

LESSON 5

PART A:

Objective:

Students will learn about some of the positive changes that can be made at different stages in a product's life cycle to benefit humans and the rest of the natural world.

Materials:

- HP case study
- Internet access for each student to view video clips within case study or Internet access plus an LCD projector for whole class viewing (preferred)
- Scrap paper, masking tape, markers

Activities:

1. On page 24 there is a written case study with video links about changes Hewlett-Packard has made to its supply chain procedures and to some of its products in the interest of social and environmental gains. Your students will use this case study to practice the reading skills introduced in Lesson 1. Therefore:
 - Review the "Word Wall" procedure from Lesson 1. This time, have students use masking tape to stick the papers with definitions and pictures to their own desks and to the back of their chairs.
 - Review the graphic organizer procedure from Lesson 1. Before they fill in the content, ask students to show their graphic organizer to a partner to see if it works.
2. After the students have completed their graphic organizers, ask them to respond to the questions on the case study handout individually, and then discuss them in small groups.

PART B:

Objectives:

Students will:

- Develop skills and knowledge that contribute to the critical analysis of the design of everyday objects.
- Engage in an effective telephone call or email exchange with someone that they do not know in order to obtain information.

Materials:

- One of each of the following (preferably used/broken) objects (that can be damaged if necessary), one object per group of four students:
 - Toy designed for a child approximately aged four to ten (preferably one which contains different types of materials). **Note to teacher:** be careful not to use products that may have been recalled because of potential lead contamination in paint. See, for example, www.mattel.com/safety/us/.
 - Used juice box
 - Running shoe
 - Lawn chair/ desk chair
 - Broom
 - Backpack
 - Picture frame
 - Stapler

*Notes to teacher:

- *You may wish to use more sophisticated objects with older students*
- *If you choose to use objects other than those listed here, ensure that the objects chosen are made/sold by companies that are represented on the business practice assessment sites listed in Lesson 6, Part B).*
- *Do not use electronics products because of concerns related to the safe disassembly, handling and disposal of component parts and materials.*
- One "Examining Everyday Objects" lab sheet on page 28 **for each group**
- One new copy of blank Life Cycle Worksheet from page 18 **for each student**
- Paper for students to record their observations (preferably paper that is already used on one side)
- Screw drivers, scissors, safety goggles
- Communication skills tips found at www.resources4rethinking.ca/en/toolbox



Safety:

- Consider the particular students in each group when assigning the objects as some of the objects require more or less skill and safety precautions than others.
- Insist that all students wear safety goggles.
- Follow the general safety guidelines described at:
www.education.gov.ab.ca/k_12/curriculum/bySubject/science/screport.pdf

Activities:

1. Gather the students into groups of two to four. Provide students with materials required to do the laboratory exercise outlined on page 28 and the important safety instructions outlined above.
2. Have the students complete the activity by following the steps on the laboratory sheet.
3. After students have completed the lab, help students to choose one of the questions marked by an asterisk about which they would like to find a more accurate answer. Help the group to identify the person that could answer this question for them – for tips, see www.resources4rethinking.ca/en/toolbox. Discuss whether or not the information can be more easily attained via email or the telephone.
4. To help your students develop their communication skills:
 - a. Model an effective information-seeking telephone call using the tips found at www.resources4rethinking.ca/en/toolbox
 - b. Share the tip sheet for composing an effective email found at www.resources4rethinking.ca/en/toolbox
 - c. Have students choose one of the following activities depending on whether they are using the telephone or email:
 - Have each group create a script for the call that they will make and participate in a telephone call role-play. Encourage each group to have another group listen to the role-play.
 - Have each group draft an email. Groups should show their email to another group before sending it and ask for feedback.
5. After the students have found the new information, have each group summarize its findings as outlined in part C of the laboratory worksheet. As an alternative to class presentations (where many of the students in the audience are often only marginally involved), you might consider pairing up the groups and have them teach their partner group what they learned about their object. For tips about peer teaching, visit www.resources4rethinking.ca/en/toolbox.



HP understands that as one of the world's largest information technology companies, its greatest impact on the environment is through its products. Throughout its history, HP has been committed to being a good global citizen and to providing products and services that are environmentally sound throughout their life cycle. Its commitment dates back more than 60 years to HP's founders and is part of the company's DNA. Over the decades, policies and programs have been established to minimize the environmental impact of the product life cycle and to make its operations sustainable – examples of these can be seen below. In 2006, HP created a Stakeholder Advisory Council to provide strategic advice on its sustainability practices. The Council is made up of representatives from outside of HP, such as non-profit organizations, as well as senior HP managers.

DESIGN

HP pioneered a Design for Environment program in 1992. Product experts work with design, manufacturing and marketing teams to incorporate environmental considerations into the design stage of HP products. Some examples include:

- Using recycled polyethylene plastic recovered from HP inkjet cartridges and drinking bottles, instead of polycarbonate plastic in the carriage cover of some scanners;
- Many HP Deskjet printers are designed without paint, plating and flame retardants in outer casings, and have parts that snap together, resulting in fewer screws, and easier disassembly and recycling;
- HP All-in-One printers combine the functions of a printer, scanner, copier and fax in a single unit, reducing total materials needed by up to 40%, compared to separate devices. All-in-One printers also use less energy than all the devices would use separately;
- Sometimes customers encourage HP to replace materials in its products. For example, customers asked HP to remove brominated flame retardants (BFRs) from its products' external plastic cases. HP removed most of them more than ten years ago and removed the remaining in 2006. HP is also phasing out BFRs in remaining parts, as well as polyvinyl chloride (PVC), as alternative materials become available. HP's goal is to have all their products launched in 2009 onwards, entirely BFR and PVC-free.

SOURCING

To ensure that companies that supply parts and products to HP are socially and environmentally responsible, HP developed a Supply Chain Social and Environmental Responsibility policy. In addition, HP worked with its industry peers and major suppliers to establish the Electronic Industry Code of Conduct (EICC). HP's commitment is to:

- Protect worker rights;
- Improve suppliers' working conditions and health and safety;
- Reduce suppliers' environmental footprint;
- Collaborate with non-profit organizations to validate, inform and improve HP's efforts;
- Participate in industry-wide initiatives to help encourage other electronics companies to use some of HP's sustainability practices.

Many of HP's suppliers are located in China where, although there are still many cases of nonconformance with the Electronic Industry Code of Conduct (EICC), HP sees evidence that companies are starting to pay more attention to social and environmental responsibility initiatives. HP has observed progress in the following areas:

- Overtime control: change from no limit to a limit of no more than 60 hours per week for all work, including overtime, at some facilities;
- Minimum wage: some suppliers have changed practices so that workers are paid according to the local labour laws (including overtime wages);

SOURCING cont...

- Child labour: suppliers have tightened their monitoring procedures. Some suppliers recruit only workers over 18 years old, to minimize their risk;
- Communication: suppliers are listening more to workers;
- Environmental health and safety (EHS): improvements have been observed in industrial hygiene, safety, dormitory and canteen conditions.

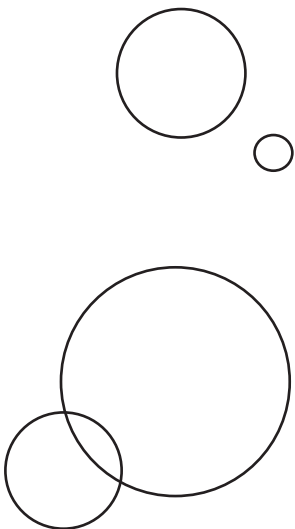
MANUFACTURING

HP strives to replace a material when scientific data has established a potential health or environmental risk, even if its use is legally permitted. Before substituting a material for these reasons, HP identifies an alternative that has a lower environmental impact and meets quality requirements. For example, in 2006 HP replaced solvent-based paints on some workstations and digital televisions. The water-based paints HP is using avoid organic vapour emissions during the coating process and make the plastics using these paints easier to recycle.

DISTRIBUTION

Improved packaging can bring social and environmental benefits concerning the packaging itself and the transportation of the product. For example, when HP reduced its inkjet print cartridge packaging for North America, the smaller, lighter packages required fewer trucks to ship them. The estimated reduction in greenhouse gas emissions is roughly the equivalent of taking 3,600 cars off the road for one year. Assessing packaging environmental performance is complex, and involves trade-offs. For example, expanded polystyrene (commonly called “Styrofoam™”) is easily recycled in many parts of the world, but in some cases its use increases package size compared to the use of other, less readily recyclable materials. Its use may reduce the number of boxes that can fit on a shipping pallet, which would increase the amount of fuel needed to ship each box. To assess all of these factors, HP bases packaging decisions on the best available evidence regarding overall impact.

The cost of alternatives can also impact substitution. In North America, cardboard boxes with 35% minimum post-consumer recycled content cost up to 10% to 15% more than boxes with only new cardboard. In addition, to perform as well as boxes made out of new cardboard, boxes made out of recycled paper fibre currently weigh more, which may raise transportation costs. In such cases, HP considers total costs, including transport and disposal, as opposed to material cost only.



For videos about HP social and environmental initiatives, please visit <http://hpcorp.feedroom.com> and use search term: “environment”.



USE

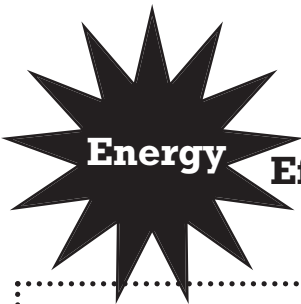
HP makes products more energy efficient. For example, HP redesigned its Deskjet printers to reduce their power consumption to less than one watt when the printer is in the “off” mode. To ensure that an electronic device uses no energy at all, it must be unplugged. Of course, how products are used by their owners greatly determines their environmental and social impact. By using less electricity, people can reduce CO₂ emissions created during power generation and save money on their electricity bill.

HP provides products and services that help their clients rethink how they do business. In addition, HP examines its own practices. For example, HP inspected the settings of 183,000 monitors within its own company worldwide and found that almost a third were not set to take advantage of the energy-saving features. They were reset to enable energy savings after 20 minutes of inactivity. Virtually no users complained and the change saved 7.8 million kWh of electricity in 2005, equal to more than \$600,000 in energy costs and more than 4,000 tons of CO₂.

END OF USE

More than 200 million new PCs are bought each year worldwide. This poses a significant challenge for HP and other suppliers, governments and users to limit the environmental impact of these products when they are no longer in use.

HP offers easy-to-use and environmentally responsible product end-of-life management services, including the choice of trade-in, asset recovery, leasing and recycling. Having launched its recycling program in 1987, HP is a recognized leader in product recycling, now offering recycling in more than 50 countries, regions and territories. HP makes it easy to recycle used HP inkjet and LaserJet cartridges and rechargeable batteries free of charge and will pick up any brand of computer equipment from your home and/or workplace for a reasonable fee towards costs. HP’s state-of-the-art processes and policies ensure that unwanted hardware and printing supplies are recycled responsibly. For more information, visit www.hp.ca/recycle.



Efficiency Tips!

1. Turn on the energy saving settings on computers. You can find these settings in the Power Options menu in your computer’s Control Panel. A computer in idle mode uses 20 to 50 times the power of a computer in standby mode. To increase savings, reduce the time delay before your equipment goes into a power saving mode.
2. “Phantom power” is the electricity that some electronics use even when they are “off” (in “standby” mode) so that they will turn on quickly when you turn them ‘on’. Standby power accounts for 10 per cent of U.S. residential electricity consumption, or more than US\$6 billion in annual electricity costs. That’s equal to the output of 36 power plants.*
3. Stop “phantom power”. Plug your cell phone chargers and battery chargers into a power bar. When the items no longer need to be charging, unplug the power bar or use a power bar with a timer that turns off automatically at a convenient time of day.

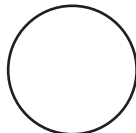
* www.backbonemag.com/Magazine/Big_Ideas_05010702.asp

END OF USE cont...

Plastics and metals recovered from recycled HP products have been used to make a range of new products, including auto body parts, clothes hangers and park benches. HP would like to use more of the recycled plastics in its own products, but the potential is limited for several reasons. The greatest difficulty is that most recycled plastics contain substances that HP has eliminated from its current products. Also, mixed plastics do not have the mechanical properties necessary for use in new electronics products, and it is difficult to separate dissimilar plastics during recycling. Finally, logistical constraints limit HP's ability to move large volumes of material from the regions where recycling is done to the regions where most new products are made.

In July 2007, HP achieved its goal of recycling one billion cumulative pounds of electronics and print cartridges, six months ahead of schedule, and set a new goal to recover two billion pounds by the end of 2010.

For more information about HP sustainability initiatives, go to www.hp.com/environment and www.hp.com/hpinfo/globalcitizenship/gcreport/



Questions

1. Based on the context (i.e. the words near the phrase), what do you think the author means by the term “supply chain”?
2. HP hires other companies to supply parts and to assemble some of its products. In your own words, explain how HP tries to encourage the other companies to follow HP's guidelines related to social and environmental responsibility.
3. HP calls corporate social responsibility, “global citizenship”. In general, what do you think companies should consider when they strive to be socially responsible?
4. What is your general impression of HP's work regarding bringing sustainability principles into the life cycle of its products?
5. What are some potential drawbacks related to HP's approach?
6. a) Which example in the case study suggests that some of HP's sustainable practices are related to encouragement from their customers?
b) Does this example encourage you to write to companies whose products you buy to tell them your preferences regarding their business practices? Why or why not?

EXAMINING EVERYDAY OBJECTS

Purpose:

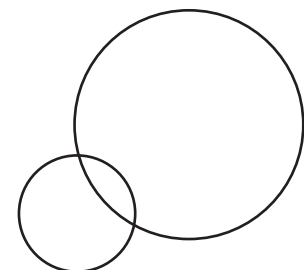
To examine an everyday object to determine the pluses and minuses of the design when considering **the perspective of all living things, near and far, now and in the future.**

Procedure:

A. Take a good look at your object. Take it apart as necessary (be careful not to lose any parts).

Discuss the following questions as a group and then record your answers on your **own** paper (each person should record her/his own observations). If you do not know the answer, take a guess.

1. What are your initial impressions about how it was designed?
 2. a) Where was your object made?
b) Who do you think made your object?
c) What do you think the working conditions were like for the person who made your object?
 3. a) What types of materials are used in your object?
b) What is the approximate percentage of each material?
c) Sketch a pie graph to represent this distribution of materials.
 4. What is the financial value of each of the raw materials – (low, medium or high)?*
 5. What is the non-financial value of the materials to humans and other living things (low, medium or high)? (For example, oxygen is extremely valuable to all of us, but it has low financial value.)
 6. Are any of the materials in your object **recycled** (i.e. were they used in something else before) [not recyclable]?*
 7. Are any of the materials in your object **recyclable**?
 - a) in your blue box program?*
 - b) in some other way? (e.g. you need to take it somewhere special to be recycled)*
 - i. If yes, is money exchanged in this transaction? If yes, does the service cost money or does the owner receive money for the material?*
 8. What kind of products can be made from the recycled materials at your object's end-of-use stage?
 9. How easy/difficult is it FOR YOU to **repair** the object (very easy, somewhat easy, somewhat difficult, very difficult)?
 10. How easy/difficult is it FOR A PROFESSIONAL TECHNICIAN to **repair** the object (very easy, somewhat easy, somewhat difficult, very difficult)?*
 11. How much money would it cost to repair the object?*
 12. How much money would it cost to purchase a new object?
 13. Do you think that someone will be using this object in eight years?
 14. Do you think that anyone in your community will be using an object similar to this one in eight years?
- B. Choose **one** of the questions marked with an asterisk and find a more accurate answer to the question by calling stores/technicians/the manufacturer etc. and/or emailing as necessary (your teacher will help you with this).
- C. Reflection:
- Use a new life cycle chart to summarize the pluses and minuses of the design of this object from the **perspective of all living things, near and far, now and in the future.**



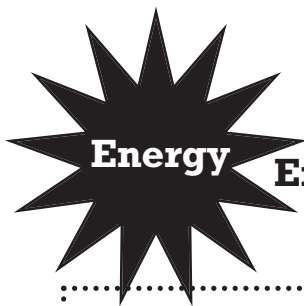
Creating a Market for Recycled Materials

Currently, most products are made from new rather than recycled materials. Why? Recycled materials are sometimes more expensive than products made from new materials. Why?

- Currently, the financial cost of new materials does not usually include all of the costs involved in harvesting that material. For example, the cost of harvesting and refining petroleum to make plastic does not include the cost of municipal recycling programs, the cost of health care related to increased air pollution, etc. (For more information, about the true cost of raw materials visit: www.epa.gov/epaoswer/non-hw/muncpl/fullcost/costs.htm#environmental)

- When recycled materials are ground up, they often contain many different kinds of materials. Changing the recycled materials into new products sometimes requires more work than making the products from pure, new raw materials.
- The infrastructure needed to gather materials at the end-of-use stage is not in place in many countries (for example good roads, recycling programs, etc. are not available in many countries.)

In order to encourage manufacturers to use recycled materials, we must purchase these products when they are available and ask for them when they are not available. When facing a financially higher price tag, we, as consumers, must also think of the full cost of the product – to Earth and all living things.



Efficiency Tips!

1. In 2004, California imposed limits on standby electricity consumption for a number of devices. As of January 2006, standby mode could consume no more than three watts; this fell to 0.75 watts in 2007 and 0.5 watts in January 2008. Applying this standard in all wealthy countries would reduce CO₂ emissions by the same amount as removing 18 million cars from roads.¹
2. A single desktop computer with the power settings turned on saves enough energy to power a 75W light bulb continuously for over a year. Screen savers were once designed to protect the screen, but today's monitors no longer need this feature.² Today, screen savers are purely decorative and when on, they use almost as much electricity as you do when you actually use your computer.³ Turn off your screen savers to reduce energy use.
3. Buy electronic products that have the Energy Star® label on them. These products are up to 50 per cent more energy efficient than conventional products.

1. www.backbonemag.com/Magazine/Big_Ideas_05010702.asp

2. www.onedayvancouver.ca/ask_archive.php?type=2&id=31

3. www.energysolutionsalberta.com/default.asp?V_DOC_ID=1209