# Recycling

- Definition
- Type of Recycle
- Benefits
- What should we Know & do ..
- Q & A

# Agenda

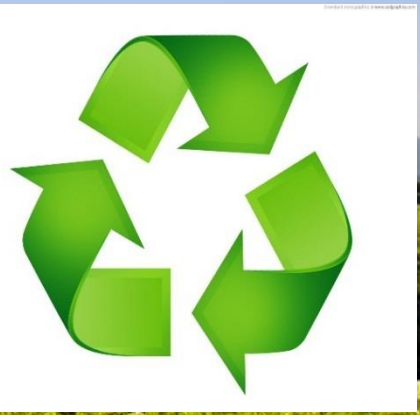
- Definition Of Recycling
- Recycling In History

# Definition

Recycling is simply giving old or used things a new lease of life, by making new things out of the old materials

The 3R Terminology

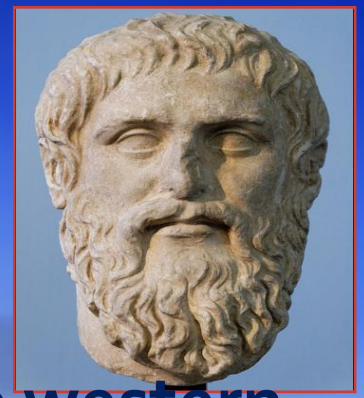
Reduce, Reuse, & Recycle



# Definition

## Definition Of Recycling

Recycling has been a common practice for most of human history, with recorded advocates as far back as Plato in 400 BC



- 500 BC Athens organizes the first municipal dump program in the western world
- 1031 Japan begins the first ever recorded reuse of waste paper
- 1690 The recycled paper manufacturing process is introduced USA
- 1776 Rebels turn to recycling to provide material to fight the War of Independence
- 1865 England begins collecting, sorting, and recycling unwanted goods

# Recycling In History

- 1897 New York City creates a materials recovery facility where trash is sorted at "picking yards" and separated into various grades of paper, metals, and carpet
- 1904 The first American aluminum can recycling plants open in Chicago and Cleveland
- 1940 Goods such as nylon, rubber and many metals are rationed and recycled to help support the war effort
- 1964 The all-aluminum can is introduced.
- 1965 To 1970 The Mobius Loop is introduced as the symbol for Reduce, Reuse, Recycle

# Recycling In History

- 1970 The first Earth Day brings national attention to the problem of increasing waste and the importance of recycling
- 1983 The first Canadian "blue box" curbside recycling project is implemented in Kitchener/Waterloo with 1,500 residents participating
- 1990 McDonald's stops using Styrofoam containers. The 20th-anniversary theme for Earth Day is recycling
- 2000 The EPA confirms a link between global warming and waste
- 2006 Dell Computer begins offering a free recycling service for their products

# Recycling In History

- 2014 A new class of industrial polymers discovered by researchers from IBM
- 2015 California enacts the first ever state-wide ban on plastic bags in grocery and convenience stores.
- 2016 A team of Japanese scientists discovered a species of bacteria that eats plastics commonly found in water bottles.
- 2017 An engineer at Stanford and her team have come up with a new semiconductor that is not only as flexible as skin but is also biodegradable.

# Recycling In History

- **2018 Organic Framework - Ontario**

  On April 30th, 2018, The Ministry of the Environment and Climate Change of Ontario released their Food and Organic Waste Framework

## Recycling In History

- Paper
- Plastics
- Glass
- Metal

# Recycling Types


# Recycling Types

The process of waste paper recycling involves mixing used paper with water and chemicals to break it down


# Recycling Types

Papers

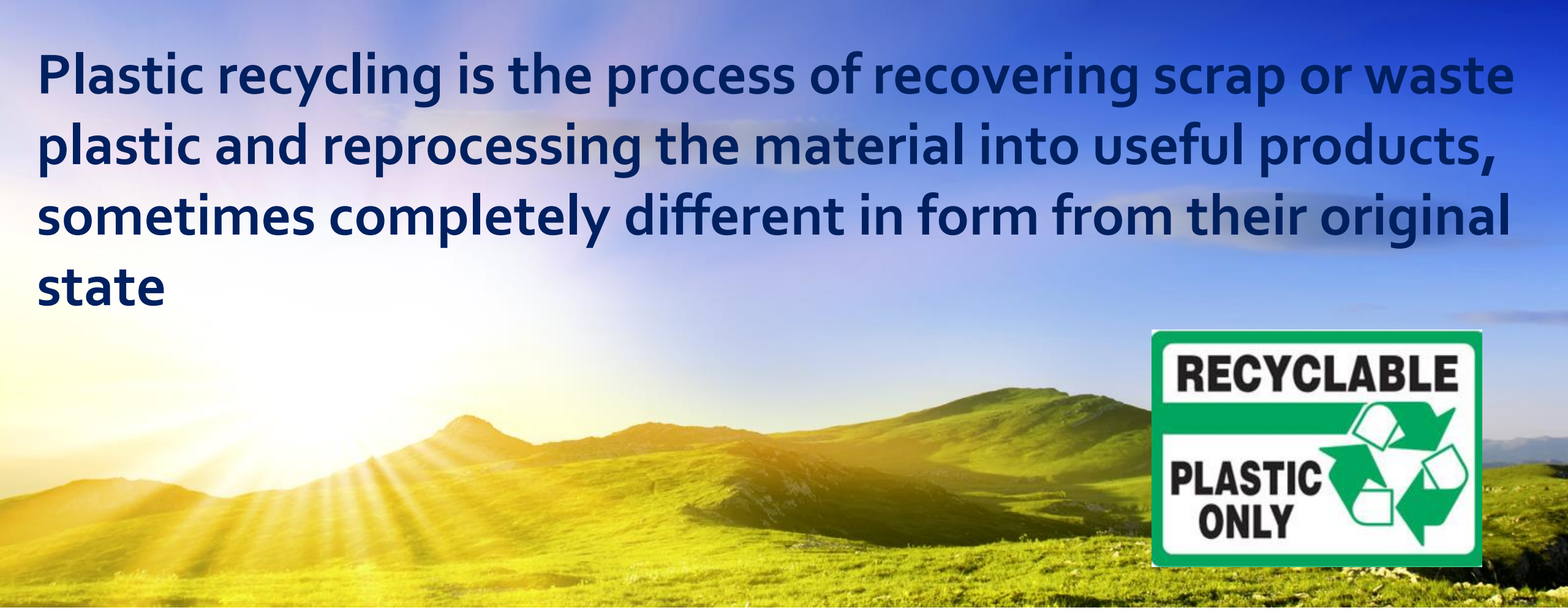
- 17 trees
- 275 pounds of sulfur
- 350 pounds of limestone
- 9,000 pounds of steam
- 60,000 gallons of water
- 225 kilowatt hours
- 3.3 cubic yards of landfill space

| | | | |
|---|---|---|---|
| Paper | | | |
|   | #20 C PAP (PCB) | Cardboard | |
|   | #21 PAP | Other paper | Mixed paper magazines, mail |
|   | #22 PAP | Wax Paper (single sided) | MacDonald's, fast food sandwich wrappers, meat packing, gum wrappers, some drink boxes, BetaMax boxes. |
| | #23 PBD (PPB) | Paperboard | Greeting cards, frozen food boxes, book covers |

# Recycling Types

## Papers

Plastic recycling is the process of recovering scrap or waste plastic and reprocessing the material into useful products, sometimes completely different in form from their original state




# Recycling Types

Plastics


PETE
DART
200 ml e
PO Box 10417
Beverly Hills, CA 90213
Rosenstraße 16
D - 35037 Marburg
#45777-000-21
5
CAP
7
OTHER
2

| Symbol | Code | Description | Examples |
|---|---|---|---|
| Plastics (see resin identification code[3]) [4] | | | |
|   | #1 PET(E) | Polyethylene terephthalate | Polyester fibers, soft drink bottles |
|   | #2 PEHD or HDPE | High-density polyethylene | Plastic bottles, plastic bags, trash cans, imitation wood |
|   | #3 PVC | Polyvinyl chloride | Window frames, bottles for chemicals, flooring, plumbing pipes |
|   | #4 PELD or LDPE | Low-density polyethylene | Plastic bags, buckets, soap dispenser bottles, plastic tubes |
|   | #5 PP | Polypropylene | Bumpers, car interior trim, industrial fibers, carry-out beverage cups |
|   | #6 PS | Polystyrene | Toys, flower pots, video cassettes, ashtrays, trunks, beverage/food coolers, beer cups, wine and champagne cups, carry-out food containers, Styrofoam |
|   | #7 O (OTHER) | All other plastics | Polycarbonate (PC), polyamide (PA), styrene acrylonitrile (SAN), acrylic plastics/polyacrylonitrile (PAN), bioplastics |
|   | #9 or #ABS[*citation needed*] | Acrylonitrile butadiene styrene | Monitor/TV cases, coffee makers, cell phones, most computer plastic |
|   | PA[*citation needed*] | Polyamide | Nylon |

**Number 1** • *PETE or PET (polyethylene terephthalate)*

1 PETE

**IS USED IN** . . . . . microwavable food trays; salad dressing, soft drink, water, and beer bottles
**STATUS** . . . . . hard to clean; absorbs bacteria and flavors; avoid reusing
**IS RECYCLED TO MAKE** . . carpet, furniture, new containers, Polar fleece

**Number 2** • *HDPE (high-density polyethylene)*

2 HDPE

**IS USED IN** . . . . . household cleaner and shampoo bottles, milk jugs, yogurt tubs
**STATUS** . . . . . transmits no known chemicals into food
**IS RECYCLED TO MAKE** . . detergent bottles, fencing, floor tiles, pens

**Number 3** • *V or PVC (vinyl)*

3 V

**IS USED IN** . . . . . cooking oil bottles, clear food packaging, mouthwash bottles
**STATUS** . . . . . is believed to contain phalates that interfere with hormonal development; avoid
**IS RECYCLED TO MAKE** . . cables, mudflaps, paneling, roadway gutters

**Number 4** • *LDPE (low-density polyethylene)*

4 LDPE

**IS USED IN** . . . . . bread and shopping bags, carpet, clothing, furniture
**STATUS** . . . . . transmits no known chemicals into food
**IS RECYCLED TO MAKE** . . envelopes, floor tiles, lumber, trash-can liners

**Number 5** • *PP (polypropylene)*

5 PP

**IS USED IN** . . . . . ketchup bottles, medicine and syrup bottles, drinking straws
**STATUS** . . . . . transmits no known chemicals into food
**IS RECYCLED TO MAKE** . . battery cables, brooms, ice scrapers, rakes

**Number 6** • *PS (polystyrene)*

6 PS

**IS USED IN** . . . . . disposable cups and plates, egg cartons, take-out containers
**STATUS** . . . . . is believed to leach styrene, a possible human carcinogen, into food; avoid
**IS RECYCLED TO MAKE** . . foam packaging, insulation, light switchplates, rulers

**Number 7** • *Other (miscellaneous)*

7 OTHER

**IS USED IN** . . . . . 3- and 5-gallon water jugs, nylon, some food containers
**STATUS** . . . . . contains bisphenol A, which has been linked to heart disease and obesity; avoid
**IS RECYCLED TO MAKE** . . custom-made products

## POLYSTYRENE (PS)

Polystyrene (PS) is a synthetic aromatic polymer made from the monomer styrene.

## POLYPROPYLENE (PP)

Polypropylene (PP), Also known as polypropene, is a thermoplastic polymer used in a wide variety of applications including

## POLYETHYLENE (PE)

Polyethylene (PE) is a thermoplastic polymer with variable crystalline structure and an extremely large range

## POLYVINYL CHLORIDE (PVC)

Polyvinyl chloride, also known as poly vinyl or vinyl,

Glass waste should be separated by chemical composition, and then, depending on the end use and local processing capabilities, might also have to be separated into different colors


# Recycling Types

Glass

| Glass | | |
|---|---|---|
|   | #70 GLS | Mixed Glass Container/Multi-Part Container |
|   | #71 GLS | Clear Glass |
|   | #72 GLS | Green Glass |

# Recycling Types

Glass

Ferrous metals and aluminum are able to be recycled, with steel being one of the most recycled materials in the world

The process involves simply re-melting the metal


# Recycling Types

Metal

| | | |
|---|---|---|
| Metals | | |
|   | #40 FE | Steel |
|   | #41 ALU | Aluminium |

# Recycling Types

Metal

| | | | |
|---|---|---|---|
|  | #8 Lead[citation needed] | Lead–acid battery | Car batteries |
|  | #9 Alkaline | Alkaline battery | TV Remote batteries, flashlight batteries |
| | #10 NiCD | Nickel–cadmium battery | Older batteries |
|  | #11 NiMH | Nickel–metal hydride battery | |
|  | #12 Li | Lithium battery | Cell phone batteries, computer batteries, camera batteries |
|  | #13 SO(Z) | Silver-oxide battery | |
| | #14 CZ | Zinc–carbon battery | Flashlight batteries |

# Recycling Type

| | | | |
|---|---|---|---|
| Biomatter/Organic material | | | |
|   | #50 FOR | Wood | Furniture, chopping boards, brooms, pencils, cocktail sticks, wooden spoons |
|   | #51 FOR | Cork | Bottle stoppers, place mats, construction material |
|   | #60 COT | Cotton | Towels, t-shirts, cotton buds/swabs, cotton pads |
|   | #61 TEX | Jute | Clothing |
| | #62-69 TEX | Other Textiles | |

# Recycling Type

| | | | |
|---|---|---|---|
| Composites (80—99) | | | |
|  | #81 PapPet | Paper + plastic | Consumer packaging, pet food bags, cold store grocery bags, Icecream containers, cardboard cans, disposable plates |
| | #82 | Paper and fibreboard/Aluminium | |
| | #83 | Paper and fibreboard/Tinplate | |
|  | #84 C/PAP (or PapAl) | Paper and cardboard/plastic/aluminium | Liquid storage containers, juice boxes, cardboard cans, cigarette pack liners, gum wrappers, cartridge shells for blanks, fireworks colouring material, Tetra Brik. |
| | #85 | Paper and fibreboard/Plastic/Aluminium /Tinplate | |
|  | #87 CSL (Card-Stock Laminate) | Biodegradable plastic | Laminating material, special occasion cards, bookmarks, business cards, flyers/advertising |
|  | #90 | Plastics/Aluminium | plastic toothpaste tubes/some vacuum packed coffee bags |
|  | #91 | Plastic/Tinplate | |
| | #92 | Plastic/Miscellaneous metals | |
| | #95 | Glass/Plastic | |
| | #96 | Glass/Aluminium | |
| | #97 | Glass/Tinplate | |
| | #98 | Glass/Miscellaneous metals | |

# Recycling Type

| Glass | | | |
|---|---|---|---|
|  | #70 GL | Clear Glass | jars |
|  | #71 GL | Green Glass | wine glass |
|  | #72 GL | Brown Glass | |
|  | #73 GL | Dark Sort Glass | |
|  | #74 GL | Light Sort Glass | |
|  | #75 GL | Light Leaded Glass | Televisions, high-end electronics display glass like in calculators |
|  | #76 GL | Leaded Glass | Older televisions, ash trays, older beverage holders |
|  | #77 GL | Copper Mixed/Copper Backed Glass | Electronics, LCD display heads, clocks, watches |
|  | #78 GL | Silver Mixed/Silver Backed Glass | Mirrors, formal table settings |
|  | #79 GL | Gold Mixed/Gold Backed Glass | Computer glass, formal table settings |

# Recycling Type

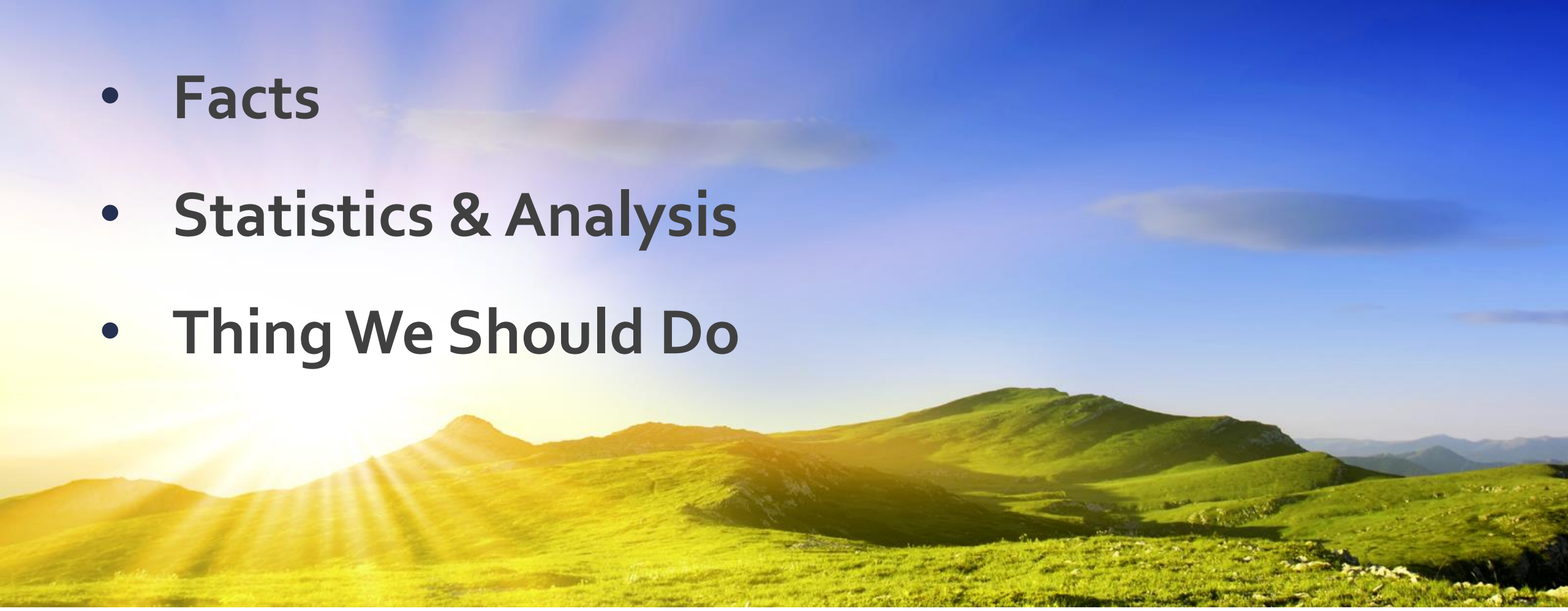
- Economic benefits
- Environmental benefits

# Benefits

Environmental effects of recycling

| Material | Energy savings | Air pollution savings |
|---|---|---|
| Aluminium | 95% | 95% |
| Cardboard | 24% | — |
| Glass | 5–30% | 20% |
| Paper | 40% | 73% |
| Plastics | 70% | — |
| Steel | 60% | — |

# Benefits

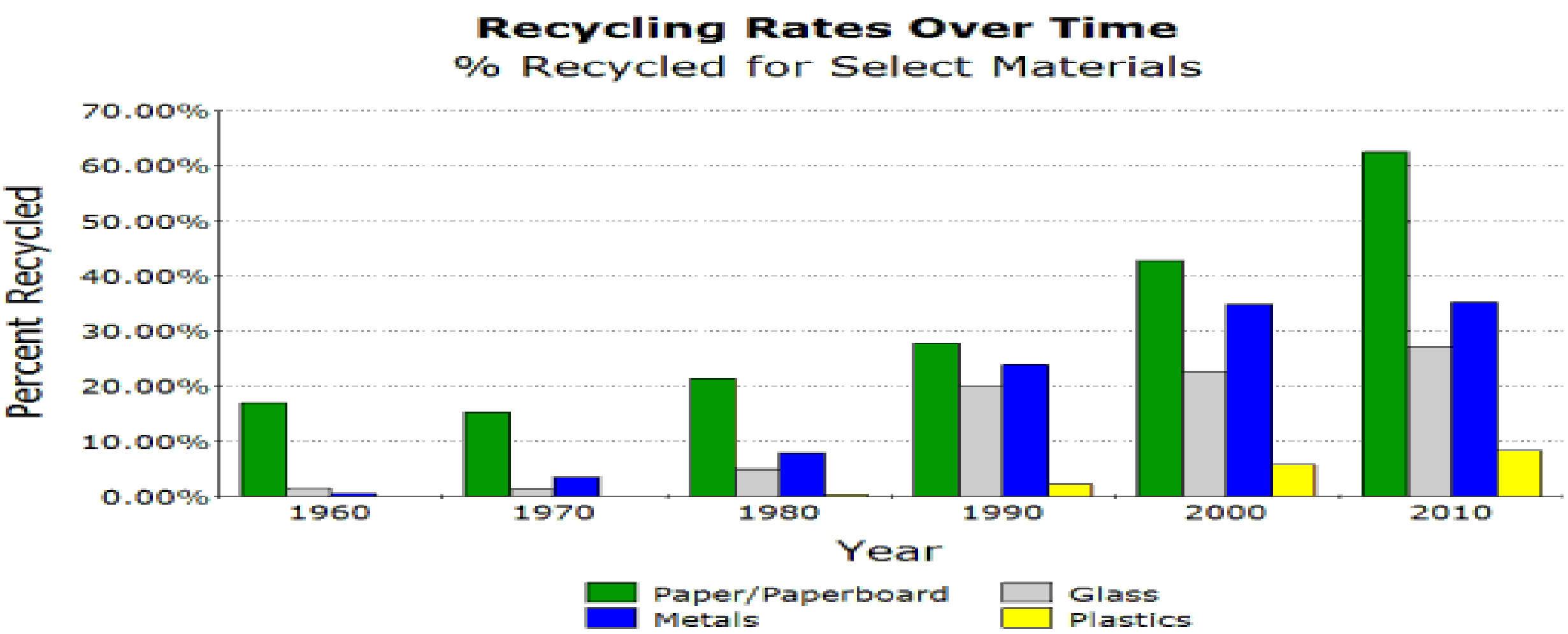



# What should we Know & do ..

- Recycling one aluminum can saves enough energy to run a television for 3 hours.
- It takes one million years for a glass bottle to break down in a landfill.
- Plastics take about 400 years to break down in a landfill.
- About 40, 000 trees are cut down each day just to produce the newsprint for Canada's daily papers.

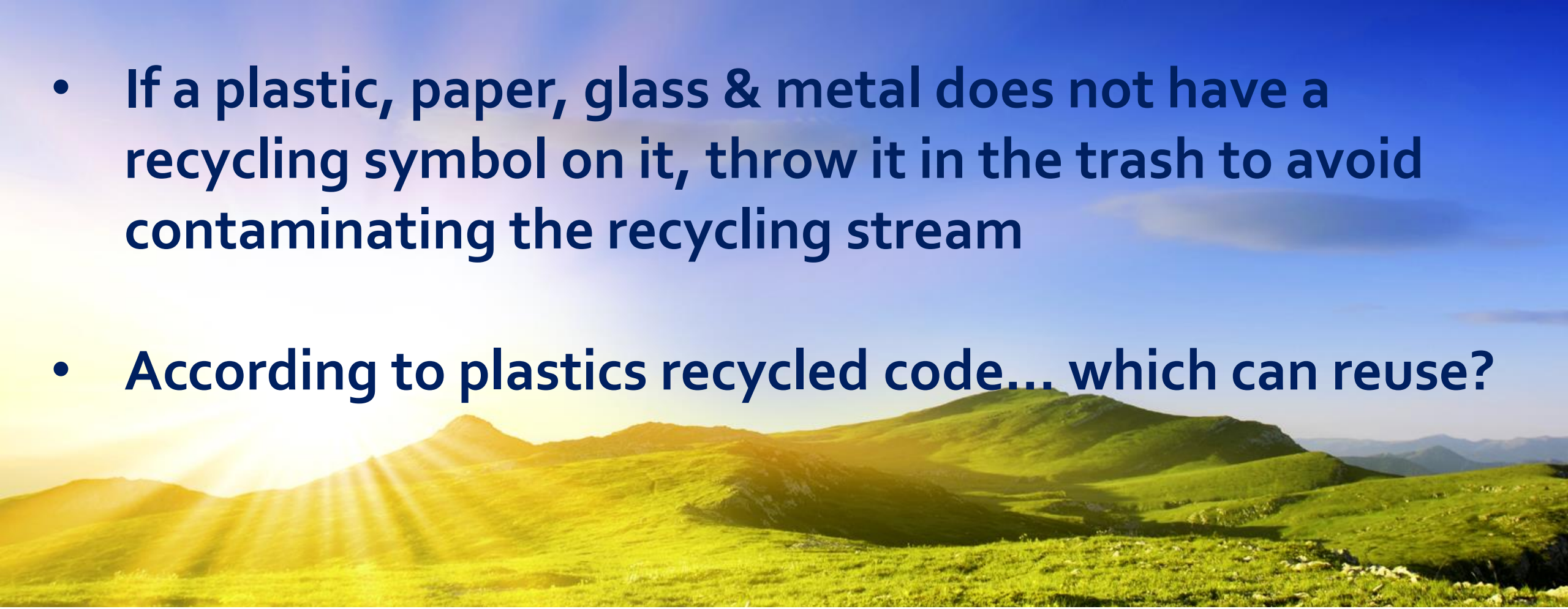
# What should we Know & do ..

Some Facts




# What should we Know & do ..

## Statistics & Analysis

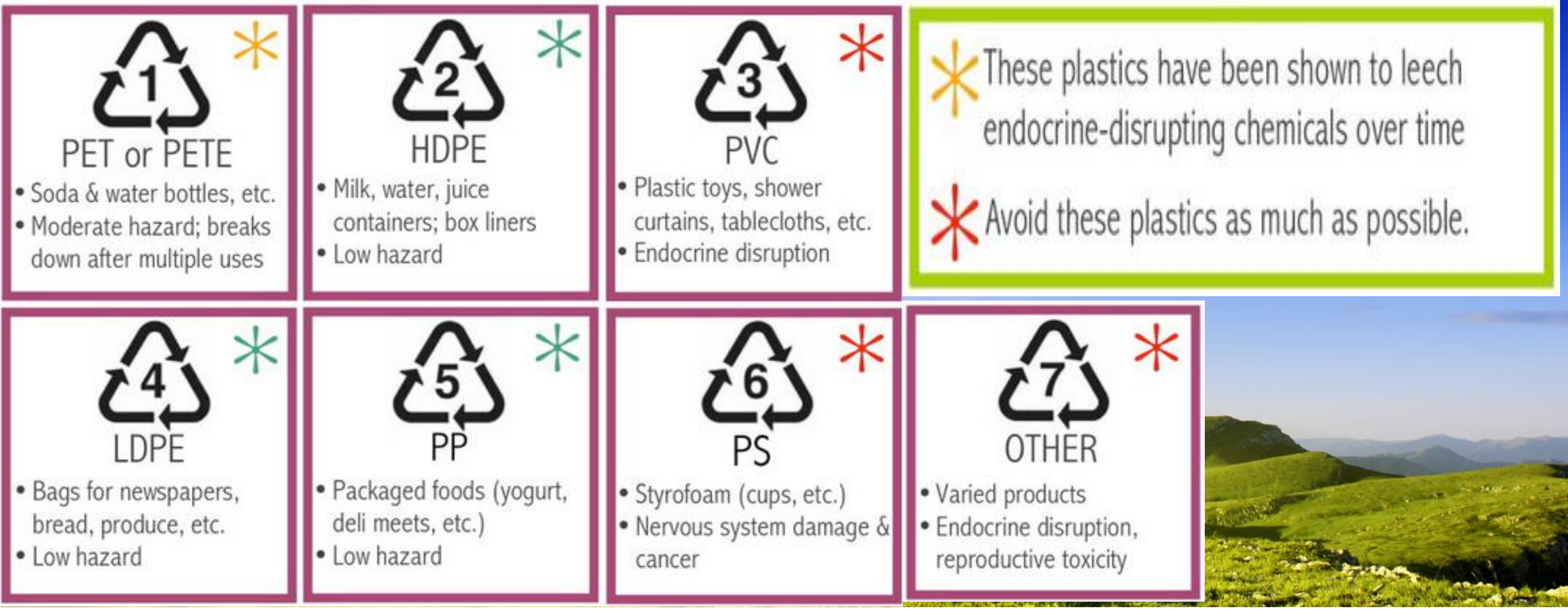


- If a plastic, paper, glass & metal does not have a recycling symbol on it, throw it in the trash to avoid contaminating the recycling stream

- According to plastics recycled code… which can reuse?

# What should we Know & do ..

**Things We Should Do..**




# What should we Know & do ..

## Things We Should Do..

http://www.all-recycling-facts.com/what-is-recycling.html#ixzz42kSbrTSS

http://www.all-recycling-facts.com/recycling-statistics.html#ixzz42kdzQHSe

http://www.buschsystems.com/recycling-bin-news/2014/05/a-brief-timeline-of-the-history-of-recycling/

https://en.wikipedia.org/wiki/Plato

https://www.buschsystems.com/resource-center/page/a-brief-timeline-of-the-history-of-recycling

# References


# Q & A