



Plastic Water Bottles

Team 5:

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Research and Product Development

- Researchers need to familiarize themselves with the types of chemicals used to purify the water
- Companies need to decide what kinds of plastic they want to use to make the bottles
 - Planned obsolescence
 - High density polyethylene
 - Polyethylene Terephthalate
 - Polypropylene

- Need to research and develop a process to make the bottles
 - Thermo molding
 - Blow molding (injection molding)

Each process has it's pros and cons (cost, efficiency, and environmental impacts)

Manufacturing

- Most plastic bottles are made out of petroleum deposits
 - Oil must be extracted from the deposits, shipped on tanker truckers to refineries
 - Once the crude oil is refined and the hydrocarbons are removed, it is usually mixed with polyethylene terephthalate (PET) to make the plastic bottle
- Manufacturers have been making the conscious effort to develop ways of constructing the plastic bottles out of less plastic, which cuts down on costs and environment consequences.



<http://www.wisegeek.com/what-is-the-life-cycle-of-a-plastic-bottle.htm>

<http://maintech-hq.com/mservices.html>

Packaging

- Crates
 - Prepared for mass distribution (vending, individual sale)
 - Shrink wrapped cases for 'warehouses' (Sam's Club)
- Fill bottle with water
- Glue on labels to water bottles
- Screw caps onto water bottles and seal them



Sales, Distribution, and Transportation

- Because bottled water is demanded by people all across the country there are many different kinds of transportation and distribution techniques used...
 - Trucks (used for local deliveries)
 - Trains (used for longer distances)
 - Boat (used for importing fresh and spring water from all over the world)
- Bottled water can be found virtually anywhere...
 - Vending machines
 - Gas stations
 - Grocery Stores
 - Many restaurants
 - Sports arenas

“The consumption of bottled water continues to grow, far surpassing the US sales of milk and beer, and second only to soft drinks” (Phys.org).

Marketing

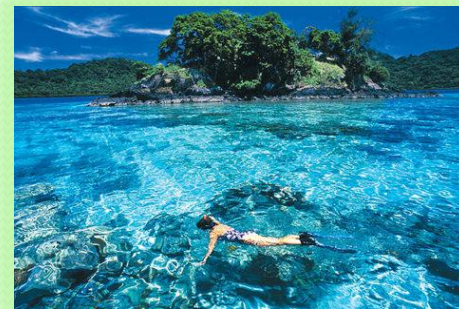
- Bottled water is marketed to an incredibly large audience
- Advertisements or promotions of bottled water are often used to make the audience perceive the product as being healthier and more convenient than tap water

- Poland spring commercial below:

<http://www.youtube.com/watch?v=A3uDEnk2QpU>

Example:

Bottled water companies often have names that help to sell their product, and market it to their audience. Fiji water is named as such because Fiji is a tropical island, often associated with clean water. When people think of Fiji they imagine the beautiful clear blue water.



Consumer Use

- “Most people who buy bottled water have access to clean drinking water virtually for free (in the US, tap water costs less than a penny per gallon, on average)” (PhysOrg.com).
- Psychological need for something ‘new’ or ‘pristine’ or ‘different’
- Reuse
 - Many people have started to continually reuse **disposable** water bottles against instructed use.
 - Possibly releases carcinogens due to plastic breakdown (heat/cold)
<http://www.snopes.com/medical/toxins/plasticbottles.asp>
 - Products designed to be disposable (planned obsolescence) ...
 - Industry intentionally punishing those who reuse product?

Final Disposition

Recycling



- 2,456 million lbs of PET & HDPE plastic bottles recycled in 2009 ₁
- Shredded into little bits
- Most recycled material is shipped to Asia where it is used to create new products (bottles, lumber, piping, spun plastic fiber, etc.) ₂
- Growing movement trending towards ‘recycle %’ materials vs. virgin plastics. ₃

1. <http://earth911.com/recycling/plastic/plastic-bottles/facts-about-plastic-bottles/>
2. <http://earth911.com/recycling/plastic/plastic-bottles/what-happens-next-to-plastic-bottles/>
3. <http://www.wisegeek.com/what-is-the-life-cycle-of-a-plastic-bottle.htm>

Final Disposition

Garbage Dump

- Can takes hundreds of years to decay (under *ideal* conditions)₁
- Take up a fairly large amount of space (in comparison to more compressible refuse)₁
- NOAA: Eastern/Western “Great Garbage Patch”₂
 - “concentrations of floatable marine debris”
 - Composed of photodegraded plastic bits & goo, releasing chemicals like bisphenol-A, dioxin, and others₃



1. <http://www.wisegeek.com/what-is-the-life-cycle-of-a-plastic-bottle.htm>
2. <http://marinedebris.noaa.gov/info/pdf/patch.pdf>
3. <http://www.mnn.com/earth-matters/translating-uncle-sam/stories/what-is-the-great-pacific-ocean-garbage-patch>