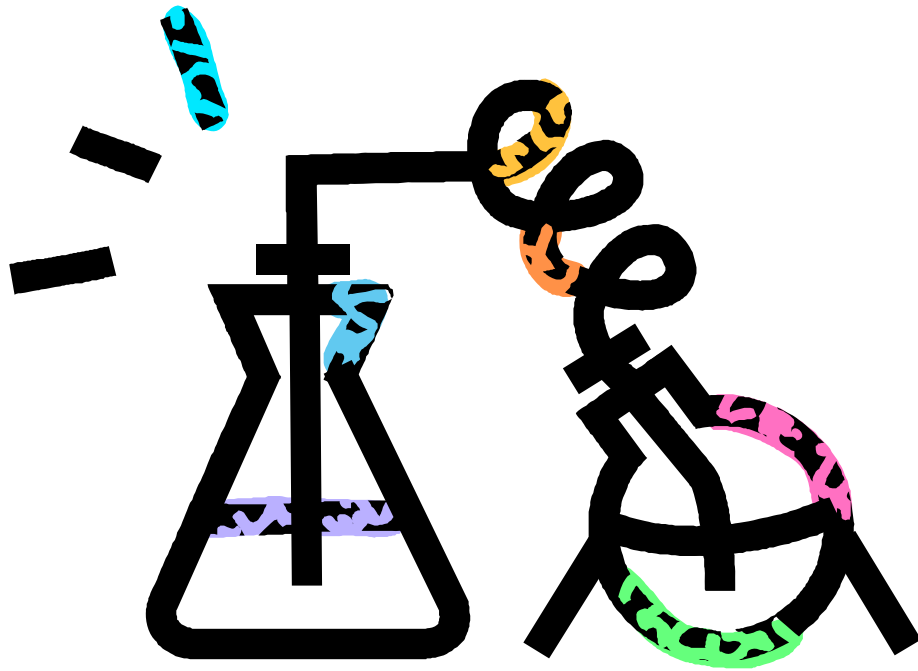
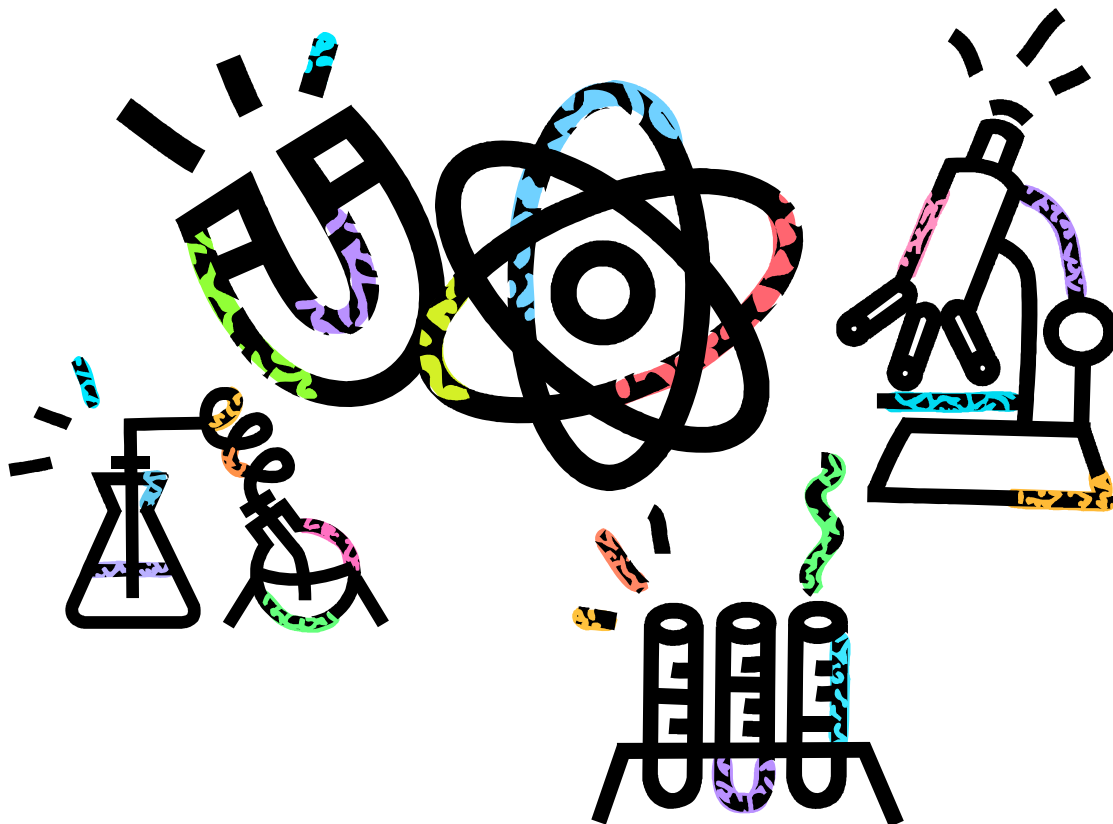


4-H Wacky, Wonderful, and Sometimes Edible Science



Grab and Go Project Bag

4-H Wacky, Wonderful, and Sometimes Edible Science



Grab and Go project developed by:

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Source for Edible Science: Kathy Booher, 4-H Youth Development, Ottawa County and Jill Stechsulte, 4-H Youth Development, Fulton County.

Evaluation



Missouri 4-H Youth Development

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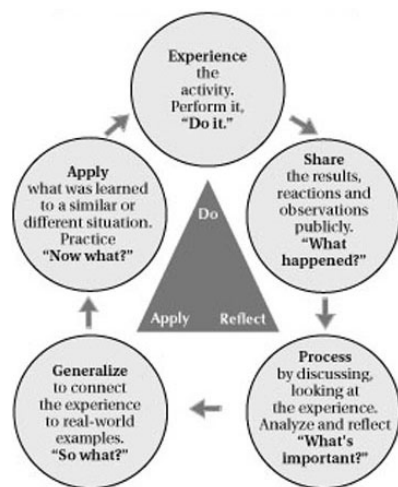
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How to use the Grab and Go Project Bag

This backpack is designed to give you the chance to explore a topic. It can be checked out and used at your own pace and time. This backpack can be geared for families, schools, 4-H community clubs and individuals. Day camps have been created using these materials. There are lesson plans and equipment to help make the learning more hands on, interactive and fun.

Please make sure to look at the variety of lessons that are in the pack and see how you can make learning interesting and fun! Included are 4-H Project book curriculum that compliment this grab and go project.

There should be a set of debriefing questions included with each lesson that use the experiential model that 4-H uses to promote positive youth development. Refer to the Learning Experiential Model processing card included in the bag.



Mad Science

4-H Wacky, Wonderful, and Sometimes Edible Science

Items included in the Grab and Go Project Bag

Curriculum:

- National 4-H Curriculum
 - Science Discovery 1
 - Science Discovery 2
- Learning Experiential Model processing card

Tools and materials:

- Plastic container
- Food coloring
- Plastic cups
- Craft sticks
- Rulers
- Zip-lock bags
- Measuring spoons
- Measuring cups
- Funnel
- Safety glasses (2 or 3 pairs)
- Plastic coated magnets
- Masking tape
- Droppers
- Gingerbread man cookie cutter

Additional Supplies:

- See each individual lesson for perishable items that may need to be secured for the activity.



Meeting Agenda

Sample

Early Activity

As youth come in let them draw a picture of what a scientist looks like. Discuss results when they are finished. Discuss any stereotypes that might exist in the drawings.

Pledges

Roll Call:

Name different types of scientists.

Business

If any voting has to happen members should raise their hand and say "mad science" to be recognized.

Program: Choose one science activity in the project book.

Recreation:

"It matters knot"

Explain the principle of matter found in Aunt Ginny's Gum Drops activity. Gather youth and ask them to stand in a tight circle. Have each youth grab hands from 2 different people in the circle creating a "knot." The challenge is to figure a way of untangling themselves with out breaking hands and ending up standing in a circle from where they first started.

Refreshments:

If you do an edible science activity then that can be used as a snack. If not, serve Kool-aid out of a beaker and place trail mix in test tubes.



Lesson 1: Soap Snow

Did you know? At least 96% of the continent of Antarctica is snow-covered. The Antarctic ice was formed from ten millions of years of snow that fell on the land, layer upon layer. The weight of new snow squeezes the old snow underneath until it turns to compressed snow called firm, and then further compacts into ice. As the ice piles up, it moves toward the coast like batter spreading in a pan. The moving ice forms into glaciers, rivers of ice that flow into the sea.

Life Skills:	Head	Learning to Learn
	Heart	Cooperation
	Hands	Contributes to Group Effort
	Health	Self-Discipline

Materials:

- 1 gallon warm water
- 3 cups of soap flakes (Ivory bowl) or make your own by grating a ivory soap bar into flakes
- 4 rolls toilet paper
- Cardboard or cookie sheet

Steps:

1. Mix soap flakes and water together in a bucket.
2. Add toilet paper a little at a time as it absorbs the soap mixture. Tear into small pieces while adding.
3. This mixture keeps at least one month.

****** Do not put this down the drain because it will cause serious clogs.***

Variations: You can color mixture by adding food coloring or colored toilet paper.

If you add about 1/4 cup wallpaper paste to this mixture, the children can make something to keep.

Make snow sculptures by adding 2 cups soap flakes to 1/2 cup hot water. Mix with an electric mixer until stiff and moldable. Mold snow into sculptures.

Debrief:

Share: What did you do?
 What surprised you?
 What was one of your favorite things while working on this project?

Process: How did others help you?
 What did the substance feel like?
 What did you learn through sharing with others?

Generalize: What did you learn about your own skill in communicating with others?
 What are some ways you like to learn?

Apply: What can you do to help yourself keep learning?
 What are some ways you can learn new things?

Sources: Global Art at www.recipegoldmine.com



Lesson 2: Meg A Mole's Bouncing Balls

Did you know? A polymer is a large molecule, often containing many thousands of small molecules joined together chemically to form one giant macromolecule. While the terms macromolecule and polymer are used synonymously, you will see the word polymer used more often.

Life Skills:

Head	Critical Thinking
Heart	Communication
Hands	Teamwork
Health	Personal Safety



Concepts:

- To become familiar with polymers.
- To create non-toxic balls from household items.
- To make observations and comparisons in a consistent, scientific manner.

Variation:

For older youth in a safe setting try this version: Measure 1 tbsp of liquid latex rubber into a marked plastic cup. Pour 1 tbsp of water into the liquid rubber and stir to mix. Using a dropper add 1 tbsp of household vinegar to the latex, while stirring. When the mixture takes on the consistency of "rubber," remove from the cup. Hold it under running water and shape into a ball. Pat the ball dry and bounce it on the table top.

Safety:

- Be in a well vented area and use safety glasses and lab aprons, if available.
- If a chemical gets into eyes, immediately flush eyes with water.
- Always avoid inhaling fumes of chemicals.

Debriefing:

Share: Describe the texture, color, smell, and other observable characteristics.

Process: Compare the different balls made by each child.

Why does it matter that you did this project?

Generalize: What key points have you learned?

How is this life skill important to you?

Apply: In what ways do you help each other learn new things?

What would you tell your leader in appreciation for how they helped you?

Lesson 3: Lava Lite

Did you know? Lava lites are lamps that were invented by an English man named Craven Walker in 1964. They are basically tall thin glass jars filled with liquid and a special kind of colored wax, set on top of a base with a light bulb. When the bulb is turned on, the lamp glows, the liquid heats up, and the wax begins to melt. Blobs of wax rise to the top of the lamp, then cool and sink back down over and over again.

Life Skills:

Head	Decision Making
Heart	Cooperation
Hands	Contributions to Group Effort
Health	Self-discipline

Materials:

- A glass jar or clear drinking glass
- Vegetable oil
- Salt
- Water
- Food Coloring



Steps:

1. Pour about 3 inches of water into the jar.
2. Pour about 1/3 cup of vegetable oil into the jar. When everything settles, is the oil on top of the water or underneath it?
3. Add one drop of food coloring to the jar. What happens? Is the drop in the oil or in the water? Does the color spread?
4. Shake salt on top of the oil while you count slowly to 5. Wow! What happens?
5. Add more salt to keep the action going for as long as you want.

Concepts:

- Oil floats on water because oil is lighter than a drop of water the same size. Density is a measurement of how much a given volume of something weighs.
- Salt is heavier than water so it sinks to the bottom carrying a blob of oil with it. As the salt dissolves, the salt releases the oil which floats back up to the top of the water.

Debriefing:

Share: What does oil float on water? What happens when salt is added?
Process: What did you learn from this project that you didn't know before?
What did you learn about cooperation?
Generalize: What key points have you learned?
Why is it important to have plenty of information before making decisions?
Apply: How can you use these skills in different situations?
What other situations like this have you experienced before?

Source: The Science Explorer, Owl Books, Henry Holt and Company, NY
www.exploratorium.edu/science

Lesson 4: Erupting Volcano

Did you know? In a real volcano, molten rock from deep within the Earth erupts through a volcano (the molten rock is called magma when it is within the Earth and is called lava when it comes out of a volcano. In this project, a mock volcano will erupt with a bubbly, fizzy liquid that is created by a simple chemical reaction.

Life Skills:

Head
Heart
Hands
Health

Learning to Learn
Communication
Teamwork
Personal Safety



Materials:

- Old pie tin or baking pan
- Lots of old newspaper
- Baking soda
- Vinegar
- Liquid dishwashing detergent
- Small pop bottle
- Modeling clay
- Funnel
- Measuring spoon and cup
- Food coloring



Steps:

1. Put the clean, empty bottle on the pie plate or paper plate.
2. Work on a pile of old newspapers-this is a very messy project!
3. Using the modeling clay, make a volcano around the bottle. Leave the area around the top of the bottle open and don't get any clay inside the bottle.
4. Decorate the volcano with twigs or things that look like small trees if you like.
5. Using the funnel, put 3-4 tablespoons of baking soda into the bottle.
6. Add a few drops of liquid dishwashing detergent and about 1/2 cup of water.
7. Put a few drops of food coloring into the funnel and about one-half of a cup of vinegar.
8. Quickly remove the funnel and watch the eruption.

Concepts:

When vinegar reacts with the baking soda, carbon dioxide gas is formed and the bubbles push the "lava" out the volcano.

Debriefing:

- Share: Why does the volcano erupt?
- Process: What did you learn from this project that you didn't know before?
What did you learn about cooperation?
- Generalize: What key points have you learned?
Why is it important to have plenty of information before making decisions?
- Apply: How can you use these skills in different situations?
What other situations like this have you experienced before?

Source: www.enchantedlearning.com

Lesson 5: Aunt Ginny's Gum Drops

Did you know? Matter is anything that has mass and takes up space. There are three kinds of matter: Liquid, solid, and gas. Lets see what kind of matter we will be observing today. All matter contains tiny particles called molecules. So why isn't all matter the same? In a gas, molecules are very far apart and they move about quickly in all directions. In a liquid, the molecules are closer together. They move about in all directions, but they do not move very far because they keep colliding. In a solid, the molecules fit together very tightly. Because of this, the molecules move together as one unit like a marching band.

Life Skills:

Head	Keeping Records
Heart	Sharing
Hands	Teamwork
Health	Self-responsibility

Materials:

- package of jello
- bowl
- cup of water
- paper plate
- dropper
- fork
- index cards
- markers



Steps:

1. Your Aunt Ginny is famous for her home made gum drops. You remember the ingredients needed but not the exact recipe or the amounts. Today you will experiment using the ingredients given to make gum drops.
2. Using the dropper, slowly add 1 to 3 drops of water to the bowl of gelatin. Count to five.
3. Slowly swirl the bowl in a circular motion.
4. Use your fork to gently remove your results from the bowl.
5. Repeat the process. Use different amounts of drops of water. Record your results.
6. Aunt Ginny heard about your recipe. Write on a recipe card the ingredients and steps to make the best gum drops.

Debriefing:

- Share: What did you observe? What happened when you started adding more drops of water? How many drops of water made the best gum drops?
- Process: What did you learn about writing a recipe?
What did you learn about matter?
- Generalize: What key points have you learned?
Why is it important to have plenty of information before making decisions?
- Apply: How can you use these skills in different situations?
What other situations like this have you experienced before?

Source: Department of Curriculum and Instruction, Science, Rockville, Maryland, August 29, 2000; Lee Ann Zimmerman, 2004, College of Education at ww.students.dsu.edu

Lesson 6: Is it in there?

Did you know? Is the mineral Iron in your diet?

Read the food guide label on Multi-Grain Cheerios.

It "says" it provides 100% of needed daily iron, but is it really in there?

Life Skills:	Head	Learning to Learn
	Heart	Cooperation
	Hands	Contributes to Group Effort
	Health	Self-Discipline

Materials:

- 2 cups of multi grain cheerios
- 2 ziplock bags
- Hammer or smashing device
- 3 cups of water
- Bowl
- Fork
- Plastic coated magnet
- Paper towels



Steps:

Let's try this experiment and see.

Take 2 cups of Multi-Grain Cheerios in a double bagged zipper bag.

1. Smash gently with a hammer until a fine powder.
Pour powdered Cheerios into a 2 quart bowl.
2. Add 3 cups water.
3. Stir with a fork until blended.
4. Stir with a plastic coated magnet for 30 seconds more or less.
5. Pull out the magnet. See iron filings on magnet.
6. Wipe on a white paper towel.
7. Use a magnet to observe the iron filings.

Debriefing:

Share: What did you observe? What happened when you stirred the cheerios with the magnet?

Process: What did you learn about the food guide label?
What did you learn about iron filings?

Generalize: What key points have you learned?
Why is it important to have plenty of information before making decisions?

Apply: How can you use these skills in different situations?
What other situations like this have you experienced before?

Lesson 7: Rainbow Creation

Did you know? You could make a rainbow you can eat?

Life Skills:	Head	Keeping Records
	Heart	Communication
	Hands	Teamwork
	Health	Self-responsibility



Materials:

5. Stove, refrigerator
6. One small box each of red, blue, and yellow gelatin dessert mix
7. Three mixing bowls
8. Measuring cup
9. Water
10. Three spoons
11. Large, sealable, plastic bag
12. Masking tape

Steps:

1. Follow directions on the boxes to make the gelatin mixes in separate bowls to the point where the gelatin is ready to chill.
2. While chilling the mixtures for 45-50 minutes, stir each a few times with a clean spoon.
3. When the gelatin is partially set, spoon each color into the plastic bag to make three separate stripes, with yellow in the middle. Smooth all the air out of the bag, then seal it. Tape over the seal.
4. Squish neighboring colors of gelatin together.
What new colors appear? _____
Where do they appear? _____
Which color of the rainbow is missing? _____ Why?
5. Squeeze the gelatin out of the bag and into a bowl.

Debriefing:

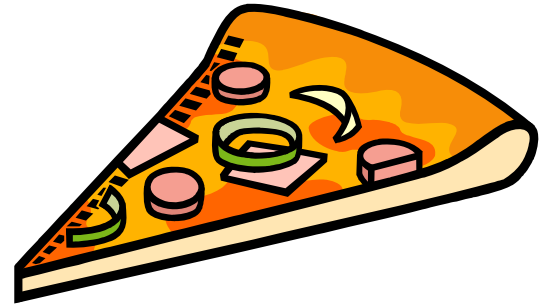
- Share: What did you observe? What happened when you mixed the colors together?
- Process: What did you learn about the gelatin?
Do the new colors taste different?
- Generalize: What key points have you learned?
Why is it important to have plenty of information before making decisions?
- Apply: How can you use these skills in different situations?
What other situations like this have you experienced before?

Source: Johmann, Carol A. & Rieth, Elizabeth J. (1996). Gobble Up Science. Creative Teaching Press, Inc.

Lesson 8: Pizza People

Did you know? That your food has a specific path to follow once it enters your body. How do nutrients get around in your body?

Life Skills:	Head	Learning to Learn
	Heart	Communication
	Hands	Teamwork
	Health	Personal Safety



Materials:

◆adult help

- Prepared pizza dough
- Pizza toppings: sauce, cheese, sausage, pepperoni, onions, etc.
- Large gingerbread man cookie cutter
- Baking pan
- Oven

Steps:

1. Preheat oven as directed for the pizza dough.
2. Use the cookie cutter to cut people shapes out of the dough (or shape them by hand). Place them on the pan.
3. Use various toppings to “draw” in the parts of the digestive system on some of the pizza people and the circulatory system on others. For example, use sausage for the stomach, pepperoni for the liver, pieces of shredded cheese for the esophagus, and sliced strips of onion for the intestines.
4. Bake as directed.
5. As you gobble up your pizza call out the body part you are eating 😊

Debriefing:

Share: What did you observe? How do the different systems in your body interact and overlap?

Process: What did you learn about your body?
What did you learn about the different organs in your body?

Generalize: What key points have you learned?
Why is it important to have plenty of information before making decisions?

Apply: How can you use these skills in different situations?
What other situations like this have you experienced before?

Source: Johmann, Carol A. & Rieth, Elizabeth J. (1996). Gobble Up Science. Creative Teaching Press, Inc.

Lesson 9: Melt in your mouth

Did you know? During digestion, both physical and chemical changes occur in food. Chewing chops food into smaller pieces. That's a physical change. Saliva contains a chemical called an enzyme that reacts with and breaks down starch in foods. This is a chemical change.

Life Skills:

Head	Keeping Records
Heart	Social Skills
Hands	Teamwork
Health	Self-responsibility



Materials:

- Miniature marshmallows
- Chocolate chips
- Nuts
- Clock with a second hand

Steps:

1. Place one miniature marshmallow on your tongue. Let it sit there. Watch the clock. Does the marshmallow "melt"? How long does it take for it to be ready to swallow? Swallow and record your findings.
2. Repeat Step 1 with the chocolate and the nuts. Record your results.
3. Do Steps 1 and 2 again, but this time move the food around with your tongue. Don't chew! Time how long it takes for the food to be ready to swallow. Record your results.
4. Repeat the process once more, but this time, chew the food. Record your results.

Debriefing:

- Share:** Which food do you think would be the easiest to digest? Which food do you think would require the most work to digest?
- Process:** What did you learn about the digestion of different foods?
- Generalize:** What key points have you learned?
Why is it important to have plenty of information before making decisions?
- Apply:** How can you use these skills in different situations?
What other situations like this have you experienced before?
Did you know that your mouth is like a chemistry laboratory?

Source: Johmann, Carol A. & Rieth, Elizabeth J. (1996). Gobble Up Science. Creative Teaching Press, Inc.

Lesson 10: Mount Sandwich

Did you know? One way mountains are made is by pushing up the earth from inside.

Life Skills:

Head	Critical Thinking
Heart	Sharing
Hands	Teamwork
Health	Self-responsibility



Materials:

- Three slices of bread
- Peanut butter or cream cheese
- Jam
- knife

Steps:

1. Spread peanut butter or cream cheese on one slice of bread. Put a second slice on top. Cover that with your favorite jam. Put a third slice on top. Don't cut your sandwich.
2. Pick the sandwich up with both hands, one on either side, with your fingers on the bottom and your thumbs on top. Make a mountain by pushing up the middle with your fingers. Now make a valley by pushing down in the middle with your thumbs.
3. To make a mountain with a fault in it, push your sandwich up in the middle as in step 2. Lay one side of the mountain down onto the bread. You have created a fault. An earthquake could happen here.
4. Cut your sandwich in half to make two rectangles. Hold the two halves so they touch. Slide one half up and one half down. Then slide the halves back and forth. Earth's crust moves along faults in both these ways. When the movement is very sudden, there is an earthquake.
5. Gobble up your mountain of a sandwich

Debriefing:

Share: What did you observe? What happened to the bread in each case?

Process: How do different movements of the earth create formations on the earth's surface?

Generalize: What key points have you learned?

Why is it important to have plenty of information before making decisions?

Apply: How can you use these skills in different situations?

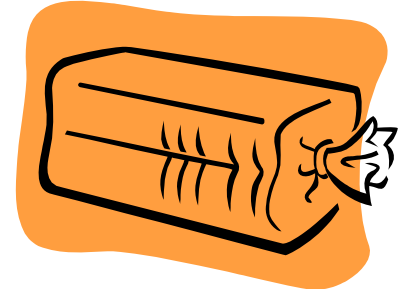
What other situations like this have you experienced before?

Source: Johmann, Carol A. & Rieth, Elizabeth J. (1996). Gobble Up Science. Creative Teaching Press, Inc.

Lesson 11: Pressed Rocks

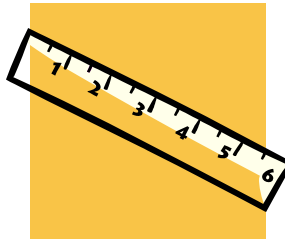
Did you know? Find a rock that has layers. It is called a sedimentary rock. Sedimentary rock is made by pressure. Heat turns it into another kind of rock, called metamorphic.

Life Skills: **Head** Critical Thinking
 Heart Communication
 Hands Teamwork
 Health Personal Safety



Materials:

- One slice of soft white or wheat bread
- One square cheese slice (from packaged sandwich slices)
- Butter
- Ruler
- Knife and cutting board
- Stove and frying pan



Steps:

1. Cut the crusts off the bread. Cut each slice into four equal pieces. Cut the cheese slice into quarters. Pile up four pieces of bread, one on top of another. Put a piece of cheese in between each piece of bread. (You'll have one piece of cheese left over.)
2. Measure the height of the sandwich and record the measurement.
Height: _____
3. With the palm of your hand, press down on the sandwich for a minute and then let go. Measure and record its height. Height after pressing: _____
4. Put a pat of butter in the frying pan and grill your cheese sandwich.

Debriefing:

Share: What did you observe? What happened when you grilled the sandwich?
Process: How did your rock change in step 4?
 What did you learn about the formation of rocks?
Generalize: What key points have you learned?
 Why is it important to have plenty of information before making decisions?
Apply: How can you use these skills in different situations?
 What other situations like this have you experienced before?

Source: Johmann, Carol A. & Rieth, Elizabeth J. (1996). Gobble Up Science. Creative Teaching Press, Inc.

Lesson 12: Feasting on Fossils

Did you know? When animals and plants die and get covered in layers of dirt, they leave marks in the rocks that are formed over time. These marks are called fossils.



Life Skills:	Head	Keeping Records
	Heart	Sharing
	Hands	Teamwork
	Health	Self-responsibility

Materials:

1. Graham crackers
2. Large, sealable plastic bag
3. Clear glass pie plate (or clear glass baking dish)
4. Large spoon
5. "fossils": animal crackers, gummy dinosaurs, raisins, nuts, small pretzels, etc.
6. Bowl of prepared pudding
7. Whipped topping
8. Refrigerator



Steps:

1. Put the graham crackers in the bag. Crush them by pounding with your fist.
2. On the bottom of the pi plate, put a layer of cracker crumbs. Sprinkle a few fossils around. Spoon on a layer of pudding and add a few more fossils. Then spread a layer of whipped topping and add more fossils.
3. Repeat, adding at least one more layer of cracker crumbs, pudding, and topping. Don't forget to add a few more fossils between each layer. Refrigerate for one or more hours.
4. Search for fossils as you gobble up the pudding. How many can you find?

Debriefing:

Share: Look at your layers from the side. How many layers did you make?

Process: What did you learn about how fossils are formed?

Generalize: What key points have you learned?

Why is it important to have plenty of information before making decisions?

Apply: How can you use these skills in different situations?

What other situations like this have you experienced before?

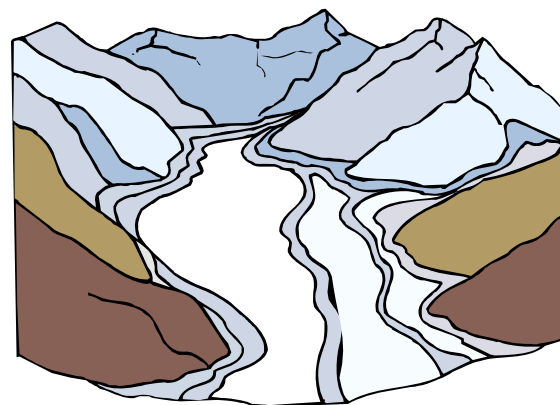
Source: Johmann, Carol A. & Rieth, Elizabeth J. (1996). Gobble Up Science. Creative Teaching Press, Inc.

Lesson 13: Edible Glacier

Did you know? The blueberry flavored gelatin is the icy blue center of the glacier. The Oreo Cookie and Cool Whip mix is the silty snow on top. Glaciers are made up of fallen snow that, over many years, compresses into large, thickened ice masses. Glaciers form when snow remains in one location long enough to transform into ice. What makes glaciers unique is their ability to move. Due to sheer mass, glaciers flow like very slow rivers.

Life Skills:

Head	Critical Thinking
Heart	Communication
Hands	Teamwork
Health	Personal Safety



Materials:

- 6 oz. package of blueberry flavored gelatin
- 1 box of Oreo Cookie Crumbs
- 1 carton of Cool Whip
- 9" x 13" pan

Steps:

1. Make the blueberry flavored gelatin following package directions.
2. Pour into the 9" x 13" pan.
3. Put in refrigerator until solid.
4. Mix $\frac{1}{2}$ of the box of Oreo Cookie Crumbs with the Cool Whip and spread over the set gelatin.
5. Cut the "glacier" and look at the layers.

Debriefing:

Share: What did you observe?
Process: What did you learn about the formation of glaciers?
Generalize: What key points have you learned?
Why is it important to have plenty of information before making decisions?
Apply: How can you use these skills in different situations?
What other situations like this have you experienced before?

4-H Wacky, Wonderful and Sometimes Edible Science Evaluation

Please rank the following:

		<u>Great</u>	<u>Ok</u>	<u>Never Again</u>	
Usefulness of the bag:	5	4	3	2	1
Ease of lessons:	5	4	3	2	1
Kids Reactions:	5	4	3	2	1
Variety of Lessons:	5	4	3	2	1

Please tell us how the kids reacted to the lessons and some things they learned:

Please give us your thoughts on the Project Kits:

To what extent did you learn more about (name of subject)? Was it:

_____ To a great extent

_____ To a moderate extent

_____ To a slight extent

_____ Not at all

Thank you for using these kits. Please let us know your thoughts of other kits that could be created.