

NAME: _____



Activity One

Biofuels Debate



People have different opinions about whether biofuels are a good alternative to replace the use of gasoline and other fossil fuels in vehicles. Arrange a debate between two groups of students. One group will argue that switching to available biofuels now is a good idea; another group will argue that biofuels have too many problems and that people should keep looking for better alternatives to gasoline.

1. First, research both positions. Use the Internet or library resources. Find out more about people's opinions about biofuels. Also, be sure to find evidence to support either position. Ask yourself the following questions:
 - Why do some people think that switching vehicles to biofuels right away is a good idea?
 - How might a global switch to biofuels affect worldwide carbon emissions?
 - How might the switch to biofuels affect other types of pollution?
 - What are the other reasons to switch to biofuels? E.g. societal or economical.
 - Why do some people think that switching to biofuels right away is not a good idea?
 - How might a global switch to biofuels affect the production of food crops around the world? What effect could it have on food prices?
 - What are the other reasons to keep looking for other alternative fuels besides biofuels? E.g. societal, environmental or economical.
 - What are some other alternative fuels that might be better than biofuels?
2. Write notes for your arguments and talking points. Write short, bulleted descriptions of your main arguments. Write evidence to support them. Also, write descriptions of what you think the opposing side will argue. Write your ideas and evidence to refute those arguments.
3. Conduct the debate. Flip a coin to see which team starts first. Each "turn" of the debate has three steps. The first team states one argument. Then, the second team has time to refute that argument. Finally, the first team has a chance to comment on what the opposing team said. Then, the second team takes their turn, beginning with an argument. The process continues until each team has had a chance to make all of their arguments. At the end, give the students in the class who are watching the debate a chance to comment on which team they thought won, and why.

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Activity Two



Alternative Fuel Fair

You learned about many types of alternative fuels. They are being developed to run vehicles and power homes and businesses. In this activity, each student will choose one alternative fuel application to research in depth. Then, students will share what they learned in a poster fair.

1. Use the Internet or library resources. Skim through information about different alternative fuels and their applications. An application is the way a fuel is being used. For example, solar cell technology is used in roofing panels that provide energy for one home. Another application might be to provide energy needed to produce hydrogen for use in fuel cells. For this project, choose just one application of one alternative technology. Choose one you think is interesting!
2. Research your alternative fuel application. Use the Internet. Look up research groups that are developing the technology. Look for companies that might be producing the technology. It is okay to present technologies that are still in development. Try to find out information such as:
 - What kinds of technology are being developed to use the alternative fuel in the application you are researching?
 - How long have scientists been working on the technology?
 - Is the technology available to buy yet? Or is it still being developed? When will it become available?
 - What are the everyday benefits to people using this alternative fuel application?
 - What are environmental, societal or other benefits of this alternative fuel application?
3. Create a poster. It should have visuals and short text describing your alternative fuel technology. Display posters from all the students in the class. Invite parents, teachers and students from other classes to walk through your poster fair and ask questions.

A row of decorative icons including a house, a compass, a family silhouette, and a triangle, located above the main title.

Activity Three

Plan A Carbon-Free Business

You read about Masdar City. It is a fully sustainable city. Can you imagine a sustainable business?

- 1. Choose your business.** What type of business would you like to run? Be imaginative. It could be anything! Any type of business can go “Green”. Amusement parks, hair salons, mechanics, stores, anything!
- 2. Research the ways that your business adds carbon emissions to the atmosphere.** Think about:
 - What are all the different ways that your business uses energy?
 - Where does the energy come from?
 - What alternative sources of energy might be available to your business? Which alternative fuels are best for each type of energy need?
 - How can your business reduce its overall need for energy?
- 3. Write your plan to run your business without carbon emissions.** Describe your business in words, pictures and diagrams. Be sure your business plan includes:
 - The type of business. The services and products you will offer.
 - The name and location of your business.
 - A description of the facilities, machines, vehicles, etc., that you will own.
 - A description of your everyday operations.
 - A complete list, with explanations, of all of the alternative sources of energy you will use in different parts of the business.
 - An explanation of the ways in which your business will reduce its overall need for energy.
 - A discussion of how your business compares to a similar kind of business that does NOT practice sustainability. How much energy and resources will your business save? How much pollution does the other business make? How much less waste do you make? Are your operating costs different?



Activity Four

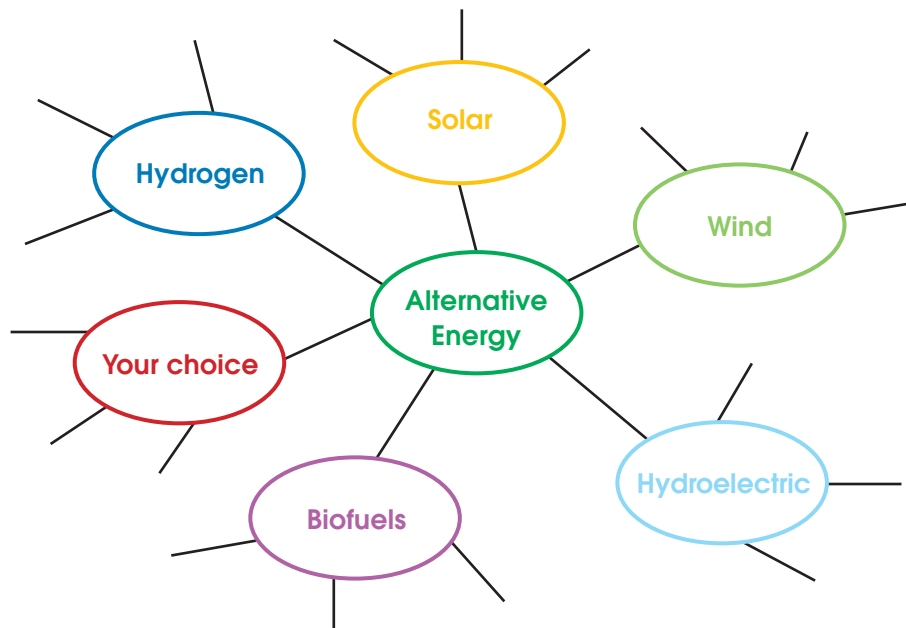
Greenhouse Gas Concept Web

Create a detailed concept web. It will organize the information you learned about alternative fuels.

- Solar
- Wind
- Hydroelectric
- Biofuels
- Hydrogen

Add one additional alternative fuel that you would like to research. This could be geothermal or tidal.

Construct your map. Use a large piece of poster paper. You should have plenty of room to include all of the main concepts about each of the alternative fuels. You may use your main topic as a central concept. Or, as a top-level concept if you would like to do a pyramid-style map.



Add links to each of the alternative sources of energy. Include information about how it is captured. Include how it is turned into useful energy that can run vehicles or power homes and businesses.



Activity Five



Create a Brochure

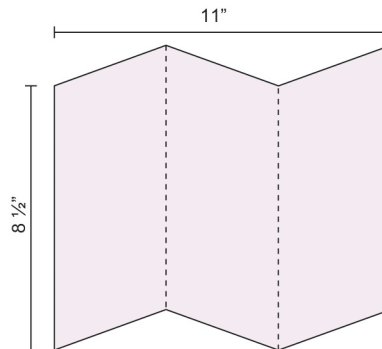
A brochure is a handy way to get information to people. You can create a brochure showing people ways to lower their greenhouse gas emissions.

GET IDEAS

Start by looking through sample brochures. Get ideas about how they are laid out. How are the graphics and text used to present main ideas in a small space? Organizations often put out brochures to help give people information. Places like banks, waste management companies, state parks, and water districts. Ask your teacher or parent for help finding a selection of brochures to study.

LAY OUT YOUR BROCHURE

Usually, brochures are made by folding an $8\frac{1}{2} \times 11$ in. paper into thirds.



Decide where you are going to put the information about ways to lower your greenhouse gas emissions. Be sure to include:

- Suggestions for using public transportation.
- Benefits of walking or riding a bicycle for short trips.
- Information about how using electricity adds to greenhouse gas emissions.
- Suggestions for reducing the use of electricity.

DISTRIBUTE YOUR BROCHURE

Ask your teacher for help making double-sided copies of your brochure. Fold the brochures and give them to your family and friends. You may want to share your brochures with other classrooms at your school.

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Activity Six



Design Your Carbon-Free Home

Design a home that people can live in. It should work without adding greenhouse gases to the atmosphere.

First, research “Green Building” or “Green Architecture”. Ask yourself:

- How will people get power to run electrical appliances? Without using electricity from power companies that burn fossil fuels.
- How can you use alternative energy sources for your home? Like solar and wind.
- What types of new technologies and appliances use less energy?
- How can the design of the home help the home use less resources? What is the effect of the placement of windows? The height of ceilings? The use of insulation? Different heating and cooling systems? The choice of landscape plants?
- How does the local climate affect which designs and materials to choose?

Then, think about the type of home you would love to have. Do you want a lovely house in the country? Or a cool city apartment? Where do you want to live? In a place with a snowy winter? A dry desert? A moist tropical environment?

Next, design your home. Start by making a list that contains all of the materials and features of each system of the home:

- | | |
|---|--|
| <ul style="list-style-type: none">• Foundation• Framing• Outside walls• Roof• Inside walls• Flooring• Heating and Cooling | <ul style="list-style-type: none">• Plumbing• Insulation• Electrical & Energy Source• Landscaping |
|---|--|

Use the Internet. Look for building plans to see how they are drawn. What types of information do they include? Have fun drawing and designing your home!

Display your drawings for the class. Make a presentation to tell your classmates about all of the Green features of your dream home!