Lesson 6
Design Challenge

Creating a Designed by Nature Product

Is this Designed by Nature?

Part 1

Directions

1. You will review pictures and descriptions of three products: a chair, a pair of shoes, and a couch. In each case, you will read the description and consider whether the product is "designed by nature" or not based on the criteria you've developed.

2. A spectrum is provided below each picture. You will put an 'X' on the spectrum to reflect your decision about the product. (You may also be asked to place the picture on a spectrum your teacher creates on the board.)

The Spoon Lounge is made of extremely strong and durable Liana vines, grown in the rainforest. In the wild, the vines are considered an environmental problem because they compete with trees for nutrients. Here, however, the vines are wrapped around a steel frame to become a unique chair. The chair is available at http://www.vivavi.com/

No, it's not designed by nature… | **Not sure/I need more information.** | **Yes, it is designed by nature…**

Is this Designed by Nature?

Part 2

These shoes are made entirely of out of reused material. The material comes from extra materials from the Army. The shoes can be found at www.treehugger.com

No, it's not designed by nature… | **Not sure/I need more information.** | **Yes, it is designed by nature…**

This couch is made with leather coated with polyurethane for extra durability. Polyurethane is a plastic-like coating made of petroleum oil. The coach has a solid wood frame.

No, it's not designed by nature… | **Not sure/I need more information.** | **Yes, it is designed by nature…**

Understanding Product Life Cycles Activity — page 1

Introduction

Understanding product life cycles can help in many types of jobs and careers. In this activity, you will explore different job situations in which you have to choose between two different products based on your knowledge of design and product life cycles.

Directions:

1. There are four case studies of job-related decisions about products. You will choose one:
   - Case Study 1: You are the executive for a record company. You are responsible for the design of a band's new CD, and you have to decide what kind of packaging to choose.
   - Case Study 2: You are the manager of a new restaurant. You have to make a decision about the type of take-out containers you will offer to your customers.
   - Case Study 3: You are the principal of your school and in charge of choosing a chocolate brand for your annual fundraiser.
   - Case Study 4: You are the owner of a hair salon or barber shop and have to choose which hair products (shampoos, conditioners, dyes, etc.) to stock and sell to your customers.

2. Read your case carefully (it's on a separate page), and decide which product you would choose.

Write your responses below, and give at least three reasons for your response.

This is the case study I'm choosing: (Circle your choice.)

1 (CD package) 2 (food container) 3 (chocolate) 4 (hair products)

I have read my case, and this is the product I would choose from the two options described: (Circle your choice.) Option A Option B

Here are three reasons why I chose this option:

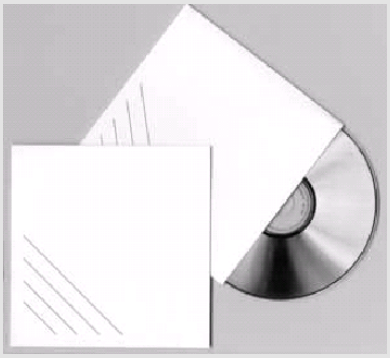
1.

2.

3.

Understanding Product Life Cycles Activity — page 2

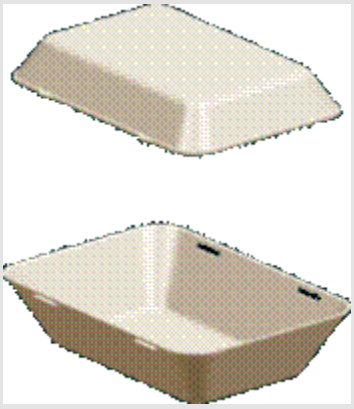
Case 1: You are the executive for a record company. You are responsible for the design of your favorite band's new CD, and you have to decide which packaging to choose. Read about the two choices and record your responses on the Understanding Product Life Cycles Activity page.

Life cycle stage ⇩	Option A: Plastic case 	Option B: Cardboard sleeve 
Raw materials	Plastic, made of petroleum, a non-renewable resource.	Recycled cardboard sleeves.
Production	Plastic jewel cases are manufactured on special machines in factories around the world. Plastic production releases chemicals that can be dangerous to workers and the environment. Plastic cases cost about 15 cents.	Cardboard sleeves are manufactured in a paper mill. Making paper can produce chemicals that can pollute waterways. These sleeves cost about 15 cents.
Consumption	Easily broken or cracked with use.	Durable with normal use.
Disposal	Can be recycled if you send them to specialized companies. If thrown away, jewel cases bleed chemicals into the earth. Burning these materials releases toxic chemicals and fumes that are linked to cancer.	The cardboard is compostable. The cardboard is also recyclable in most communities that have recycling programs. In rural areas, residents may have to drive their recyclable waste to a drop-off station or pay extra for the service.

Sources for this page: http://www.ezinearticles.com/?Recycled-CD-Jewel-Cases&id=302153)
ww.eia.doe.gov/kids/energyfacts/saving/recycling/solidwaste/paperandglass.html
es.epa.gov/techinfo/facts/chmr/strtgy6.html

Understanding Product Life Cycles Activity — page 2

Case 2: You are the manager of a new restaurant. You have to make a decision about which type of take-out containers you will offer to your customers. Read about the two choices and record your responses on the Understanding Product Life Cycles Activity page.

Life cycle stage ⇩	Option A: Plant-based "foam" 	Option B: Styrofoam 
Raw materials	This packaging is made of starches and fibers from grass or sugarcane, which are biodegradable.	This packaging is made from fossil fuels. It is not biodegradable.
Production	The grasses or sugarcane are grown in the United States, and some of the factories operate in the U.S, too. The production of the containers does not harm the workers. The price of a case of 250 containers is $42.50, or about 17 cents each.	Workers who manufacture Styrofoam can contract sickness such as irritation of the skin, eyes, and upper respiratory tract, and stomach problems. The price of a case of 200 containers is about $20, or 10 cents each.
Consumption	These containers are comparable to Styrofoam containers in durability. Because the containers are made of natural materials, they are safe to use with food products.	Styrofoam is a good insulator and will keep your food warm. However, toxic chemicals leach out of these products into the food that they contain (especially when heated in a microwave). These chemicals have been linked to health problems.
Disposal	Plant-based foam is biodegradable and compostable.	Styrofoam does not biodegrade.

Sources for this page: www.earthresource.org;
Center for Disease Control: www.atsdr.cdc.gov/toxprofiles/phs3.html

Understanding Product Life Cycles Activity — page 2

Case 3: You are the principal of a middle school and must choose a chocolate for your school's annual fundraiser. Read about the two choices and record your responses on the Understanding Product Life Cycles Activity page.

Life cycle stage ⇩	Option A: Fair trade chocolate	Option B: Conventional chocolate
Raw materials	All chocolate is made from cocoa beans, which grow in pods on trees in tropical climates. Most cocoa is grown in Africa, Latin America, and Southeast Asia. One cocoa pod has about 50 beans and it takes 1 pod to make a 2-ounce bar. The cocoa trees are grown on farms and workers harvest the pods by hand.	
Production	The cocoa was grown at a cooperative farm in the Dominican Republic. A cooperative farm means that the farmers own it and make the decisions. The farm is also organic, meaning that artificial pesticides are not used. The farmers decide on the price for their cocoa and sell it directly to the companies that make the chocolate. Because of these practices, this chocolate is called "Fair Trade" and displays a special label. The farmers get about $.80 per pound for the cocoa they produce, which is enough to support their families and send their children to school. There is no child labor on these farms.	The cocoa was grown at a large farm on the Ivory Coast in West Africa. The farmer makes only pennies for every pound of cocoa he sells. Because of this, the farmer must find inexpensive workers. Most of the workers hired are boys, ages 12-16, who perform dangerous tasks such as using machetes and applying pesticides without necessary protection. Most of these boys do not go to school. Some of the boys have been sold and work as slave laborers on the farm. The United Nations estimates there are 15,000 child slaves working on cocoa farms.
Consumption	The candy bar is sold for $1.50 and allows the school to make a profit and the farmers a living wage.	The candy bar is sold for $1.00; half goes to the school, but only pennies will reach the farmers, and even less will reach the workers.
Disposal	The wrapper can be thrown away or recycled.	The wrapper can be thrown away or recycled.

Sources for this page: include the United Nation's International Labor Organization. See the teacher's guide for additional sources.

Understanding Product Life Cycles Activity — page 2

Case 4: You are the owner of a hair salon or barber shop and have to choose which hair products (shampoos, conditioners, dyes, and styling) to stock and sell to your customers. Read about the two choices and record your responses on the Understanding Product Life Cycles Activity page.

Life cycle stage ⇩	Option A: Organic product 	Option B: Non-organic product 
Raw materials	Organic hair products contain no synthetic detergents, artificial preservatives, colors or fragrances, genetically modified organisms (GMOs), or petroleum by-products that non-organic products may contain.	Non-organic shampoos, conditioners, and styling products have synthetic (human-made) and petroleum-based products. The ingredients derived from plants may be from genetically-modified organisms (GMOs).
Production	Many organic products are not tested on animals and state this on their bottles.	Non-organic shampoos may or may not be tested on animals. If they were not, this will be written on their bottles.
Consumption	Although most organic products are considered safer for humans and the environment, some may use synthetic chemicals to keep their products fresh and useful. Consumers should check the ingredient list before buying.	Most individual synthetic ingredients are not dangerous in small doses, but because we may use many different products everyday, the risks could add up. The government does not require companies to do safety tests on their products before selling them, so it is unsure if ingredients are harmful or not. Synthetic ingredients may cause eye and skin irritations, hair loss, dandruff and allergic reactions.
Disposal	Most organic hair care products are also biodegradable in the environment.	Many of the petroleum-based ingredients in hair products are washed down the sink and may contaminate a water source or may require treatment at a water plant. Some brands may include additives that are biodegradable.

Sources for this page include: http://www.organicconsumers.org/bodycare/toxic cosmetics.cf
http://www.coopamerica.org/pubs/realmoney/articles/cosmetics.cfm
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=14587856&dopt=Citation

"Designed by Nature"

What does it mean to be "designed by nature"? The table below compares the main traits of products that are and are not "designed by nature." Take notes as your teacher presents.

Life cycle stage	Product Traits that ARE NOT "Designed by Nature"	Products Traits that ARE "Designed by Nature"
Design		
Raw Materials		
Production		
Consumption		
Disposal		

"Designed by Nature"

Are there careers that will require me to know and make decisions about products?
There are many kinds of jobs that require knowledge and decisions about products. A few examples are below.

Directions

1. Choose one of the sample careers and read the decisions someone in this career will face. Add another decision, in the form of a question, in the space provided.
2. In the last space, write in a career you're interested in. Write at least two questions that describe decisions you'll have to make in this career.

Sample Career	Example of decisions someone in this career will make
1. industrial designer	Is this product necessary? How will this product be made?
2. business manager	What kind of paper should our office use?
3. marketing manager	What kind of paper should I use?
4. childcare worker	What snacks will I give the children?
5. architect/ construction careers	What materials should I use in construction?
6. landscape worker landscape architect	What kind of machines should I use on the job (electric or gas powered)?
7. restaurant worker or food service professional	Where does the food I serve come from? Who grew it?
8. travel and hospitality industry	How can I reduce energy use in the hotels?
Fill in a career you're interested in:	Generate some "Designed by Nature" questions or decision you will face in this career:

"Designed by Nature"

To attract consumers, companies often use words like "natural" or "organic" on labels. But do these terms really mean the product is better? Or are the words just an advertising gimmick? Here's an overview:

"Organic" is a term defined by the US Department of Agriculture (USDA).

- "Organic" means grown without synthetic pesticides or fertilizers.
- An "organic" product must contain at least 95% organic ingredients, and can carry the USDA Organic seal. ("100% organic" means just that – all organic.)
- "Made with Organic Ingredients" means the product contains at least 70% organic ingredients. The product does not qualify to carry the USDA organic seal.

"Fair Trade" is a term based on international certification

- Like "organic", "Fair Trade" has a specific meaning and products must meet certain criteria to get certification.
- "Fair Trade" criteria are defined by a group of international non-profit organizations, not the US government.
- To be Fair Trade certified, a product must be made in an environmentally sustainable manner. The producers must be paid a fair amount of money for their work.

Recycled: Different forms of the word have different meanings

- **Recyclable:** This means that the material CAN be recycled-but only if it's possible in your community. For example, plastics marked # 5 or 6 can be recycled, but many communities do not collect these materials. Thus, they often end up in landfills.
- **Contains recycled content:** Some 'recycled' content is actually raw materials that were recovered during manufacturing instead of going into a landfill. For example, paper with 'recycled content' can actually be made of virgin trees, but include wood scraps or sawdust from the manufacturing process. Although these scraps were used in the paper instead of being put in a landfill, they are not truly 'recycled' since they were not first used by a consumer. For this reason, 'recycled content' can be a deceptive phrase.
- **Post-consumer:** This means the product is made of materials that were first used by consumers, collected through a recycling program, and then re-made into new products. Post-consumer recycled products are the truest form of recycling. Buying products with post-consumer products "closes the loop" on a product's life cycle.

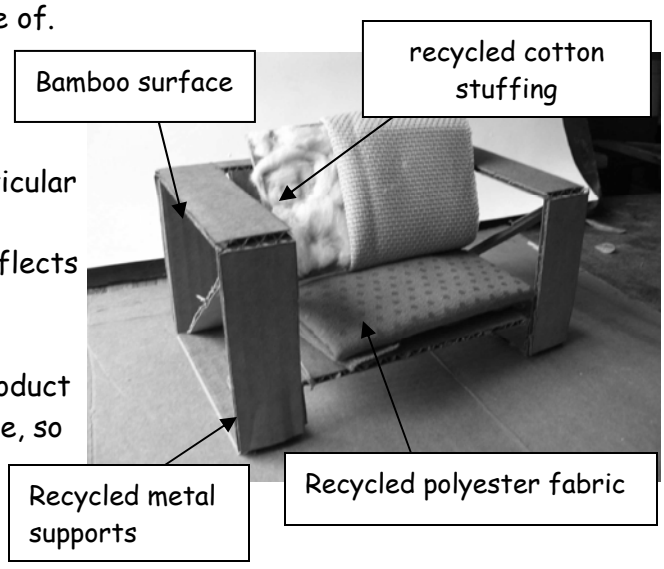
Natural: No official or consistent meaning

- Unlike the terms "organic" and "Fair Trade," "natural" has no official meaning. Manufacturers can label a product "natural" without meeting any requirements.
- With no real definition, ingredients such as crude oil or a dead squirrel could be considered "natural," since they come from the earth.
- Read the ingredients and judge for yourself if something "natural" is really better.

Source: http://www.ftc.gov/bcp/grnrule/guides980427.htm

Design Challenge! Instructions

In this activity, you will design your own product – a piece of furniture for your room, such as a chair, couch, table, or set of shelves. Your goal is to make your furniture reflect Designed by Nature principles. You will select materials, sketch the design, and construct a model, like the one pictured. This shows a model of a couch made with cardboard, cotton balls, and materials scraps. These materials represent actual materials the couch would be made of. For example, the cotton balls represent organic cotton filling, and the cardboard supports represent the bamboo and metal the couch would actually be made of.



Step 1: Select materials

a. You will get a set of Material Cards. Each card describes the benefits and drawbacks of a particular material. Choose one card at a time and read it carefully. Think about whether the material reflects "Designed by Nature" principles. Based on this, decide if you want to use the material for your product. Remember, your goal is to create a product that is "Designed by Nature" as much as possible, so think carefully about the materials you choose.

b. Keep the cards with the materials you want; put the other cards aside. If you want to use another kind of material, write it on a blank card.

Step 2: Sketch a Design: On a separate handout, sketch a picture of your design. Think about how big your model will be, and include the dimensions on your drawing.

Step 3: Construct your model. You can use a combination of the materials you receive.

Tips:

- Sketch the pattern in pencil onto your material. You may need to make your furniture in pieces.
- Use the blade of your scissors to score (make small nicks) in the cardstock or cardboard. This will make it easier to cut and/or fold.
- Attach your parts together using tape, staples, or by creating slits in the pieces that fit together.
- Label each part of your model, indicating what the actual materials would be. The picture above shows an example.

Step 4: Promote your design. (See separate handout): Imagine you had to convince a store to sell your product. What kind of description would you write for the catalog? How would you communicate the great aspects of your product? How much would your product cost? Thinking like a marketer, write a description of your product that tells its best features, price, and why it's "Designed by Nature." (The fact that it is "Designed by Nature" may be one of its great features!) Finally, describe why customers will choose your product over a competitor's product.

Design Challenge! Furniture Drawing

Name _____ Date: _____

Criteria	no	incomplete	yes
You sketch a drawing of your design.			
You indicate what materials your model is made out of (like metal, wood, plastic, cotton, etc.).			

Design Challenge! Product Promotion

Name _____ Date: _____

Criteria	no	incomplete	yes
You describe at least three great features of your product.			
You say how much your product will cost.			
You describe why your product is "Designed by Nature."			
You describe why customers will choose your product over a competitor's. (Hint: Tell why your product is worth the price!)			