons, are made out of materials that can be recycled.**
- **Recycled items are put through a process that makes it possible to create new products out of the materials from the old ones.**



# RECYCLE



- What can you recycle?
- You surely recognize this symbol. It's the Möbius ribbon, the logo for recycling. It guarantees that a product and/or its packaging is made entirely of recycled materials.
- You will be pleasantly surprised to see that most of your "garbage" can be recycled or recovered. However, a container made of several materials must be taken apart before being recycled: For instance, a jam jar is entirely recyclable (if you don't need it for storage), but you must separate the container (glass) from the lid (metal).

# RECYCLE



- As we saw, one single sheet of recycled paper requires less energy than a sheet made of virgin fibres, and it preserves 15 grams of wood and 1 litre of water. Recycling one tonne of waste paper is the fibre equivalent of 11 to 24 trees, depending on their size and nature. In practical terms, recycling a onemeter- high stack of newspaper saves one tree. And the benefits are even greater: a 74% reduction in air pollution and 35% less water pollution.
- A sheet of paper can only be recycled about seven times, since the fibres become shorter and more fragile during the recycling process.

# RECYCLE



- What happens to recycled paper:
- Cardboard, Tissues, Paper Towels, Toilet paper
- What happens to recycled newspaper:
- Egg Cartons, Fruit trays, Animal litter, Cereal and Shoe Boxes, phone Books, Thermal insulations, Roof coverings.

# RECYCLE



- Products which cant be recycled;
- Lighters, Binders, Rubber and garden hoses, Motor oil or solvent containers, expandable film, meat, cheese, toys, plastic furniture

# Recover



## Recover:

**Of course, this “R” is difficult, if not impossible, for individuals to apply. Therefore, this segment is intended for industries or towns with a high volume of waste to manage.**

Most of the materials thrown in the garbage can be used and processed in ways other than being destroyed. This is what is called recovering. Reusing, recycling and composting (for food leftovers) are the most frequently used methods for recovering waste. When it’s not possible to reuse or recycle objects—such as dead batteries, ink cartridges or cell phones, which all contain toxic elements labelled hazardous household waste—there is one last option before throwing them away: scrap dealers, recycling workers and recoverers. Recover is to convert waste into resources (such as electricity, heat, compost and fuel) through thermal and biological means.

# Recover



- The energy produced by this special method is used as power. Energy can be recovered from waste either by direct waste incineration (typically mass burn incineration plants, taking unsorted waste) or by using waste as a fuel substitute (either directly or as a “refuse derived fuel”).

# Recover



- Another alternative is recovering the energy stored in residual material. That means turning waste into a fuel for manufacturing processes or equipment designed to produce energy. Various mechanical, biological and caloric systems and technologies can convert, reprocess or break up wastes into new materials or energy. For example, the methane caused by rotting materials in dump sites can be recycled. This gas is converted into power, and thus eliminates its harmful effects on the environment.
- (methane is a greenhouse gas 20 times more powerful than CO<sub>2</sub>).

# Recover



- What can you recover?
- Although it represents less than 1% of our waste, hazardous household waste (HHW) threatens our health and that of the environment.

Incinerators, dumps, dumping sites and water treatment plants cannot get rid of them safely. Luckily, we can recover them by recycling components in most of the following hazardous household waste :



# Recover



- Hazardous materials? Yes, you read that right. Because it contains the following materials, this "waste" is dangerous to human health and to the environment after spending time at the dump or being crushed or burnt :
- **Lead:** Increases blood pressure, causes lesions to the kidneys and brain, disrupts the nervous system, reduces children's learning capabilities and affects their behaviour (aggressiveness, hyperactivity, etc.). The cathode-ray tube of a computer screen contains 2.4 kg of lead .

# Recover



- **Cadmium:** poisons and damages lungs and kidneys.
- **Beryllium:** One of the most toxic chemicals known, it is damaging to the lungs and heart. In addition to causing Berylliosis, it can increase risks of cancer and alter DNA ;
- **Arsenic:** Irritates the stomach, intestines and lungs, reduces the production of white and red blood cells and causes skin problems. It can also create resistance to infections, disrupt the heart, cause brain damage and alter DNA ;
- **Mercury:** Toxic in very small doses (1/70th of a teaspoon can contaminate 870,000 p2 of water), damages the kidneys, brain and nervous system.

# Recover



- Phenomenal quantities of used computer hardware are sent to developing countries: India receives up to 20,000 kilos a day, while Nigeria welcomes 500 containers per month. 75% of the material shipped is unusable. Frequently, it is destroyed inadequately, thus becoming a health risk for people living near landfills. In some cases, lead percentages are 2,000 times higher than standards recommended by the World Health Organization.
- In conclusion, electronic products contain precious resources, including ferrous metals, aluminium, copper, precious metals (gold, silver, copper, platinum) and engineered plastics.



THANK YOU