Solar City

Objectives

Understand how building design can accommodate solar panels.
Understand how building design can be used to take advantage of passive solar energy.

Skill Level: Middle school or high school.	**Prep time:** Minimal **Class time:** Multiple class periods

Materials

See activities materials listed in the link below.

Background Information

Solar energy is usually a negative for building designers. It generates extra heat that must be eliminated by air-conditioning. However, this perspective is changing as architects and buyers begin to see solar radiation as a free energy source.

By designing a house properly, it can use the sun to power either photovoltaic panels, or to

passively heat the house. For photovoltaic panels, the house needs to be oriented so that a roof surface is facing south. For passive solar energy, the house needs to be designed to collect sun in the winter and to shade it from sun in the summer.

Engage

Ask students to name positive and negative aspects of sunlight on a building. How can we design homes so that it takes better advantage of the positive aspects, while reducing the negative ones? Can these be used to reduce the costs of operating a building?

Explore

Experiment Questions:
How can the sun be used to provide energy for a building?

Procedure:

Have students complete one of the following activities:

Design a Solar City Activity (Intermediate)

Passive Solar Design Lesson and Zero Energy Housing Activity (Advanced)

Explain

Ask each design team to describe their design and how it performed in the testing. Which designs captured the suns rays most efficiently? Ask the students why they think this was the case.

Elaborate

Students can complete the Daylighting activity to design a house that uses the sun for light.

Resources

Resources Used:

Teach Engineering. One of the best K12 engineering education web sites with lots of unit and lesson plans.