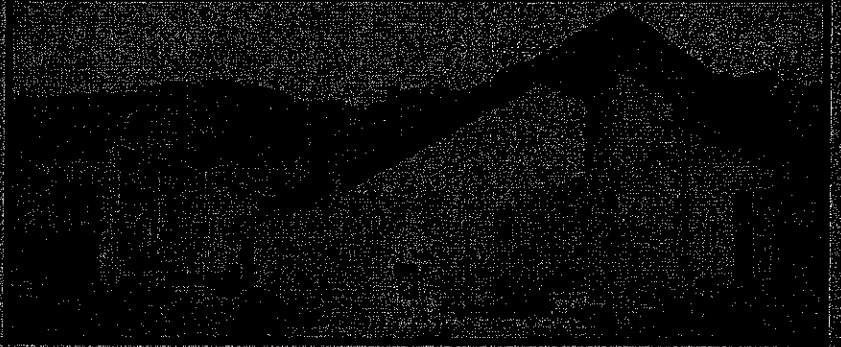
GREEN BY DESIGN

TEACHER RESOURCE PACKET | GRADES 7 – 9

NATIONAL BUILDING MUSEUM

The Green House

New Directions in Sustainable Architecture & Design



Program Description

From the food people eat to leaving the bedroom lights on, the choices of being environmentally friendly, or being "green," can affect all aspects of life. Students visiting the National Building Museum will explore how their choices may have an impact on the natural and built environments. During this program students will collaborate to create a definition of environmentally responsible or "green" home construction. They will explore sustainable architecture from the past and present to gain insight into construction and design choices. Working in groups, students will construct green houses of the future for several different geographic regions. Similar to builders around the world, students must consider a variety of factors in planning and building their model houses, including the geography, climate, cost, materials, and uses. As both citizens and consumers, students come to understand the complexity of issues associated with making green living decisions and the effect different decisions have on their surroundings.

Goals, Objectives, and Skills Used in the Program

Goals

After completing the *Green by Design* program students will:

- understand and experience the numerous choices involved when designing and constructing a building;
- understand how citizens can negatively or positively impact their environment – natural and built – through the choices they make in location, materials, use of the building, etc.; and
- apply these lessons to their everyday lives.

Objectives

During and after completing the *Green by Design* program, students will be able to:

- identify 5 Big Ideas of Sustainable Design and define environmentally friendly building practices;
- recognize climate and geography as influencing factors of home and community design;
- recognize the changing needs in society and how those needs impact the natural and built environment;
- apply knowledge of early American architecture and modern building design and technology to design structures that reflect environmentally friendly or "green" principles; and
- work in a team, through the design process, to plan and construct future model homes with craft materials.

Skills

- Analysis
- Application of knowledge
- Cooperative Learning
- Experimentation
- Problem Solving

It's Easy Being Green!

As environmental concerns continue to mount worldwide, thinking about how sustainable practices and products affect our lives becomes increasingly important. There is growing popular interest in green living, and the possibilities for achieving it in our personal lives are rapidly expanding. This activity introduces students to the basic ideas behind being "green" or living in a sustainable way. Students discuss the concept, brainstorm ways to practice it in their own lives, and then market the idea to their peers.

OBJECTIVES

Students will:

- understand the basic concept of sustainability
- recognize and identify various ways they can practice being green
- become active citizens by encouraging other students to be green

NATIONAL STANDARDS OF LEARNING

English 8
Social Studies 3, 4, 10
Visual Arts 1, 3, 5

DURATION

45 minutes-2 hours

MATERIALS

- paper
- pencils
- markers and/or colored pencils
- computers
- poster board

TEACHER PREP

- Prepare various supplies for students to use to create posters, newsletters or flyers

LESSON PROCEDURE

1. What is green?
2. How can we be green?
3. Share the message

GREEN VOCABULARY

Green, Sustainable Design, Conserve

LESSON PLAN

1. What is green?
Ask the students to think about what it means to be green? What comes into their minds when they hear that word?

Ask the students to discuss why we need to protect the environment? (Lead the discussion to the idea that if we protect and take care of the environment then it will be there for future generations to enjoy and use).

2. How can we be green?
With the students brainstorm ways to "protect" or "conserve" the environment. What are things they can do at home? What are things they can do at school? Keep a running list on the blackboard or whiteboard. Challenge the students to think about how valuable it is for even one person to recycle their soda bottle. Is this worth it? Why? Some students may argue that they have little say in how environmentally friendly their home or school is. Encourage them to think of helpful things they can do without their parent's or school administration's permission.

- Turn off the water when brushing youth teeth
- Turn off the lights/TV/stereo when leaving the room
- Recycle their bottles, paper, etc
- Reuse scrap paper for notes
- Put their lunch in a reusable bag and not a plastic bag
- Take shorter showers

Lead students toward the idea that one person can effect change and it could be them!

3. Share the message

Assign students to share their new knowledge by creating a poster, newsletter, comic strip, or flyer suggesting ways other students in the school can go green at home or at school. Students may use computers to design these marketing pieces or construct them out of available craft materials. See suggestion page in resource section for other easy ways to go green.

NOTES:

What a Piece of Junk!*

Ever wonder if the parts of a cell phone are recyclable? Walked on a floor made of bamboo? Or wondered how to dispose of an aerosol can? If so, you are the happy or unhappy beneficiary of a choice made, in large part, by a designer. Choices that have the least negative impact on the health of people, the economy of an area, and the environment result in what is called "sustainable design." The goal of sustainable design is to meet the present generation's needs without compromising future generation's ability to meet their needs. But consumers can also affect sustainable design by the choices they make. If people don't buy a design, eventually it will no longer be made. In this lesson students will learn how choice plays an important role in sustainable design.

*This activity was adapted from *Why Design?* a publication by the National Building Museum.

OBJECTIVES

Students will:

- understand the roles of both designers and consumers in creating sustainable designs
- understand the effect of making choices and compromises as an important part of sustainable design

NATIONAL STANDARDS OF LEARNING

Science . . . . . F
Social Studies 1, 2, 4, 7, 10
Technological Literacy 18,19, 20
Visual Arts 3

DURATION

1 hour

MATERIALS

- *What a Piece of Junk!* worksheet
- pens or pencils
- poster board
- 2 objects (for each pair of students) that are designed to meet the same need (writing instruments, something that can scoop food, a container smaller than a shoe box that holds liquids). These objects can be brought from home.

TEACHER PREP

- Photocopy *What a Piece of Junk!* worksheets (one for each pair of students)
- As student homework, ask students to bring in one object that meets a specific need (a writing instrument, something that can scoop food, a container smaller than a shoe box that holds liquids). The class can be divided into 3 groups, each group bringing in objects from one of the three categories. The students will then be matched in pairs during the lesson; they will come back together in the conclusion to discuss all the objects.

LESSON PROCEDURE

1. Introduction to Sustainable (Green) Design
2. Sustainable Design as choices
3. Evaluate object pairs
4. Conclusion: Making the choice

GREEN VOCABULARY

Sustainable, design

LESSON PLAN

1. Introduction to Sustainable (Green) Design
Introduce students to the ideas of sustainable design. Explain that sustainable design means:

- Creating products/buildings that have the least negative impact on the health of people, the economy of an area, and the environment
- Meeting the needs of present generations without depleting the ability of future generations to meet their own needs

2. Sustainable Design as choices
Tell students that designers concerned with sustainability consider things like: Will the paint give off a lot of fumes? Which material will create the least waste when it's processed and disposed of? Does this wood have to be trucked across the country, or will local wood be just as good (and help the local economy)? Consumers also need to ask themselves questions too.

Ask the students what questions they think should be asked before making a purchase. Designer and teacher Victor Papanek has suggested that before making a purchase we ask ourselves the following six questions:

- Do I really need it or am I being persuaded through advertising that I need or want it?
- Will something else serve the purpose?
- Are there substitutes I already own that will perform the same, or a similar, function?
- Can I share, rent, borrow, or lease it?
- Can I buy it used?
- Can I make it from a plan or build it myself?

Our choices can affect sustainable design too. If we don't buy a design it will eventually no longer be made.

3. Evaluate object pairs

Pair the students up; making sure each pair has two objects to evaluate. Use the student worksheet to evaluate the object pairs. Students may add their own criteria to the list that already exists.

Ask students to decide which one of the pair they think is the most sustainable design (or least harmful to the environment and future generations)?

4. Conclusion: Making the choice

As a class, ask students to discuss the choices they made. Were the choices easy? Did they have to make a compromise (chose something more expensive because it had more efficient packaging)? Do they think any one of the criterion is more or less important in making the decision?

What conclusions can they make? Use student's answers to discuss the following ideas:

- questioning design is important to being sustainable; and
- each person's choices may be different but are equally valid.

What a Piece of Junk! Student Worksheet

NAME:

As you evaluate each product, put an X closest to the word or phrase that best describes it. Use the top half of the line for one product and the bottom for another.

Name of product on top half of line: ***Name of product on bottom half of line:***

parts are easy to get		parts are hard to get
safe		unsafe
accomplishes many tasks		accomplishes one task
requires little energy to operate		requires a lot of energy to operate
made from renewable/recycled materials		made from nonrenewable materials
recyclable or reusable		must be disposed of after one use
efficient packaging		excessive packaging
decomposes quickly		takes years to decompose
well made/durable		poorly made/falls apart easily
suited to a person of any physical ability		suited to a very specific user
manufactured close by		manufactured far away
easy to maintain/fix		hard to maintain/fix
works without additional purchases		requires other purchases to work well
materials required little processing		material required a lot of processing
easy to understand and use		difficult to understand and use
meets my physical needs		doesn't meet my physical needs
meets my emotional needs		doesn't meet my emotional needs
overall this design is worthwhile		overall this design is a waste

