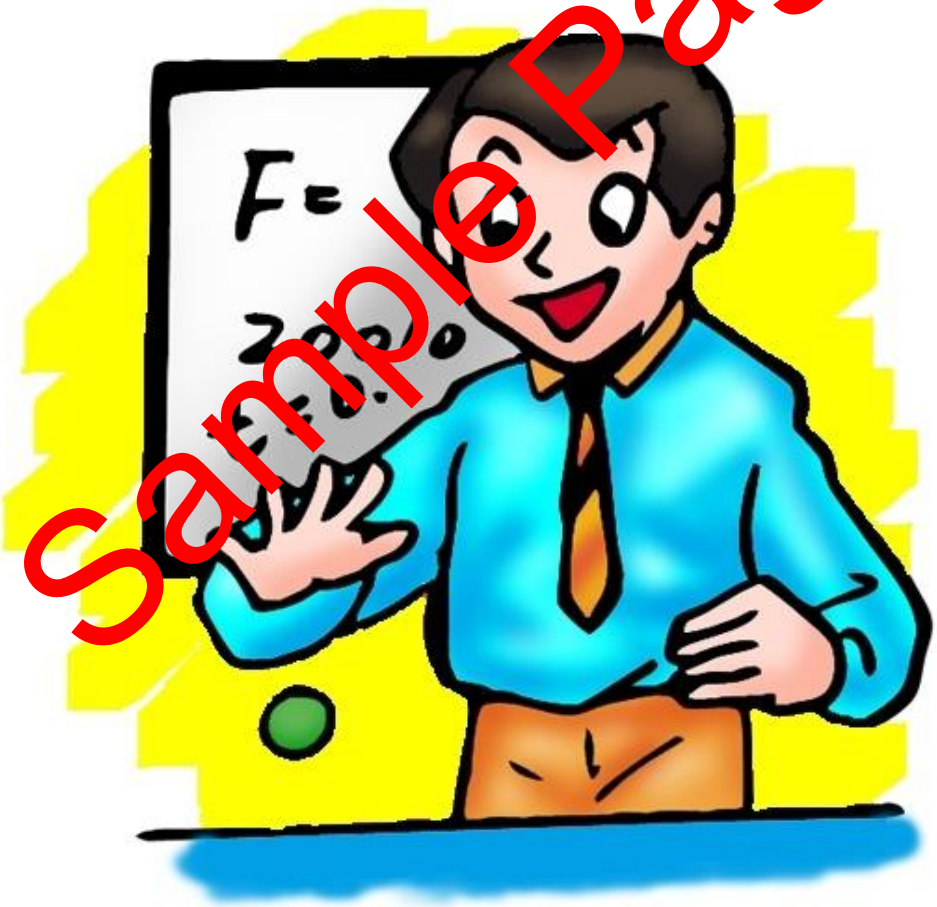
Grades 2-7

Exploring Physics

Learning Lapbook with Study Guide



A Journey Through Learning

www.ajourneythroughlearning.com

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While you are there, sign up for our email newsletter and receive a FREE lapbook!
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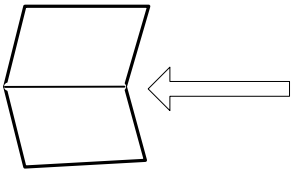
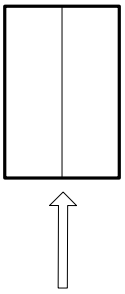
Things to Know

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

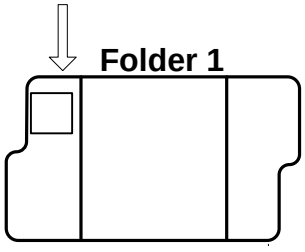
(see photos on how to fold and glue your folders together)

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!

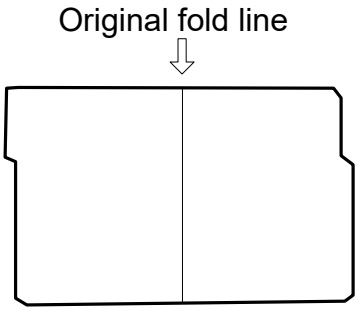
How do I know where to place each template in the folder?



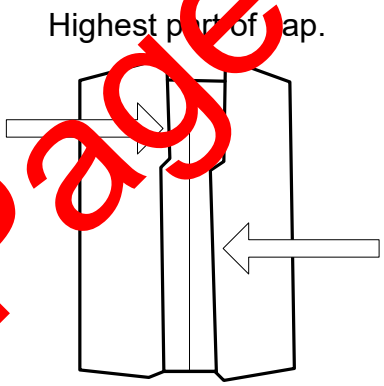
This placement key tells you the template goes in the first folder at the top of the left flap.

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.

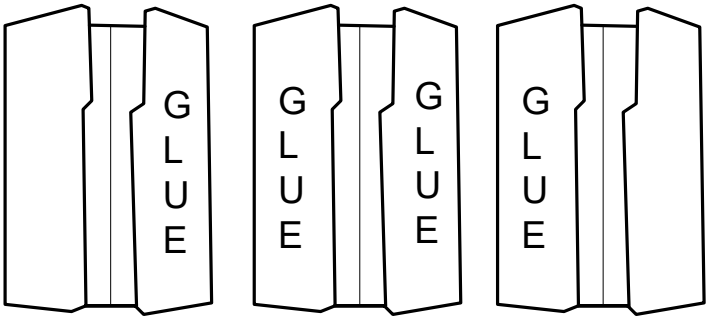
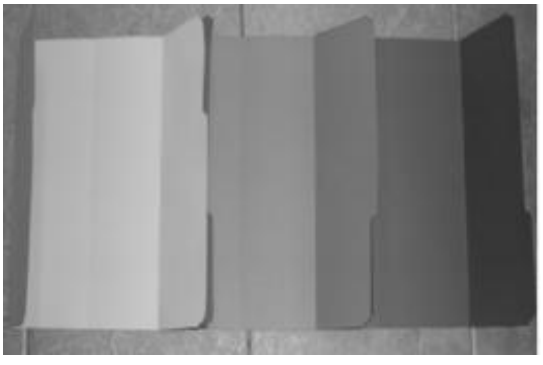


Photo of a completed lapbook base



Supplies and Storage

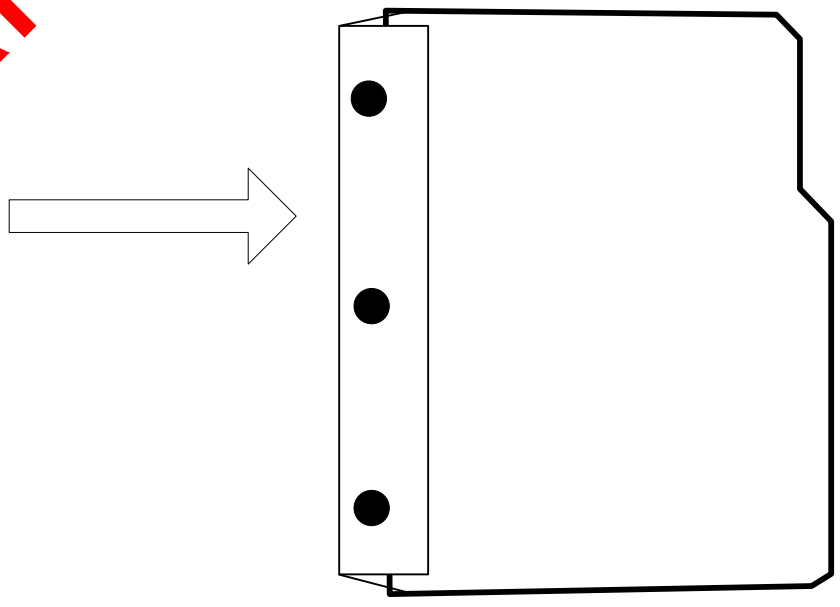
*Lapbook Pages
*3 Colored File Folders
*Scissors
*Glue
*Stapler
*Brads (not needed for every lapbook. If brads are not available, a stapler will do.)
*Hole Puncher (again, not needed for every lapbook.)

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

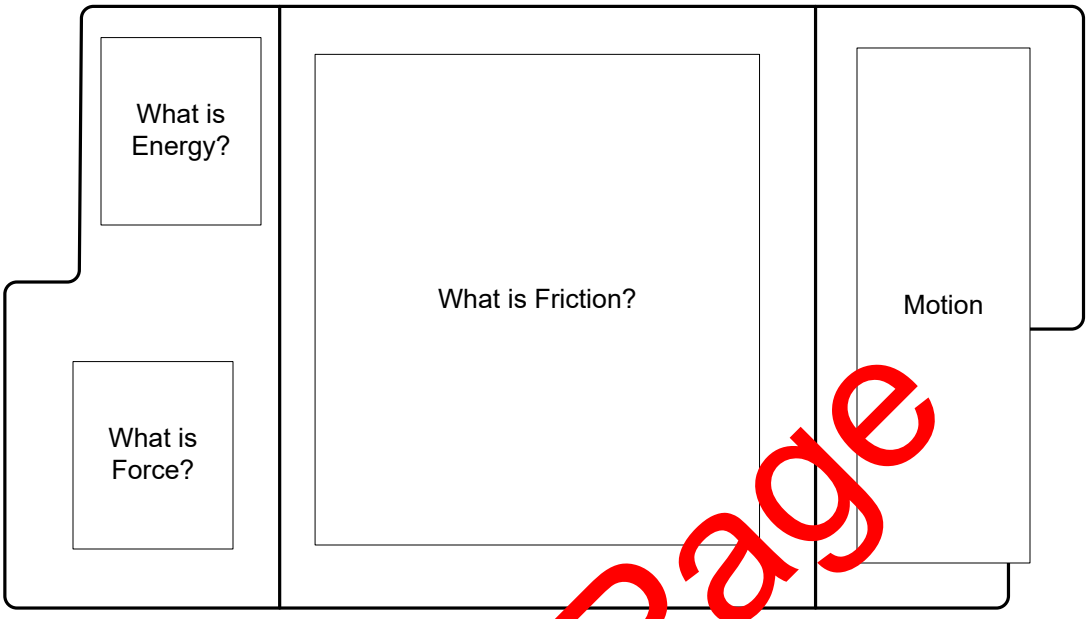
My child has made several lapbooks. Can I store all of the lapbooks together in one place?

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.



Folder 1



Folder 2

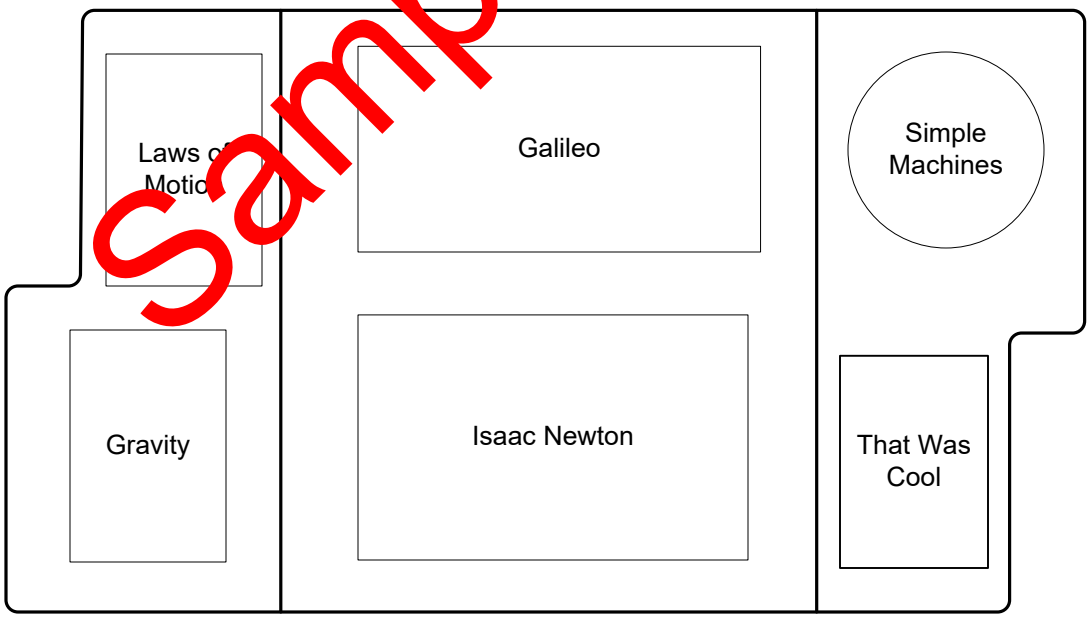
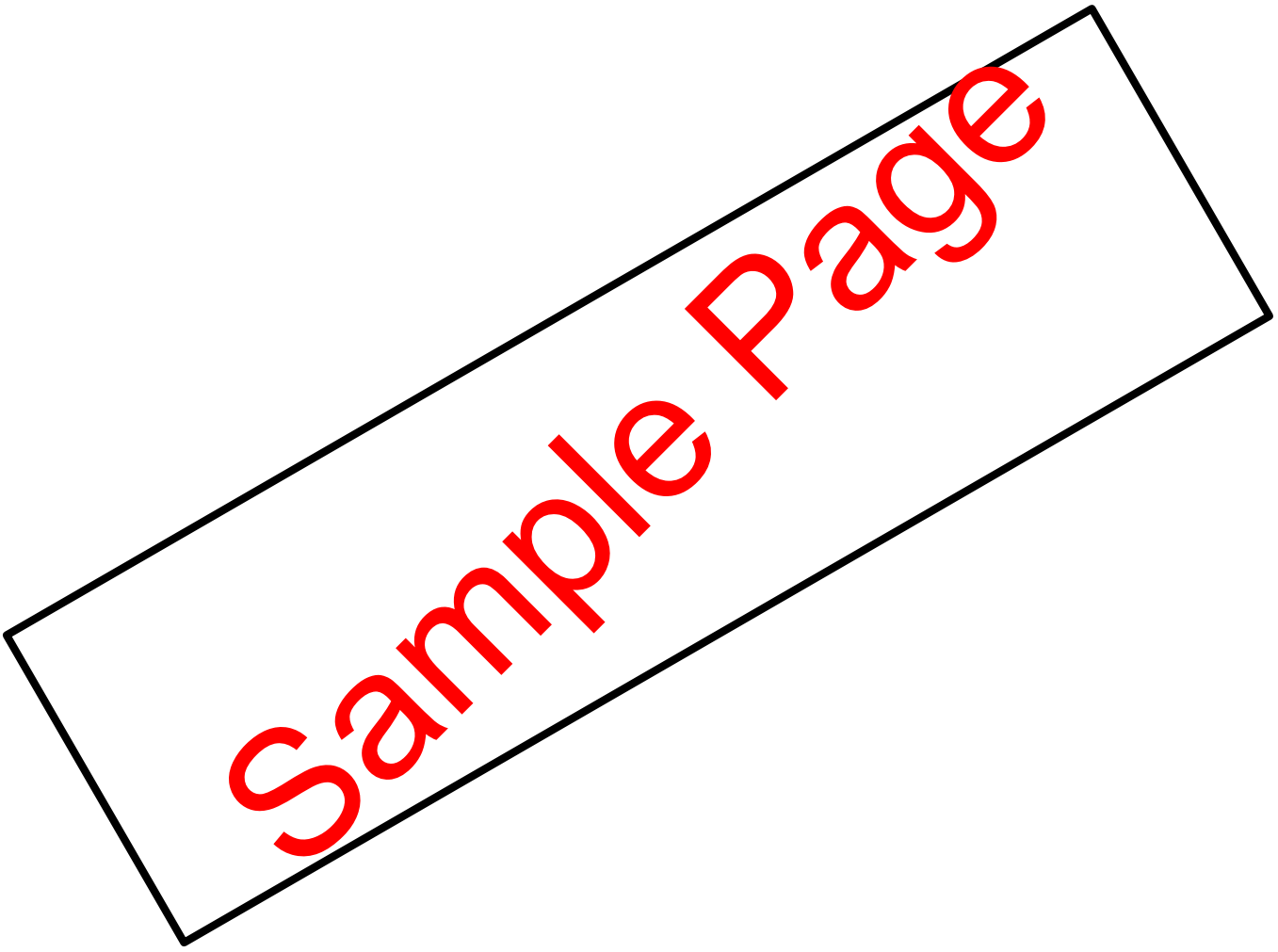


Table of Contents

Cut out around the dotted lines and glue to the front of your closed lapbook. Add a sample to the slide.

Exploring Physics



What is Energy?

Energy is what makes things work. The ability to do anything comes from energy. There are different kinds of energy, but they are all defined as the ability to make things happen. Some energy heats our homes, some fuels our vehicles, some feeds our bodies, and some runs our lights and televisions. These are all different kinds of energy, but in reality all energy is basically the same thing. It is the ability for something to happen.

There are three main kinds of energy. Kinetic energy is energy that is happening. This is energy that something has because it is moving. Potential energy is energy that isn't happening, but will. This is stored energy. Chemical energy is released as the result of a chemical reaction.

Kinetic energy is the energy of a moving object. If it isn't moving, it has no kinetic energy. The faster something moves, the more energy it has. A car racing down the highway is using kinetic energy. Wind blowing through your hair, a wave crashing on the beach and a waterfall are examples of kinetic energy.

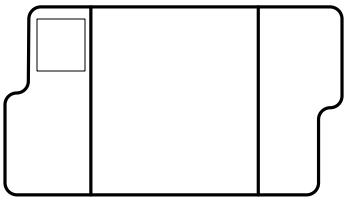
Potential energy is stored energy, just waiting to happen. When a bow string is pulled back, it is full of potential energy, the energy that will push the arrow through the air. Rubber band guns also rely on potential energy. A ball sitting on the edge of a shelf has potential energy that will be released when it falls. Most stored energy is created when an object is moved or changed in some way. The rubber band is stretched, the ball is lifted.

All objects can have potential and kinetic energy. If you pull back a rubber band, you use kinetic energy to do it. That energy is transferred to the rubber band, where it sits as potential energy. When you release the rubber band, it flies across the room, and now is kinetic energy. The wall it smacks into then absorbs the energy from the rubber band, the same energy that came from you when you stretched it back in the beginning.

Chemical energy is created by a chemical reaction. When you eat a cookie, it is converted through a chemical reaction into energy. When a plant uses photosynthesis to create green leaves, that is chemical energy. Fire is also chemical energy, called combustion.

Nearly all energy on earth is recycled. This energy is created in the sun, through a process called nuclear fusion. The only way we can make new energy at this time is through nuclear fusion here on earth, in nuclear power plants. You can see how energy is re-used by thinking about the way you get your own energy. First, a plant makes energy through photosynthesis of sunlight. This energy is stored in the plant as potential energy. When an animal (or you) eats the plant, a chemical reaction changes the plant into chemical energy. This energy is the same energy that is was in the plant, only now it is part of you. Now this energy is again potential energy, waiting on you to do something.

Folder 1



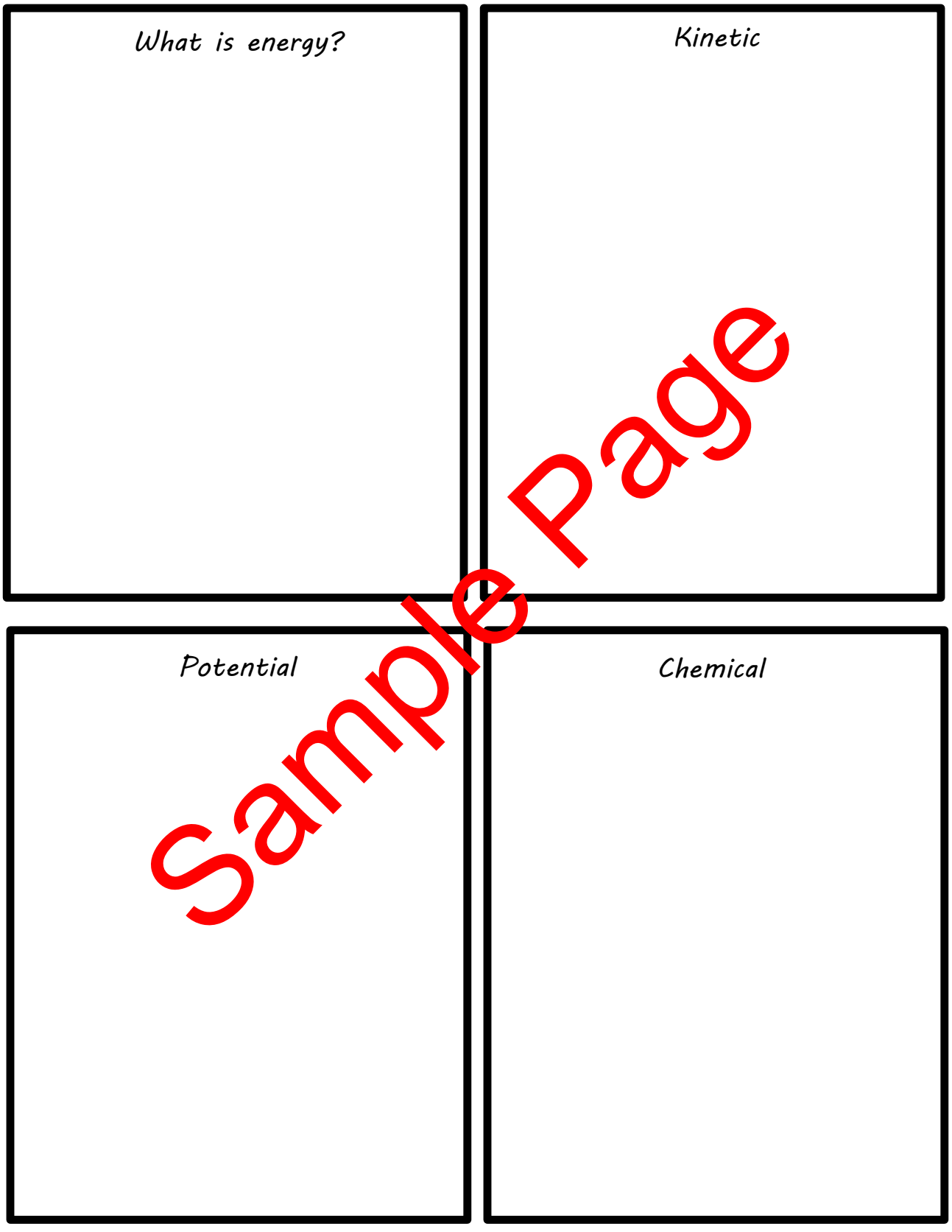
Read What is Energy?
Cut out booklet as one piece. Fold the back bottom section up in back, and then fold the flaps back and glue to make a pocket. Cut out the cards on the next page.
Directions: On each booklet, write what you have learned.

Flap

What is Energy?

Flap

Hamburger fold



What is a Force?

A force is a push or a pull on something. Everything has forces against it, all the time. Even an object sitting perfectly still has many forces acting on it. There are different kinds of forces which work in different ways. Forces working in opposite directions work against each other, and if they are balanced, nothing will move. Forces working in the same direction work together and the force is greater. Forces are measured with a special measurement called a “Newton”. This is named after Sir Isaac Newton, a scientist who discovered many important things about forces and energy. Newtons are measured by a device called a force meter.

Imagine a piece of paper sitting on your table. That paper has several forces working on it, even as it sits unmoving. The paper isn't moving because the forces on it are balanced against each other. The force of gravity is pulling the paper toward the table. The force of the table is pushing back up on the paper. The force of friction between the table and the paper is there, too. These forces are all balanced so the paper sits there. This is called inertia, this state of not moving.

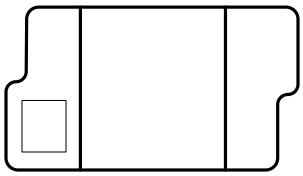
If you blow on that paper, or pick it up, or turn on a fan, a new, unbalanced force happens and the paper will move. Because a paper has a very light mass, it doesn't take a large imbalance to move it. A puff of wind will do. An object with a large mass, such as a car, takes a much greater force to move.

A similar state to inertia is called momentum. When something is moving, it continues moving in the same direction and at the same speed until another force changes it. This is momentum. Momentum and inertia both mean that the object's motion doesn't change until a new force happens. Momentum is harder to see because in our world, there are always forces working against a moving object. For example, gravity pulls things towards the ground and friction slows things down until they stop.

When there is a force on an object, the push or pull tries to move that object. A small force moves the object slowly, while a large force moves the object quickly. A large object requires a larger force to get moving. This speeding-up is called acceleration. It may seem like a large force causes something to move farther, but it actually causes a large (faster) acceleration.

One interesting force is the force of turning things. When something is stopped in one place and moving in another, it turns. A wheel, a door, and a swing are all examples of this. The fixed point is called a fulcrum or pivot. The object moves because it is being pushed or pulled. Because it is held in one place, it cannot move in a straight line and instead turns around the fulcrum. One effect of this is called centrifugal force. Because a turning object is held in place by its fulcrum, it stays in place. Anything on that turning object is also moved by the force, but if it is not attached, it will be pushed away. You can feel this force pushing you outward when you ride on a merry-go-round.

Folder 1



Read What is a Force?
Cut out the large booklet. Cut out each smaller booklet. Stack them on top of the larger booklet with the cover label on top. Staple in place. Glue into lapbook.
Directions: On each booklet, write what you have learned.

Acceleration

What is Force?

Cover label

Inertia

What is force?

Fulcrum

Momentum