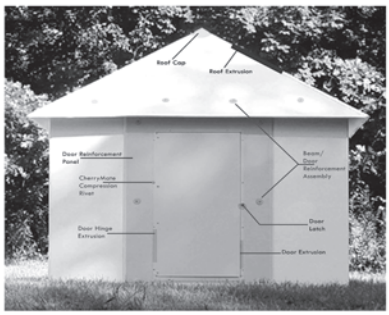
LESSON FIVE: Design That Makes a Difference: Focus on Shelters and Water



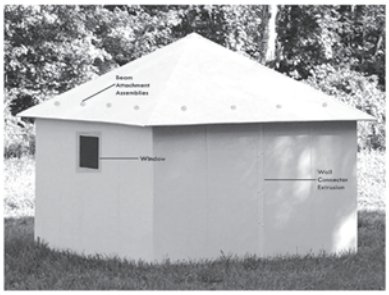


IMAGE TWENTY-FIVE: Daniel Ferrara. American, born 1941. Mia Ferrara. American, born 1977. Ferrara Design, Inc. USA, est. 1968. Global Village Shelters, LLC, USA. in partnership with Weyerhaeuser, USA. Global Village Shelter. 2001. Triple-wall fiberboard corrugate, 7' 5" x 8' 2 1/2" x 8' 2 1/2" (234 x 250 x 250 cm). Gift of Global Village Shelters, LLC

IMAGE TWENTY-SIX: Michael Rakowitz. American, born 1973. paraSITE Homeless Shelter. 1997. Polyethylene, 42" x 36" x 11' (107 x 91.5 x 335 cm). Gift of Michael Rakowitz and Lombard-Freid Projects

IMAGE TWENTY-SEVEN: Nikhil Garde. Danish, born 1972. Designskolen Kolding. Denmark, est. 1967. Instructors: Elle-Mie Ejdrup Hansen. Danish, born 1958. Barnabas Wetton. British, born 1962. Michael Frederiksen. Danish, born 1966. Viking Life-Saving Equipment A/S. Denmark, est. 1960. Sea Shelter. 2004. Nylon and rubber, 6' 6 3/4" x 10' 6" x 12' 1 5/8" (200 x 320 x 370 cm). Alexander Schärer Purchase Fund

IMAGE TWENTY-EIGHT: UNICEF United Nations Children's Fund. Est. 1946. Multiple manufacturers. Water Container. n.d. PVC-coated polyester, polyethylene, or equivalent materials; collapsible, capacity five gallons (twenty liters). Gift of United Nations Children's Fund

IMAGE TWENTY-NINE: Stephan Augustin. German, born 1967. Wisser Verpackungen GmbH (Germany). Watercone Water-Collection Device. 1999. Makrolon polycarbonate, diam. 11 3/4 x 31 1/2" (30 x 80 cm). Gift of Augustin Produktentwicklung

IMAGE THIRTY: Niels Due Jensen. Danish, born 1943. Grundfos Management A/S. Denmark, 1945. SQFlex Combo Drinking Water Pump. 2001. Stainless steel, aluminum, fiberglass, polycrystalline silicone, and polymer; pump: diam. 48 x 2 7/8" (122 x 7.3 cm); wind turbine: diam. 10' (304 cm); solar panel: 48 x 21" (122 x 53.3 cm); control box: 9 x 7 x 3.5" (22.8 x 17.7 x 8.9 cm). Gift of Grundfos Pumps Corporation

INTRODUCTION

One in seven people worldwide lives in a slum or refugee camp, and more than three billion people, or nearly half of the world's population, do not have adequate sanitation or access to clean water.[14] This lesson will focus on how designers respond to severe environmental conditions to alleviate human hardship. It examines three different types of temporary shelters and discusses how designers have responded to specific environmental factors. It then presents three innovative designs that help people access, filter, and carry water.

LESSON OBJECTIVES

- **Students will look at how designers address specific problems, such as the need for temporary housing and clean water, and consider various solutions to these problems. Students will consider the use and cost of materials in design.**

- **Students will think about how environmental factors can affect design.**

INTRODUCTORY DISCUSSION

- **Ask your students to define "shelter." A shelter is a basic structure that provides protection from the sun, wind, and cold. What different kinds of shelters can they list? What are the different components of a shelter? How do shelters differ around the world? How do factors like climate affect the design of shelters?**

- **Ask students to discuss their homes in small groups. What elements are similar? What are different? How are their homes designed for the environment in which they are located? How do they provide protection from weather conditions? What materials are they made of? When were they built? Ask each group to present its findings to the rest of the class.**

People who have been displaced from their homes by natural or man-made disasters often need quick housing solutions.

- **Ask your students to research recent environmental disasters such as Hurricane Katrina in 2005 and the tsunami in the Indian Ocean in 2004. What happened? Why were people displaced? What solutions did governments attempt? How well did they work? Have your students discuss their research with the class.**

Designers have created temporary shelters that may be used in emergency situations. These need to be inexpensive, portable, and easy to set up, and must provide protection from the elements. In this lesson, we will look at shelters addressing diverse environmental needs. We will also look at three objects that help to supply people with clean water.

IMAGE-BASED DISCUSSION

- **Show your students Global Village Shelter (Image Twenty-five), by Daniel Ferrara and Mia Ferrara of Ferrara Design, Inc., and Global Village Shelters, LLC. Ask them what they can learn about this shelter just by looking at it. What do they notice about its size? Material? What purpose might it serve?**

This shelter was designed in 2001 by the American father-daughter team Daniel and Mia Ferrara. After testing over one hundred different configurations, they designed this wind- and fire-resistant house. Made of recycled corrugated cardboard, it can be assembled in less than an hour and lasts up to a year. It has easy-to-follow instructions, can be packed flat, is easy to ship, and costs around four hundred dollars. The door has a lock for security purposes.

14. Architecture for Humanity, ed. *Design Like you Give a Damn: Architectural Responses to Humanitarian Crises* (New York: Metropolis Books, 2006), 52.

In Granada in 2005, Hurricane Ivan destroyed eighty-five percent of housing stock. Makeshift schools and clinics were built under tarps, and temporary homes were built with debris. To help address the housing shortage, seventy Global Village Shelters were shipped to Granada to be used as clinics and temporary houses. These shelters can also be linked together to form a larger structure. The designers are currently developing a permanent structure that would include a toilet.

- **Ask your students to summarize the factors that make the Global Village Shelter a good design. How do the form, materials, cost, and assembly process contribute to the function?**

- **Show your students the paraSITE Homeless Shelter (Image Twenty-six), by Michael Rakowitz, but do not tell them what it is called. Ask them to make a word list describing the things they notice about the structure. Have them each share one word, and ask them to try not to repeat any words.**

- **Ask your students what kind of shelter they think this is. What problem might it solve? What materials do they see? How are the materials used?**

- **Tell your students the structure's title. What does this title tell them about it? Ask them to discuss how the word "parasite" relates to this object.**

The designer, Michael Rakowitz, says that parasitism is "a relationship in which a parasite temporarily or permanently exploits the energy of a host."[15] This shelter, which is designed for use by homeless people, is small, collapsible, temporary, and easy to transport. It uses the outside of a building's HVAC (heating, ventilation, and air-conditioning) system to give it form and for a source of heat.

In 1997 Rakowitz proposed the concept and a prototype of this shelter to Bill Stone, a homeless man living in Cambridge, Massachusetts. At the time, city officials were installing tilted grates over HVAC vents in Harvard Square so that homeless people could not sleep on them. According to Stone, the paraSITE shelter is a tactical response to the challenges presented by the city.

This shelter was originally constructed of materials easily found on the street, such as plastic bags and tape. Now it is made of polyethylene, a type of plastic (for an in-depth exploration of plastics, see Lesson Six). It costs about five dollars to make and is provided to users free of charge.

Rakowitz says, "Many of the homeless users regarded their shelters as a protest device, and would even shout slogans like, 'We beat you, Uncle Sam!' The shelters communicated a refusal to surrender, and made more visible the unacceptable circumstances of homeless life within the city."[16] The paraSITE shelter is meant to be a temporary solution and to act as a form of social protest. It has been controversial in cities where it has been used, as it makes the problem of homelessness visible to all who pass by.

- **According to a report by the National Alliance to End Homelessness, between 150,000 and 200,000 people in the United States are chronically homeless.[17] Have your students research homelessness in their area. What are some existing solutions? What others can they think of?**

15. Michael Rakowitz, "paraSITE," www.michaelrakowitz.com.
16. Ibid.
17. National Alliance to End Homelessness, "Chronic Homelessness Brief" (PDF), March 2007, http://www.endhomelessness.org/content/article/detail/1060.

- **Show your students Sea Shelter (Image Twenty-seven), by Nikhil Garde and the design school Designskolen Kolding, but do not tell them what it is called. Ask them to describe what they see. What do they think this shelter might be used for? Inform them that it is called Sea Shelter. A combination life raft and seaworthy tent, it was Garde's project in graduate school; he worked with the maritime safety company Viking Life-Saving Equipment.**

- **Ask your students to imagine climbing aboard a life raft in the middle of the ocean during a storm. What are some of the environmental challenges they might face?**

To address some of these challenges, this raft has to be flexible, lightweight, easy to launch, and self-righting. It also has to be easy to climb. The Sea Shelter has handles and a step that extends under the water. It is designed to position itself according to the direction of the wind and waves so that it floats with the current, making the ride more comfortable.

- **Ask your students to compare this shelter to the previous two. How do they solve temporary housing problems? How are the materials similar? Different? What environmental factors do each of these design solutions address?**

- **In addition to shelter, what are other basic human needs? Make a list on the board. You may want to discuss Abraham Maslow's Hierarchy of Needs with your students. (For more infor-mation about this, please visit http://chiron.valdosta.edu/whuitt/col/regsys/maslow.html.)**

Now that you and your students have looked at various types of shelters, we are going to move onto another major issue facing people in developing nations—water and sanitation.

- **Ask your students what the role of water is in their daily lives. How do they obtain water? What do they use it for?**

- **Ask your students to imagine carrying, from a source miles away, all the water they drink, bathe in, and wash their hands with in one day. Have your students consult a map. What would their source for water be? How far is it from their house? Is the water clean? How long would it take to walk back and forth from this site? Have them research which reservoir supplies water to their city or neighborhood. Where does the water come from?**

Many people around the world lack access to clean water, and three billion are without proper sanitation facilities. More than two million people die each year from preventable water- and sanitation-related diseases.[18] The next three objects address these issues.

- **Show your students Water Container (Image Twenty-eight), but do not tell them what it is called. Ask them what they think it might be used for. Inform them that this is a water container used by the United Nations Children's Fund (UNICEF).**

- **Ask your students to do a quick Internet search for more information about UNICEF. What is the mission of this organization? When was it founded? Whom does it serve? Have them discuss their findings in class.**

Founded in 1946, UNICEF aids children around the world by providing services ranging from basic necessities like food and clothing to education and housing. The organization educates people about water sanitation and distributes this water container to help combat water-borne diseases. It has built-in safeguards that prevent the water from being touched by people's hands, thus preventing contamination. It is also lightweight, collapsible, and easy to stack, making it easy to transport.

18. Architecture for Humanity, 278.

- **Show your students the Watercone Water-collection Device (Image Twenty-nine), by Stephan Augustin and Wisser Verpackungen GmbH, but do not tell them what it is called. Ask them what they think this object might be used for. Why?**

Inform them that this is a water collection and purification device called Watercone. It is a solar water purifier that uses the sun's heat to evaporate water. The water evaporates and then condenses on the inside of the cone. If you flip the cone over, you can pour the water directly into a container. This is a cheap and durable system that can purify about 1.5 liters of water a day, enough for one child. Two Watercones can take care of one adult. The device kills all waterborne pathogens and removes particulates, many chemicals, and heavy metals. It can also desalinate seawater, which is an important function for people who live near the ocean and lack fresh water. Because it is stackable, it is easy and inexpensive to ship.

- **Ask your students to research other water purifiers. How do they work? What materials do they use? What is their cost? How does their design contribute to their function? Ask students to make a chart rating their findings. If they were to purchase a water purifier, which one would they select? Why?**

- **Show your students the SQFlex Combo Drinking Water Pump (Image Thirty), by Niels Due Jensen and Grundfos Management A/S. Inform them that this is a water pump. How do they think it might work? Have them identify the two main parts shown in the image. What do they think they might be used for? Have they ever seen a wind turbine before?**

This water pump was designed for use in remote areas. Advances in technology have enabled people to go to areas in the world previously considered uninhabitable.

- **Ask your students to imagine they are in the middle of the desert. What kinds of things would be around them?**

This water pump uses two natural elements that are readily available and produce energy—the sun and wind—and can be attached to existing pump systems.

The Danish company that manufactures these pumps, Grundfos, is dedicated to environmental responsibility. Its founder, Niels Due Jensen, said, "When this generation delivers planet earth to the next generation, it should be a cleaner and more energizing place than the place which we inherited."[19]

- **Ask your students to summarize what they have learned about water purifiers, pumps, and containers. What problems do each of the objects discussed in this lesson solve?**

- **Ask your students to work in groups to create an idea for their own environmentally responsible company. What will they produce? What will they do that is good for the environment? What considerations would they have to take into account when creating their products?**

ACTIVITIES

Create Your Own Shelter

Ask your students to work in small design teams to create their own temporary shelter. Have them think about what specific problem they want to address. They should consider materials, size, assembly, and environmental conditions. Ask them to create a drawing and to present it, along with their rationale, to the class.

19. Niels Due Jensen, quoted in "Social responsibility: The challenge of making your employees comply," by Thor Wilkens, Well Web, www.wellweb.org/Default.asp?Id=108&AjrNws=102&AjrNwsPg=1 (accessed March 2008).

Architecture for Humanity

Architecture for Humanity is a nonprofit organization that encourages architects and designers from all over the world to think creatively about how to solve problems in their community. It helped the government of Granada link up with the designers of the Global Village Shelter to facilitate the distribution of seventy shelters. Ask your students to visit the organization's Web site, at www.architectureforhumanity.org, select a project they find interesting, and present their findings to the class or to small groups.

Action!

Ask your students to research other objects that help people in developing countries obtain or transport water. The Hippo Water Roller (www.hipporoller.org), the Roundabout Outdoor PlayPump (www.playpumps.org), and a ceramic water filter (www.potpaz.org) are some examples.

Ask your students to select one of these objects and hold a fundraiser to raise money for its purchase. Why did they select that object? How much money will they need to raise to meet their goal? Who will it help? Why will it be effective?