Title: Future Home Design

By Katie Gavenus, Children of the Spills, http://childrenofthespills.org.

Theme: There are many innovative ways to design a building that needs less energy, generates less waste, and supports a healthy way of life.

Objectives:

- Students will identify ways to conserve energy and minimize waste.
- Students will design their ideal green home.

Duration: 60-75 minutes

Age Range: 4th-8th Grade

Materials:

- Pencils
- Pens
- Colored Pencils
- Drafting paper or other large sheets of paper
- Scratch paper
- Rulers
- Computers with Google Earth
- Google Earth green building tour
- Whiteboard or posterboard
- Dry erase markers or colored markers
- Future Home Design Rubric

Background:

In this activity, students design a home for themselves in the future. This builds on their knowledge of energy conservation and efficiency, but also pushes students to create innovative solutions to problems of energy & resource use, waste, and health.

Preparation:

If possible, arrange a field trip to visit a local building or home with features that promote some type of energy conservation, waste mitigation, or clean water and air. Your school might incorporate some of these features. Otherwise check out a building with solar panels, living roof, or recycled or renewable insulation (straw bale houses are a great example!)

If you cannot arrange a field trip, use Google Earth. Download Google Earth on to computers – 1 computer for every 2 students, or 1 computer and projector to lead a demonstration for the whole class. Download the Google Earth green building tour (http://www.calacademy.org/teachers/resources/lessons/green-buildings-virtual-tour/) onto the computer(s) you will be using. You may also be interested in looking at the burgeoning phenomenon of building and living in micro-homes. A full length documentary (http://faircompanies.com/videos/view/we-tiny-house-people-documentary/) and shorter video about tiny cottages built from salvaged materials (http://faircompanies.com/videos/view/salvaged-tiny-homestudio-tin-can-sides-paper-bag-wallpaper/) are both available through documentary filmmaker Kirsten Dirksen.

Introduction:

Following a tour of a renewable home, the Google Earth green buildings virtual tour, or the video(s) on micro homes, ask each student to think about the most interesting feature they have ever seen or heard about on a home or building that made it less wasteful and more livable. Write all of these features on the board. As a class, organize these features into categories based on the challenges they address (energy conservation, building materials, water conservation, clean air, human health, etc.).

Activities & Procedures:

Explain to students that they are going to design their own future home. Their goal is to create a home they would be happy living in that incorporates innovative ways to conserve resources, minimize waste, and have a positive effect on the environment.

Encourage students to think about what they have learned about energy conservation and also ways that a home can mimic an ecosystem, where all waste is recycled and reused. Provide students with some examples of green buildings, either through a live or virtual tour.

Divide students into "design teams" of 2-3 and arrange so that they are sitting near each other.

Pass out drafting paper, scratch paper, pens, pencils, and colored pencils to each student. Give them copies of the Future Home Design Rubric as well. Working alone, have students begin by creating a quick sketch of their future home on the scratch paper, incorporating green building ideas that appeal to them.

After the first sketch is complete, students should meet with their design teams. Each student needs to present their preliminary plan to their design team for constructive criticism and feedback. If necessary, provide guidance to students on how this feedback should be delivered.

Then have each student revisit his or her original design and incorporate the feedback from their peers into a final design, which should be illustrated on the drafting paper. The green design features should be included in the drawing and explained in writing on the edge of the design.

Wrap-Up:

Have each student present their green building design to the class. Have students share compliment sandwiches about the designs – one aspect they think is really strong, one aspect they think should be changed, and another aspect they think is really strong. Display the design plans where others can see them.

Discuss the designs. Ask students how many of them would actually like to live in one of these homes. Why or why not? Ask students to identify the one feature they'd be most likely to incorporate into their home in the future. List these features on the board and discuss the effects (positive and negative) these features would have on the environment and human health.

Evaluation:

Use the Future Home Design Rubric to evaluate the projects and assess student understanding.

Making A Blueprint : Future Home Design

Teacher Name: _____

Student Name: _____

CATEGORY	4	3	2	1
Brainstorming - Solutions	Students identify more than 4 reasonable, insightful possible design solutions/strategies to create a better home design.	Students identify at least 4 reasonable, insightful possible design solutions/strategies to create a better home design.	Students identify at least 3 reasonable, insightful possible design solutions/strategies to create a better home design.	Students identify fewer than 3 reasonable, insightful possible design solutions/strategies to create a better home design.
Home Design	Students create an original, innovative and interesting design that adequately addresses the issues.	Students create an original design that adequately addresses the issues.	Students create a design that adequately address the issues, but it is not original.	The design does not adequately address the issues.

Accuracy and Neatness	All straight lines are ruler-drawn, all errors have been neatly corrected and all features are colored completely. All features on blueprint are drawn to scale and the scale used is clearly indicated.	All straight lines are ruler-drawn, most errors have been neatly corrected and most features are colored completely. Most features on blueprint are drawn to scale and the scale used is clearly indicated.	Most straight lines are ruler-drawn, most errors have been neatly corrected and most features are colored completely. Many features of the blueprint are NOT drawn to scale even though a scale is clearly indicated.	Many lines, corrections of errors, and/or features are not neatly done. Many features of the blueprint are NOT drawn to scale AND/OR there is no scale marker on the blueprint.
Design Team Group Work	The design team functioned exceptionally well. All members listened to, shared with, provided feedback, and supported the efforts of others. The group (all members) was almost always on task!	The design team functioned pretty well. Most members listened to, shared with, provided feedback, and supported the efforts of others. The group (all members) was almost always on task!	The design team functioned fairly well but was dominated by one or two members. The group (all members) was almost always on task!	Some members of the design team were often off task AND/OR were overtly disrespectful to others in the group AND/OR were typically disregarded by other group members.

Future Home Design

Science and Technology: Students develop an understanding of the relationships among science, technology, and society.

SE1 Students develop an understanding of how scientific knowledge and technology are used in making decisions about issues, innovations, and responses to problems and everyday events.

The student demonstrates an understanding of how to integrate scientific knowledge and technology to address problems by:

[3] SE1.1 identifying local problems and discussing solutions

[4] SE1.1 recognizing that tools (e.g., spear, hammer, hand lens, kayak, computer) and processes (e.g., drying fish, sewing, photography) are an important part of human cultures

[5] SE1.1 identifying a community problem or issue and describing the information needed to develop a scientific solution

[6] SE1.1 recognizing that technology cannot always provide successful solutions for problems or fulfill every human need

SE2 Students develop an understanding that solving problems involves different ways of thinking, perspectives, and curiosity that lead to the exploration of multiple paths that are analyzed using scientific, technological, and social merits.

The student demonstrates an understanding that solving problems involves different ways of thinking by:

[3] SE2.1 identifying local tools and materials used in everyday life

[4] SE2.1 identifying the function of a variety of tools (e.g., spear, hammer, hand lens, kayak, computer)

[6] SE2.1 identifying and designing a solution to a problem

[6, 7] SE2.2 comparing the student's work to the work of peers in order to identify multiple paths that can be used to investigate a question or problem

[8] SE2.2 comparing the student's work to the work of peers in order to identify multiple paths that can be used to investigate and evaluate potential solutions to a question or problem

SE3 Students develop an understanding of how scientific discoveries and technological innovations affect and are affected by our lives and cultures.

The student demonstrates an understanding of how scientific discoveries and technological innovations affect our lives and society by:

[5] SE3.1 describing the various effects of an innovation (e.g., snow machines, airplanes, immunizations) on the safety, health, and environment of the local community