NAME: _____

Student Worksheet

Activity One

Build a Model of a Carbon Neutral Community

In this activity, you will show how all the design features of a carbon neutral community fit together and what the town would look like to a bird flying over it. The materials can be very simple. Here are some suggestions.

- Toy building blocks to use as houses, shops, and schools
- Chunks of a green sponge to use as trees
- Sawdust or sand to build hills
- Mirrors for water
- Any toys that are the right scale
- Use your imagination to make such things as rail systems, wind turbines, and solar cells.

Scissors, magic markers, and glue or a glue gun will be useful.

Think of how you will add these features in a way that they will work together:

Community Size and Street Plan

Make it small enough to be walk-able and bike-able. Arrange the streets for ease of travel. Think about the best locations for markets, schools, and businesses.

Energy Supply

What will be the best alternative energy supply? Where should it be located?

Transportation

Is it possible to design the community so that cars are not even needed? What kind of public transport will you use, and how will it be powered?

Food Supply

Where will the food be grown, how will it be transported, and where will it be sold?

Open Space

Include a greenbelt around the town and green spaces inside the town. Farmland also counts as open space. Plant lots of trees.

If you like to draw and you are good at it, you could draw a detailed picture of a carbon neutral community instead of building one.

NAME: _____

Student Worksheet

Activity Two

Report on Green Roofs

Learn about the different types of buildings covered with grass, plants, and trees and write a short report on the subject. Here are some of the topics you can explore:

Modern homes with grass roofs

If you search the Internet or library for "green roof" and "grass roof," you will get a mixture of results. Sort through the results for information and pictures on single-family homes. Look for any information on how to prepare a roof for laying down sod and on what goes under the sod.

Traditional grass-covered homes

In some European countries, people have been building houses with grass roofs for hundreds of years. You will find out about these if you search for "Swiss grass roof" and "Scandinavian grass roof."

Earth houses

Some very interesting houses are built into hillsides. You can find out about these by searching for "earth house." Report any additional advantages these homes have compared to grass roofed houses.

Large commercial buildings with green roofs

For a general search, look for "rooftop park" and "rooftop garden." For a few of the wilder ones, search for "Singapore Polytechnic School of Art and Design," "California Academy of Sciences," and "Waldspirale."

Finally, if you can find a birds-eye view of your community, make a copy of the picture. Now use a green marker to color some of the rooftops green. On the large, flat roofs, add some trees and vegetable gardens. If you have access to a computer and a color printer, you can also go to a site that shows satellite views and print out a picture of your community. You will see which roofs are already green and color in the ones that could be.

You might also want to look for satellite views of some of the green roofed commercial buildings mentioned above.

NAME: _____

Student Worksheet

Activity Three

Visit an Alternative Energy Company

Search the telephone or internet yellow pages for "solar" and "wind." Look for listings of companies that install or build solar cells, solar hot water heaters, and wind turbines. Choose one that looks interesting, call them, and ask if you can visit. Prepare for your visit by preparing a list of questions. Here are some questions you might like to ask:

- How do your devices convert wind or solar energy into electricity?
- How much would it cost for an average family?
- How long does it take the buyer to pay for what you sell in savings on energy bills?
- Can the buyer sell back extra electricity to the utility company?
- If the company sells passive solar devices, such as hot water heaters, ask the same questions about payback time.
- Can the buyer get any help from state, national, or local governments in terms of cash, loans, or tax breaks?
- Ask where you might go to see houses in which they have installed these devices. Ask for customers who would welcome your questions.

NAME: _____

Student Worksheet

Activity Four

Create a Bike Route Plan

Design a bike route plan or improve an existing plan for your community. For this activity, you will look at the layout of your community and decide which routes people would want to travel by bicycle. Next you will look for routes that do not already have good bike paths and decide which would be best to build first.

First find a map of your community. Street maps will be available online, at gas stations, at book stores, and at libraries. Bike route maps are usually sold at bicycle shops.

With maps in hand, check out the existing bike routes and look for:

- Which ones seem safe
- How well they are marked with signs and on the pavement
- Which dangerous highway crossings have bicycle overpasses
- Which routes are on streets with traffic and which ones are separated from traffic

People will want to bike from where they live to where they work, shop, and go to school. Mark the residential areas and the places to which people are likely to want to ride. Make a note of these trips that can already be made on safe bike routes.

If some trips do not have good bike routes, decide where new ones should be built. Your first choices should be bike paths away from traffic through parks and open space. Along rivers, on levees, and on abandoned railroad tracks are often good routes.

On a community map, mark all the existing bike routes in one color. Mark the new bike routes you are suggesting in another color. Mail it to your mayor.

NAME: _____

Activity Five

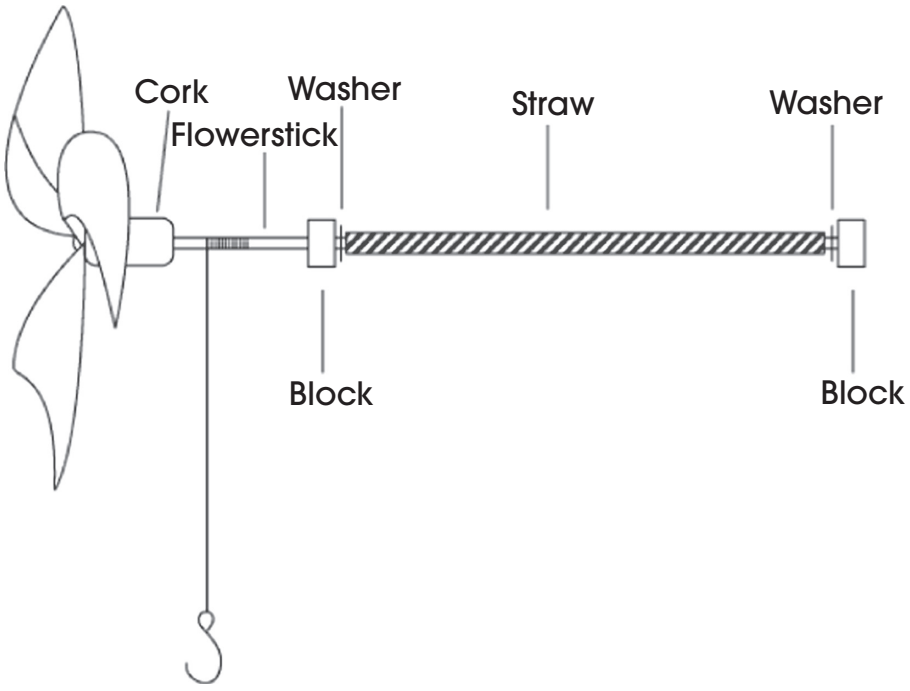
Build a Model Wind Turbine

The goal of this activity is to learn about wind turbines by building a working model of one. Begin by searching the Internet or library for "model wind turbine." You will find many plans ranging from simple to complicated. Your teacher may be able to give you some help and even give you some of the equipment you will need.

Most of the parts and tools for the simplest plans can be found around the house. Some plans use Tinker Toys for most of the parts. All plans will need a set of blades and a generator.

The blades can be as simple as a child's pinwheel. The generator can be a small DC motor, such as the ones in remote control cars. It is also possible to buy model wind turbine kits online or from a hobby store, but they can be fairly expensive.

If you think you would not be able to find all the parts for a wind turbine that generates electricity, there is a simpler possibility. You can build a windmill that changes wind energy into mechanical energy. A design of such a windmill is shown below. This is similar to the old-style windmills that were used before machines and appliances ran on electricity.



NAME: _____

Student Worksheet

Activity Six

Village Life

In this activity, you will learn about village life as it was lived in the past and as it still exists in developing countries. From the information you gather, you will write a short report.

Begin by searching the Internet and library for the following topics: "traditional village," "19th century village," "18th century village," "African village," and "Native village." As you search, you will find a lot of interesting pictures you can put in your report.

Here are some of the questions you can try to answer about village life:

- How did villagers get their food, and where did it grow?
- What energy sources did villagers use?
- How large were villages, and how were the different buildings arranged?
- What did villagers use for transportation?
- Did villages create much trash, and what did they do with it?
- Was the carbon footprint larger or smaller than that of today's communities?
- Why was it larger, or why was it smaller?

These questions all ask about the past, but you will find in your reading that villages in many countries are not much different today.

Now compare old-style village life to life in a modern carbon neutral community. Describe how the life in the old villages and new communities are the same. Describe how they are different.