Grades 2-7

Renewable Energy

Learning Lapbook with Study Guide

A Journey Through Learning

www.ajourneythroughlearning.com

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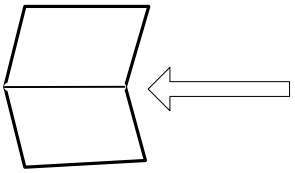
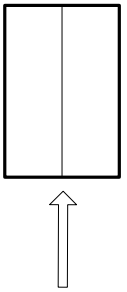
Things to Know

Hamburger Fold-Fold horizontally



Hotdog Fold-Fold vertically



Dotted Lines-These are the cutting lines.

Accordion Fold-This fold is like making a paper fan. Fold on the first line so that title is on top. Turn over and fold on next line so that title is on top again. Turn over again and fold again on the next line so that title is on top. Continue until all folds are done.

Cover Labels-Most of the booklets that are folded look nicer with a label on top instead of just a blank space. They will be referred to as "cover label."

How Long Does it Take to Complete the Lapbook?

Doing a study guide page and mini-booklet a day, a 3-folder lapbook takes about one month to complete. However, you can expand the study portion and make it last as long as you like! That's the beauty of homeschooling! Do it YOUR way!

Lapbook Assembly Choices

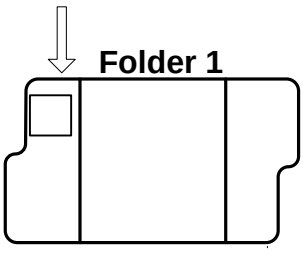
(see photos on how to fold and glue your folders together)

We recommend using Zip Dry Glue or Elmer's Extreme.

Choice #1 -Do not glue your folders together until you have completely finished all three folders. It is easier to work with one folder instead of two or three glued together.

Choice #2 -Glue all of your folders together before beginning. Some children like to see the entire project as they work on it. It helps with keeping up with which folder you are supposed to be working in. The choices are completely up to you and your child!

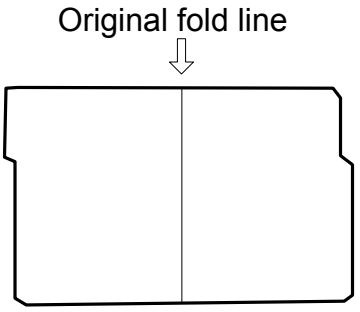
How do I know where to place each template in the folder?



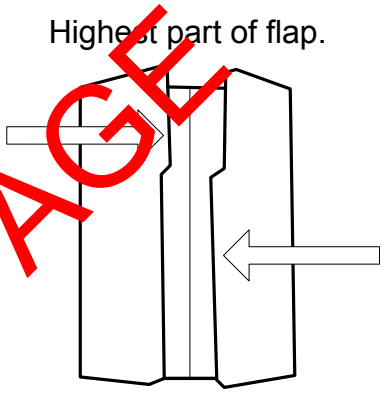
This placement key tells you the template goes in the first folder at the top of the left flap.

Folding a Lapbook Base

Gather the number of folders required for the project. Fold them flat as seen here.



For each folder, fold the left and right sides inward toward the original line to create two flaps. Crease so that the highest part of each flap is touching the original line. It is important not to let the two flaps overlap. *You may want to take a ruler and run it down each crease to make it sharper.*



Glue your folders together by putting glue (or you may staple) on the inside of the flaps. Then press the newly glued flaps together with your hands until they get a good strong hold to each other. Follow this step to add as many folders as you need for your project. Most of our lapbooks have either 2 or 3 folders.

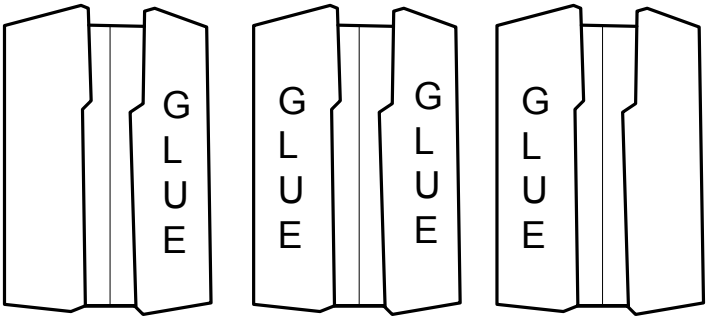
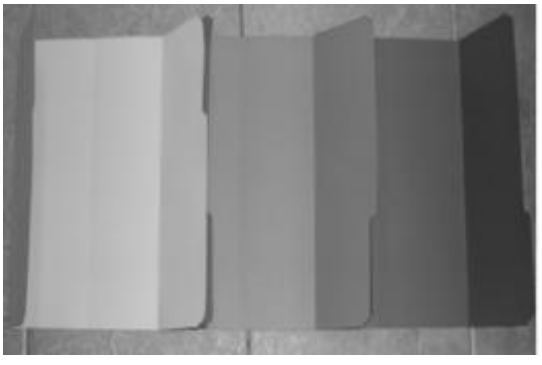


Photo of a completed lapbook base



Supplies and Storage

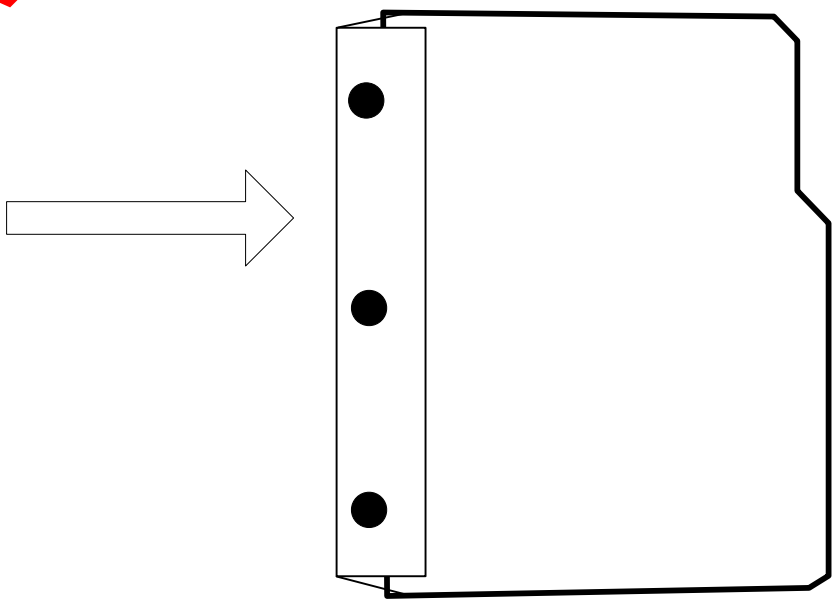
*Lapbook Pages
*3 Colored File Folders
*Scissors
*Glue
*Stapler
*Brads (not needed for every lapbook. If brads are not available, a stapler will do.)
*Hole Puncher (again, not needed for every lapbook.)

To make the storage system (optional)
See details below about the use of a storage system.
*Duct tape (any color)
*One 3-ring binder
*Hole Puncher

My child has made several lapbooks. Can I store all of the lapbooks together in one place?

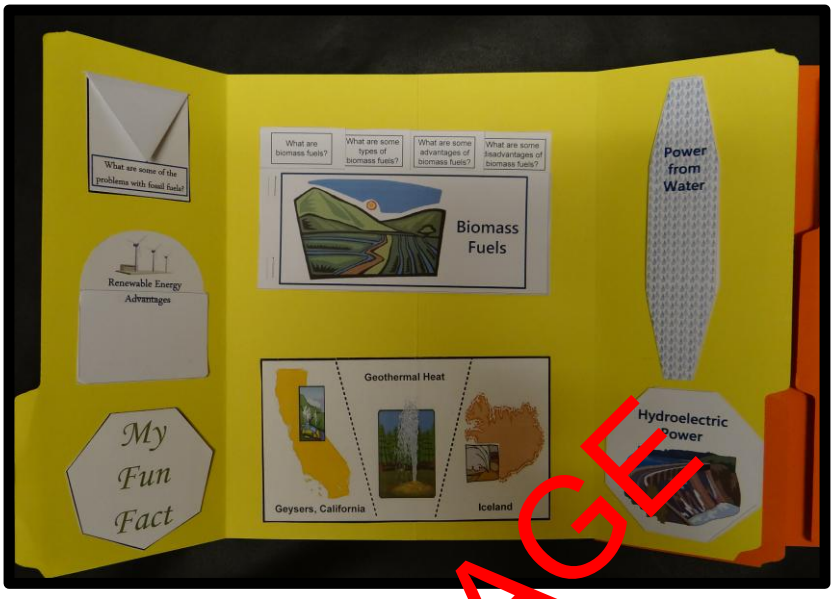
Yes! A three-ring binder serves as a great place to keep your lapbooks. This method of storage not only keeps your lapbooks from getting lost but also keeps them neat and readily available to share with dad, grandparents, friends, etc. When you are through sharing your lapbooks, just place the three-ring binder back on your bookshelf. Below are step-by-step directions of how to prepare each lapbook to be placed a in a three-ring binder.

Close the lapbook. Measure a piece of duct tape that is as long as the lapbook. Place the edge of the duct tape on the top edge of the lapbook. Then fold the duct tape over so that it can be placed on the bottom edge. Make sure to leave enough duct tape sticking out from the edges to punch three holes. Be careful when punching the holes that you do not punch the holes in the folder. If you do, that's okay. Then place in three-ring binder. Depending on the size of your three-ring binder, you can store many lapbooks in it.

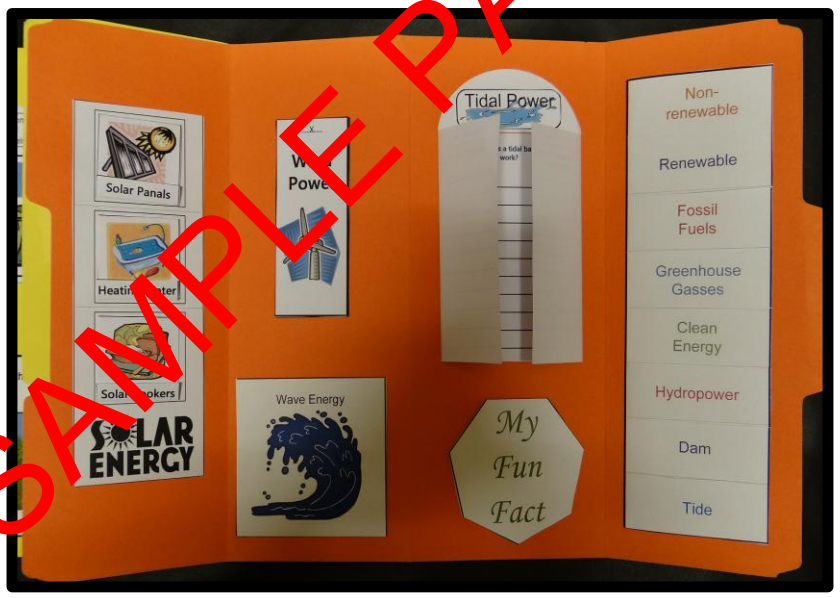


Photos of Lapbook

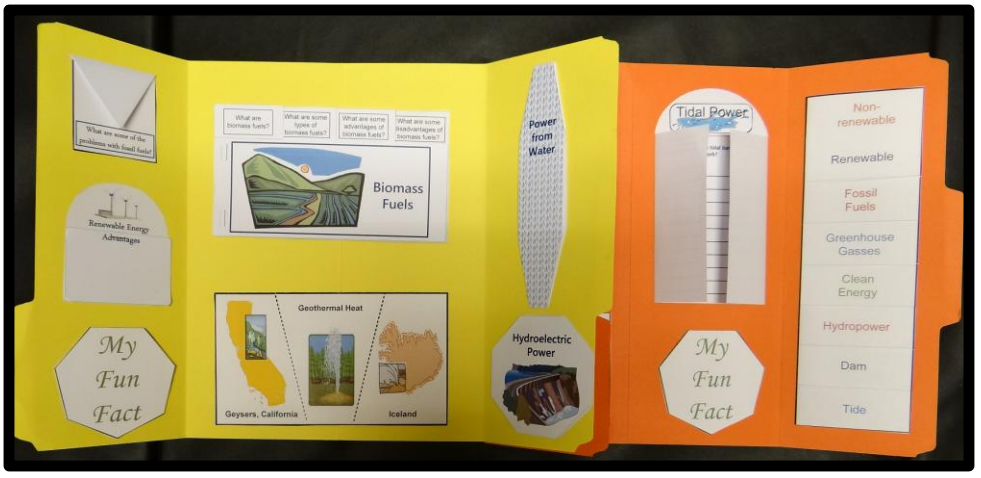
Folder 1



Folder 2

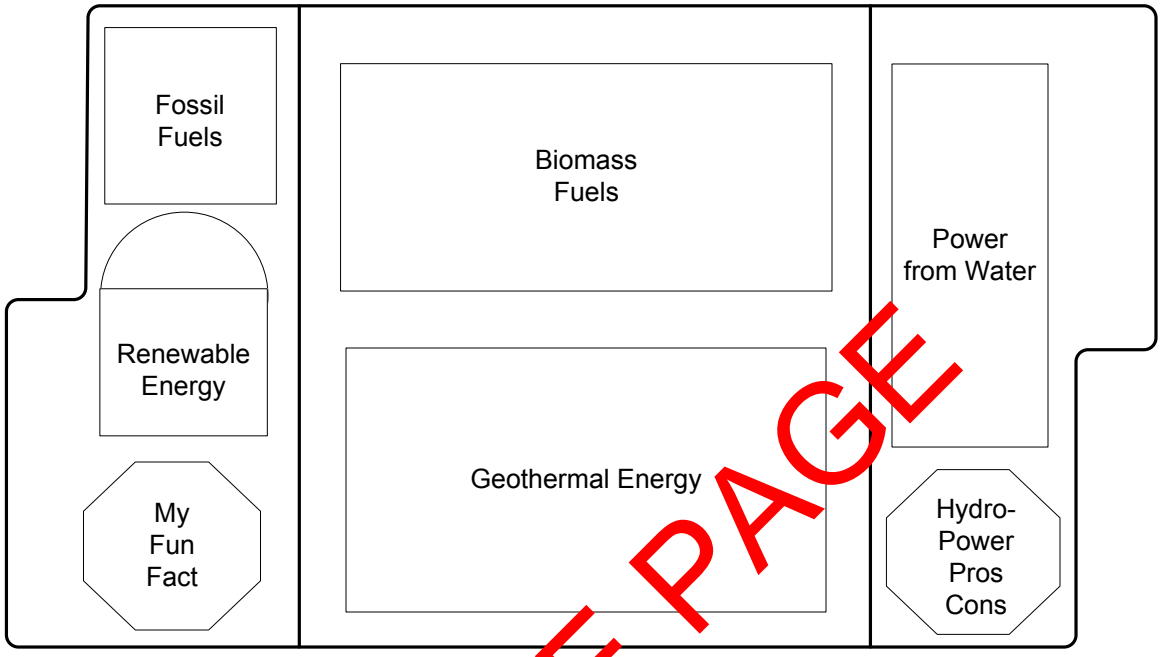


Entire Lapbook

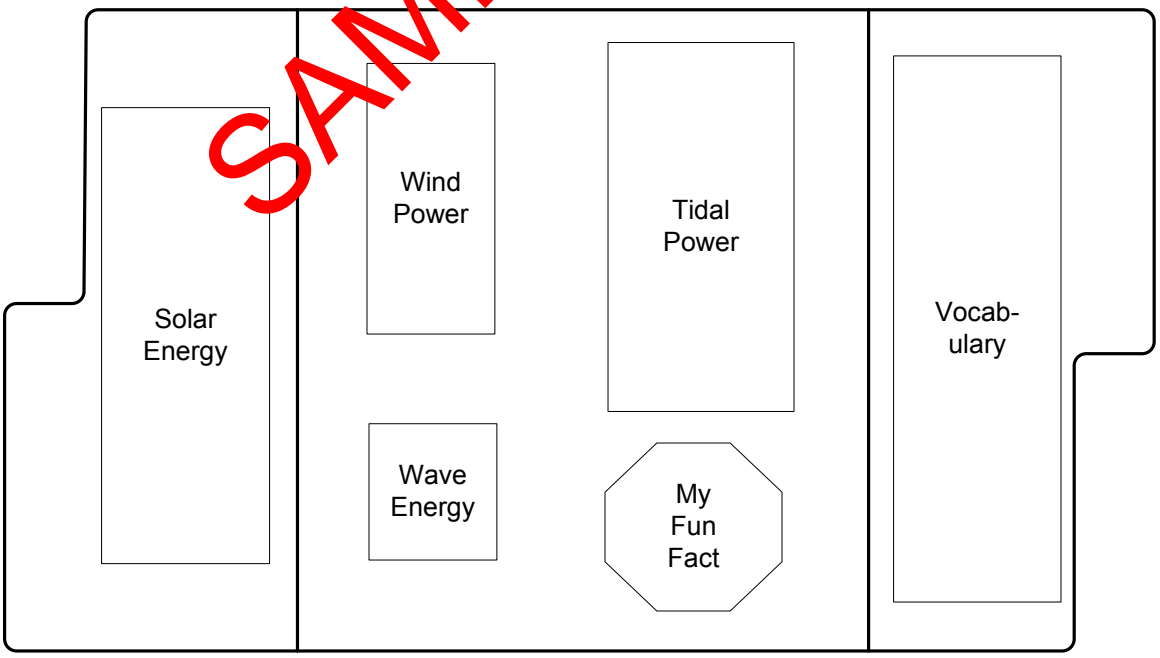


Booklet Placement Key

Folder 1



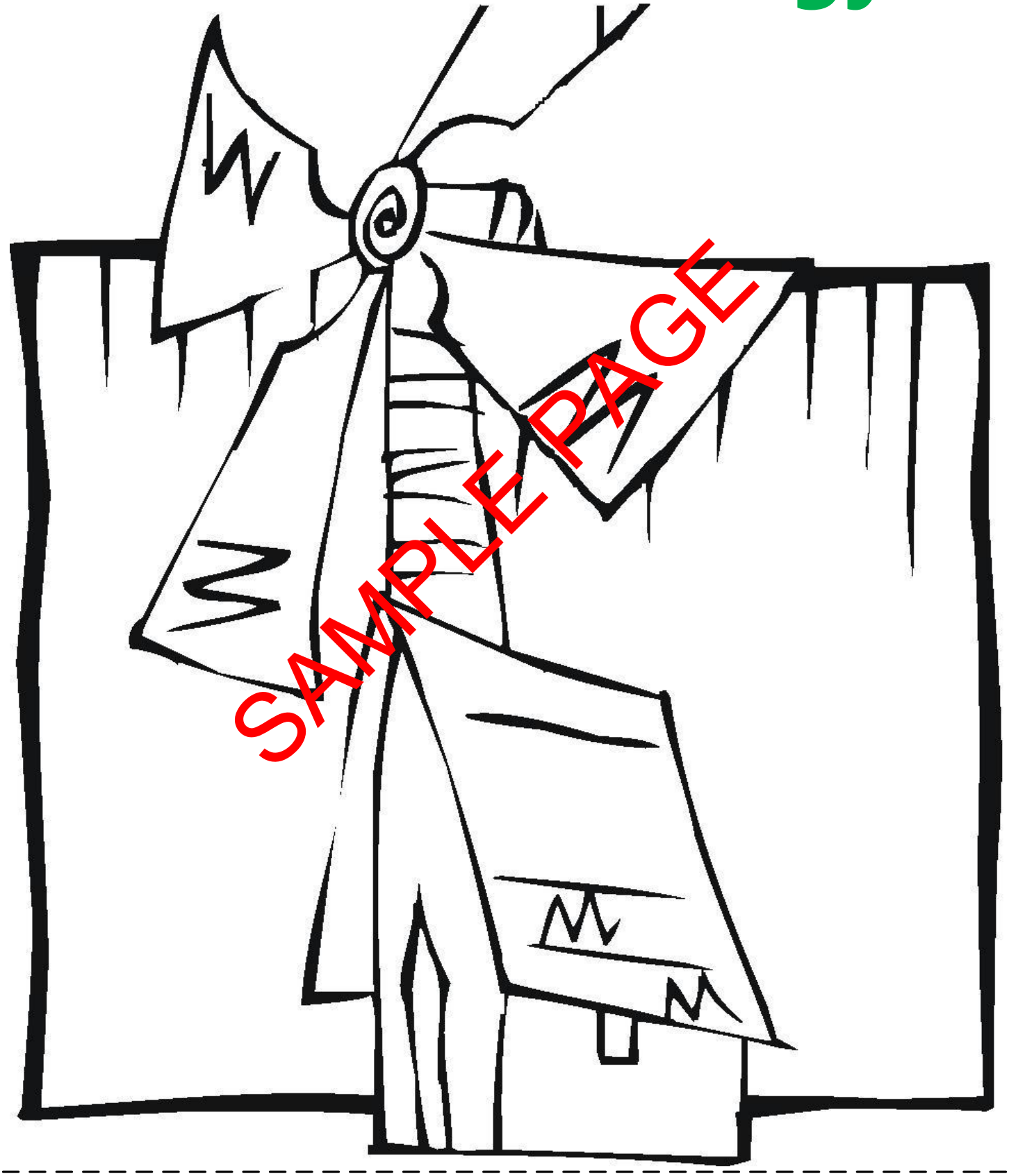
Folder 2



Contents

Color the picture. Cut on dotted line. Glue to the front of your folder.

Renewable Energy



Solar Energy

Capturing the power of the sun to convert into electricity is one of the newest forms of renewable energy. In an indirect sense, all of the energy on earth (except geothermal energy) comes from the sun. Wind, weather, the water cycle, and the ocean currents are all caused by the sun, as well as the plant and animal waste used in biomass energy. Although all energy comes from the sun, when we talk about solar power we are meaning the energy that we capture directly from the sun.

When most people think of solar energy, they think of solar panels, and this is the way we transfer the sun's energy into electricity. Solar panels are made of solar cells, or photovoltaic cells. These PV cells were originally designed for use on satellites, but today are used in many ways.

PV panels are becoming more common as an alternative way to power homes. The panels are built onto roofs, and connected to a system of batteries and the home's electrical circuit. Most of the time, the home is still connected to the power grid through power lines. This way, when the weather is cloudy, the home still has power. If the panels capture more energy the home can use, it goes through the power lines to other homes and the family gets paid by the electrical company.

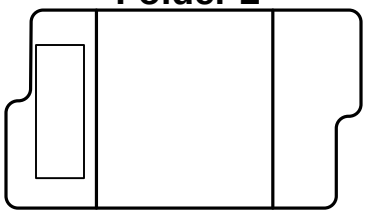
Another less common use for solar energy is in water heating. Because about a third of the electricity in the United States is used to heat water, this can make a big difference in electric use. In most systems, the water is heated by being pumped onto the roof of the home and underneath black panels. The panels absorb the sun's heat and transfer it into the water, which is then pumped back into the home and used. The biggest downside to this method is that it only works during warmer months. During winter, the pipes must be drained to prevent them from freezing.

Some homes are designed to take full advantage of the sun's low rays in the winter. The sun shines in through large banks of southern windows and warms the homes. Some designs are efficient enough to nearly eliminate the need for heaters, except for in the coldest weather.

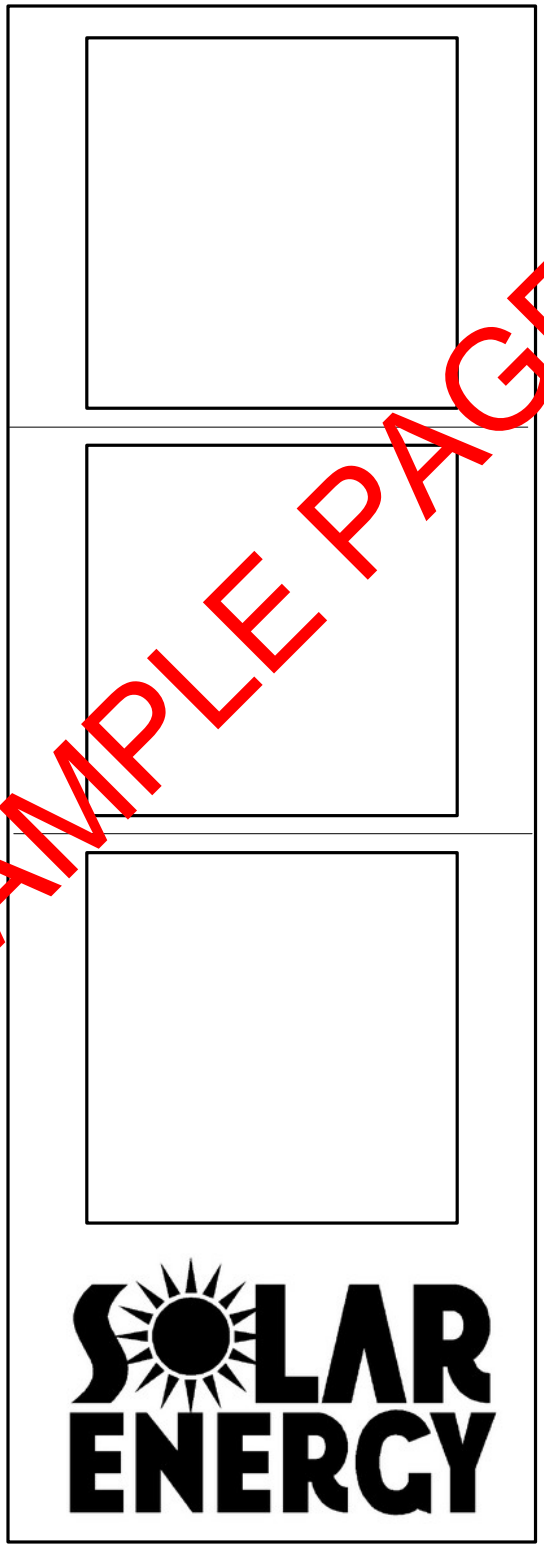
Solar heat can also be used to cook food, and is becoming more popular in developing countries as a way to save fuel costs. Solar ovens and cookers are basically boxes of some kind with reflective surfaces that capture and condense the heat of the sun until it is warm enough to boil and cook food.

Using solar panels to create electricity is a very new and technological method, and as such it is expensive and sometimes unreliable. The weather itself effects the reliability of solar power, so it is used most often and most effectively in sunny, dry climates. However, although it is a developing industry, solar power is clean and renewable. As the technology continues to be developed prices will keep dropping, making solar power an excellent option for renewable energy.

Folder 2



Read Solar Energy.
Cut out large piece and the three small booklets from the next page. Hamburger fold the three booklets on the dotted lines like a matchbook. Glue them onto the large piece, one inside each square. Glue into lapbook.
Directions: Write about each type of solar energy.



Solar Panals	Heating Water	Solar Cookers
		

Wind Power

Wind power, like biomass and hydropower, has been used since ancient times. Wind power is captured today in much the same way it always has been. In Holland wind has been used to pump water for hundreds of years. It is also used to turn grinding stones to grind, or 'mill', grain into flour. In America, old windmills can be seen dotting the prairie where they were used to pump water out of wells for homes, farms, and livestock. In many areas, the old windmills are still in use today, filling water tanks for cattle. For hundreds of years, wind was also a means of transportation, pushing ships across the seas.

Today, wind power is harnessed in a very similar way, and then turned into electricity. Tall towers are built in areas with a lot of wind. These towers are not called windmills, as they are not milling anything. Instead, they are always called wind turbines. The wind spins the long, thin blades of the turbine, which are shaped like airplane wings. The turbine rotates a generator, which produces electricity in the same way all turbine generators do.

Small wind turbines can be used to power homes, and in areas with frequent wind, they can provide all the electricity the family needs. Slightly larger turbines can be used to power schools and farms.

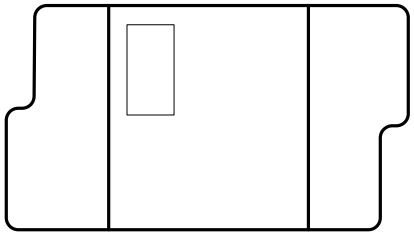
Large wind turbines are used on power plants, often called wind farms. These turbines are built by the hundreds on carefully selected ground, ideal for catching wind. The builders are looking for consistent wind activity, not the fastest wind. In fact, wind that is too powerful can harm the turbines. After the land has been selected, the turbines are built in long rows, sometimes stretching for miles.

Wind power is a clean energy, meaning no pollution is caused by the production of the electricity. It is also relatively cheap once the turbines are built. In open flat areas, the wind is nearly always blowing enough to turn the blades, so electricity is being produced day and night most of the year.

However, there are some limitations to wind power as an energy source. One of the biggest obstacles is cost. Fabricating, transporting, and building the turbines is very expensive, as well as the purchase of hundreds of acres of land. Many of the best places for wind harvesting is farmland, cutting back on the amount of food being grown. Another problem with wind energy is the transportation of the electricity from the farms, which are often in remote areas, into cities far away. Also, wind cannot be relied upon as a complete source of electricity, because even in the windiest areas it is sometimes still.

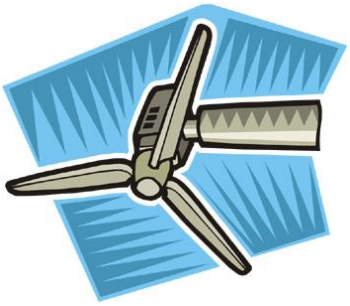
Even with these disadvantages, wind has the potential to be one of the best renewable energy sources for the world. Today, Germany produces the most wind power, and worldwide over 70,000 megawatts are produced yearly. Some scientists believe that wind could eventually provide about a third of the world's electricity.

Folder 2



Read Wind Power
Cut out each piece. Stack on top of each other with the largest piece on the bottom and the smallest on top. Attach at the top using a brass fastener. Glue into lapbook.
Directions: Write about the topics.

Wind Power



Ancient Wind Power

Wind Power Advantages

Modern Wind Turbines

Wind Power Disadvantages