

Energy Challenge

The EnlightenSC Energy Challenge is for creative students who are interested in energy, architecture and the connection between aesthetic beauty and the development of sustainable, energy-efficient homes.

Design a cost effective, energy-efficient home, incorporating a Chiaroscuro Chamber, that maximizes the use of natural light.

What to bring:

Your completed energy-efficient home and 4 photographs of the construction of your home.

Instructions for building your energy efficient home:

1. You will need stiff white paper or cardboard, scissors, an x-acto knife, a light source (flashlight) and tape/glue. You need repurposed and recycled materials to apply to represent additions to the structure.
2. Using the paper, craft a home or three dimensional space – a cube, series of planes, or an irregular shape. The design must allow enough light to enter the space. Using the flashlight when you are finished, see what shadows are cast in the volume. Move the flashlight to represent the changing of the sun’s location during the day.
3. Assume that your home will use natural light for most of the day. Where will you position your home to be most efficient and most comfortable while allowing the most productivity?
4. Consider how you will generate the additional power you need to heat, cool, light, and operate your home. Will you attach to the power grid like most homes do and purchase electricity from a local utility? Will you go “off the grid” and power your home with renewable energy, such as solar panels? If so, what will you do when the sun isn’t shining? Whatever you decide, think about the consequences of each choice, including how much it will cost to purchase power or the initial cost of equipment such as solar panels.
5. Use only recycled or repurposed pieces to create your additional power to the paper design of your home. For example, use old camera film as a way to represent solar panels.



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Judging:

Entries will be judged on three criteria: design, explanation of thinking, and photographs documenting construction. Homes are to be built off-site and brought to the competition for judging.

1. Homes will be judged on their beauty, creative design, creative use of repurposed objects, energy efficiency, cost effectiveness and consideration of practical challenges, including costs.
2. Be prepared to explain your thinking to the judges about the choices you made in designing your energy-efficient home, featuring natural light. See *Questions to Consider* below.
3. Provide at least 4 photographs of the construction of your home in process.

Information to Apply:

- A Chiaroscuro Chamber is an architectural design made of paper that uses natural light, only depicting light and shade. There are no colors, but only black, white, and shades of gray. The model is a way of studying how light moves in and around an architectural space.
- According to the U.S. Energy Information Administration (EIA), lighting accounts for about 14% of all residential electricity consumption. Thoughtful home design that incorporates natural light can significantly reduce a home's energy use and lower consumers' monthly electric bills.

Questions to consider in your design:

- Is it possible to design a home that is both aesthetically appealing and energy efficient?
- What does it mean for a home to be energy efficient?
- How are homes made energy efficient?
- What is the impact of an energy-efficient home on the environment?
- How does using natural light contribute to energy efficiency? What problems does it create?
- What is the connection between natural light, energy efficiency, and productivity?
- What kinds of renewable energy systems can be installed in a home to allow the home to be more energy efficient? Which systems are the most cost-effective for consumers?
- How can you harness renewable energy to power a home?
- How does the design of the home contribute to energy use and/or efficiency?
- How does energy efficiency in one home affect a community?
- What does the term "Demand Response" mean and how can it impact home energy use? Define a "Smart Home." How does it incorporate "Demand Response"? How are the two concepts different?
- How have consumers responded to electric utilities' efforts to manage their use of electricity during periods of peak energy use?

