





# Smart Plastics Guide

NATIONAL GEOGRAPHIC'S  
**STRANGEDAYS**  
ON PLANET EARTH

Plastic products are typically labeled with a number surrounded by the recycling symbol. These numbers and labels identify both the type of resin used to make the plastic and the products' recyclability. Associated with the different types of resin are potential health risks. The following table summarizes seven different types of commonly used plastics, product examples, recyclability, and potential health risks.

USED FOR	RECYCLABILITY	HEALTH	NOTES
<b>PLASTIC #1 - POLYETHYLENE TEREPHTHALATE (PET)</b>			
 <ul style="list-style-type: none"> <li>soft drink, water, and other beverage bottles</li> <li>detergent and cleaning containers</li> <li>peanut butter and other food containers and bottles</li> </ul>	PET is recycled into: new bottles, polyester for fabrics and carpet, fill for bumper cars and fiberfill for sleeping bags and jackets.	No known health issues.	PET is one of the most easily recycled plastic.
<b>PLASTIC #2 - HIGH DENSITY POLYETHYLENE (HDPE)</b>			
 <ul style="list-style-type: none"> <li>milk and water jugs</li> <li>laundry detergents, shampoo, and motor oil containers</li> <li>shampoo bottles</li> <li>some plastic bags</li> </ul>	Clear HDPE containers are easily recycled back into new containers. Colored HDPE are converted into plastic lumber, lawn and garden edging, pipes, rope, and toys.	No known health issues.	HDPE is easily recycled.
<b>PLASTIC #3 - POLYVINYL CHLORIDE (PVC OR V)</b>			
 <ul style="list-style-type: none"> <li>clear food packaging, cling wrap</li> <li>detergents and window cleaner bottles</li> <li>some plastic squeeze bottles, cooking oil and peanut butter jars</li> <li>vinyl pipes</li> <li>shower curtains</li> <li>flooring, home siding, and window and door frames</li> </ul>	PVS is one of the least recyclable plastic due to additives. Potentially harmful substances are also created by its disposal.	Many harmful chemicals are produced in the manufacturing, disposal, or destruction of PVC including: <ul style="list-style-type: none"> <li>Lead</li> <li>DEHA (di(2ethylhexyl)adipate)</li> <li>Dioxins</li> <li>Ethylene dichloride</li> <li>Vinyl chloride</li> </ul> Effects of exposure to these chemicals may include: decreased birth weight, learning and behavioral problems in children, suppressed immune function and disruption of hormones in the body, cancer and birth defects, genetic changes.	Harmful chemicals created as a byproduct of PVC can also settle on grassland, where they can be consumed by livestock, and accumulate in meat and dairy products that are directly ingested by us.
<b>PLASTIC #4 - LOW DENSITY POLYETHELENE (LDPE)</b>			
 <ul style="list-style-type: none"> <li>bread, frozen food, and grocery bags</li> <li>most plastic wraps</li> <li>some bottles</li> </ul>	LDPE is not usually recycled.	No known health issues.	While no known health effects associated with the use of this plastic are known, organic pollutants are formed during manufacturing.

Just because the recycling number on a plastic object indicates that it is potentially recyclable doesn't necessarily mean that it is. Normally, only #1 and #2 plastic bottles with narrow necks are recycled. Check to see what plastics your local waste management organization recycles. The Earth911 Web site is a good place to start your search: [www.earth911.org](http://www.earth911.org)

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## PLASTIC #5 - POLYPROPYLENE (PP)



- deli soups, syrup, yogurt and margarine containers
- disposable diapers
- outdoor carpet
- house wrap
- clouded plastic containers, e.g. baby bottles, straws

PP is not easily recycled. Differences in the varieties of type and grade, mean achieving consistent quality during recycling is difficult.

No known health issues.

## PLASTIC #6 - POLYSTYRENE (PS)



- Rigid Polystyrene**
- CD cases
  - disposable cutlery
- Formed Polystyrene (Styrofoam)**
- food containers
  - packaging
  - insulation
  - egg cartons
  - building insulation

Recycling PS is possible, but not normally economically viable.

Styrene can leach from polystyrene. Over the long term, this can act as a neurotoxin. Studies on animals report harmful effects of styrene on red-blood cells, the liver, kidney, and stomach organs<sup>1</sup>.

<sup>1</sup> US Environmental Protection Agency (1992) "Styrene". Air Toxics Website. Retrieved on 31/1/2008 from <http://www.epa.gov/ttn/atw/hlthef/styrene.html>

Styrene can be absorbed by food, and once ingested can be stored in body fat. It is thought that repeated exposure could lead to bioaccumulation<sup>2</sup>.

<sup>2</sup> WHO International Programme On Chemical Safety. "Styrene". Environmental Health Criteria 26. Retrieved on 31/1/2008

<http://www.inchem.org/documents/ehc/ehc/ehc26.htm>

Try reusing styrofoam packing peanuts, and polystyrene cutlery where practical.

## PLASTIC #7 - MIXED (OTHER)



- lids
- medical storage containers
- electronics
- most plastic baby bottles
- 5-gallon water bottles
- "sport" water bottles
- metal food can liners
- clear plastic "sippy" cups
- some clear plastic cutlery

Mixed resin plastics like #7 are difficult, if not impossible, to recycle.

Health effects vary depending on the resin and plasticizers in this plastic that often includes polycarbonates. Polycarbonate plastic leaches bisphenol A (BPA) a known endocrine disruptor. By mimicking the action of the hormone, estrogen, bisphenol A has been found to: effect the development of young animals; play a role in certain types of cancer; create genetic damage and behavioral changes in a variety of species.

bisphenol A is widespread--one study found BPA in 95% of American adults sampled<sup>3</sup>.

<sup>3</sup> Calafat, A.M., Kuklennyik, Z., Reidy, J.A., Caudill, S.P., Ekong, J. & Needham, L.L. (2005) "Urinary Concentrations of Bisphenol A and 4-Nonylphenol in a Human Reference Population" Environmental Health Perspectives 113: 391-395. Retrieved 31/1/2008 from

<http://www.ehponline.org/members/2004/7534/7534.html>

The number of studies documenting the detrimental effects between BPA and health are increasing.

## TIPS FOR USE OF PLASTIC CONTAINERS WITH FOOD

- **Avoid heating food in plastic containers.** Heat can release chemicals so avoid heating food in plastic containers. For the same reason, only drink cold liquids from plastic containers.
- **Wash plastic containers in mild detergents.** Harsh detergents help liberate chemical from plastics making the container much more likely to leach chemicals into food.
- **Avoid using plastic packaging where you can.** For example, bring reusable bags when grocery shopping, and your own "to-go" containers when dining out.
- **Select safe plastics for food storage.** Only use plastic containers with the recycling #1, #2, #4 and #5 for food storage. Consider switching to glass storage containers since plastic containers can leach chemicals into the environment and your food as they age and become used.