LESSON 1
GRADE LEVEL: K/1

ACITIVITY TITLE: Buoyancy

ACTIVITY OBJECTIVES: The student will make predictions and follow the scientific method for problem solving. Students will determine which kinds of items will sink and which ones will float (remain buoyant) in water.

SUNSHINE STATE STANDARDS: SC.H.1.1, SC.A.1.1

MATERIALS AND SOURCES: Plastic shoe box/ large bowl or container, water, items made of different materials (examples include: plastic spoon, straw, pennies, marbles, food lids, legos, buttons, pencil, etc.)

ACTIVITY STEPS:

1. Before making copies of the lab sheet, fill in the items that will be placed in the water in the data table.
2. Fill any large plastic container with water.
3. Go over the information in the box at the top of the page. Be sure that students understand that something that is buoyant will float in water.
4. Hold up each item and have students predict whether it will sink of float when placed in water.
5. Have students come up one at a time and place the item on the top of the water.
6. Record on the data table whether it sank or floated.
7. Guide students to list the items that sank and floated in the results section. If you have access to a blackboard, have students tell you the results and write them on the board for students to copy.
8. Guide students in coloring in the table

EXTENSION:

Brainstorm other items and have students tell whether they will sink or float based on what they are made of. Be sure students understand at the end of the activity that items like wood and plastic will float and items such as glass and metal will sink.

WRAP UP:

Encourage students to try this at home. Fill a container with water and find 10 items around the house. Have family members predict which ones will sink and which will float. Try it out to test your guesses.

NAME_____ **Date**_____

BUOYANCY

Background Information: Some items will sink when placed in water and some will float. Items that float in water are **buoyant.** In the activity, you will place items in water to see which ones will sink and which will remain buoyant.

PROBLEM STATEMENT:

MATERIALS: Water, large plastic containers, items made of plastic, metal, wood, and other types of materials

HYPOTHESIS: What do you guess or predict will happen? Write sink or float for each item to show your guess.

PROCEDURE:

1. Fill in the chart with your guess for each item before the experiment.
2. Take each item one at a time and place it at the top of the container of water. Wait to see if it floats to the top or sinks on the bottom.
3. Record what actually happened on your chart. If you guessed correctly, write yes in the last column if you did not guess correctly, write no in the box.
4. Count up how many guesses you got correct.

Item	prediction **sink or float**	What actually happened **sink or float**	Yes or no	Item	prediction **sink or float**	What actually happened **sink or float**	Yes or no

RESULTS: Summarize what actually happened.

The items that floated were the
The items that sank were the

Count how many items floated and how many sank.
Graph your results below.

Buoyancy Graph

8			TALLY
7			SANK:
6			FLOATED:
5			
4			
3			

2		
1		
	SINK	FLOAT

Classify the items into group and graph how many **of each there were.**

METAL ITEMS:
PLASTIC ITEMS:
WOOD ITEMS:
OTHER:

ITEM GRAPH

7				
6				
5				
4				
3				
2				
1				
0				
	METAL	PLASTIC	WOOD	OTHER

LESSON 2
GRADE LEVEL: K/1
ACITIVITY TITLE: Our five senses

ACTIVITY OBJECTIVES: Student will identify their five senses and the sense organ used for each. Student will also tell about why each sense organ is important in their everyday lives

SUNSHINE STATE STANDARDS: SC.H.1.1

MATERIALS AND SOURCES: crayons, paper (optional items: mirror, glue, magazine pictures)

ACTIVITY STEPS:

1. Ask student if they have ever heard the word senses. Write the word on the board.
2. Jot down points they already know to guide you in your discussion. Let students know that our senses help us to live our lives each day from the time we wake up, to the time we go to sleep.
3. Draw the following chart on the board:

Sense	Sense Organ (do not fill these in right away, ask for students to tell you what sense organ is used)	How we use the sense (do not fill these in right away, ask for students for examples of each sense and how it is used.)
Sight	Eyes	Ask student what are some things they can see? We can see people, places, colors, shapes
Smell	Nose	Ask student what are some things they can smell? We can smell pizza, flowers, candles…
Touch	Skin	Ask student what are some things we can feel? We can cat fur, sandpaper, cold ice…
Taste	Tongue	Ask student what are some things we can taste. We can taste candy, chicken, sour things, sweet things, spicy things.
Hearing	Ears	Ask student what are some things we can see. We can see people, places, colors, shapes

4. Pass out paper and crayons. Instruct student to draw themselves. They should label each sense organ. If you have magazines, they can cut out the sense organ and glue it on their body. If you have a mirror, let students look in the mirror to help them to draw the sense organs. If not, they can look at their partner as a model.

EXTENSION:

Bring in several different items to smell. Have students close their eyes and smell each item as they try to guess what the items are. Use items with strong smells like pickle juice, coffee ground, perfume, etc. Also bring in a lemon or lemon juice so that they can taste something sour.

WRAP UP:

Tell students to go home and have their parents help them write down or draw all the things they tasted (ate) in one day.

LESSON 3
GRADE LEVEL: K/1
ACITIVITY TITLE: Sound
ACTIVITY OBJECTIVES: Students will use their sense of hearing to listen to different sounds and pitches. Students will identify the ear as the sense organ associated with sound. Students will also learn ways to protect their hearing.
SUNSHINE STATE STANDARDS: SC.H.1.1

MATERIALS AND SOURCES: 4 or more drinking glasses, water, metal fork or spoon
ACTIVITY STEPS:

1. Ask students to tell you what the senses are. Remind them that they include hearing, seeing, touch, sight, smell, and taste.
2. Tell them that in this lesson, they will use their sense of hearing to hear different sounds.
3. Line up the empty drinking glasses and tap them each twice with the handle of the spoon. All the glasses should make the same sound.
4. Next, fill the first glass ¼ full of water and compare the sound it makes with the other glasses.
5. Fill the second glass ½ full and tap the first, second, and third glass.
6. Continue by filling the next two glasses with ¾ and the last glass full of water. Have students take turns tapping the glasses and comparing the sounds.
7. See if students can brainstorm possible reasons why there are differences in sounds for each glass.
8. After students have given you their speculations, let them know that the reason for the different sounds is that there are different amounts of air in each glass.

EXTENSION: Bring in objects that make different sounds. Instruct students to close their eye and see how many they can identify them. You can also use empty film containers (Eckerd, Kmart, Wal Mart, & Target will give them to you for free if you tell them you are using them for a school) or plastic eggs and fill them with items that students can her when you shake them. Fill each container with a different item like rice, marbles, broken toothpicks, and beans. Number the container and have students shake each one and try to guess what is inside.

WRAP UP: Tell students to go outside their house for 5 minutes and write down all the things they hear. Next they should go inside and sit in one room and list all the things they can hear.

LESSON 4
GRADE LEVEL: K/1
ACITIVITY TITLE: Animal Homes
ACTIVITY OBJECTIVES: Students will learn that animals are adapted to living in different types of environments. After listing different animal homes, students will take part in making a simulated spider web.
SUNSHINE STATE STANDARDS: SC.F.1.1, SC.F.2.1, SC.G.1.1

MATERIALS AND SOURCES: ball of string or yarn, bowl, wax paper, ½ cup of liquid starch (available in the grocery store in the laundry soap aisle)

ACTIVITY STEPS:

1. All living things are adapted or equipped to live in different environments. Some prefer to live in hot environments while others prefer cold ones. Some animals are adapted to live in the water and other to live on land.
2. Animals also are adapted to living in different homes. Draw the following table on the board and have students help fill in the animal homes. The answers have been provided for you. Do not list them on the board, rather engage students in coming up with the appropriate responses.

Ant	Ant hill
Bee	Hive
Wasp	Nest
Bird	Nest
Turtle	Shell
Spider	Web
Crab	Shell
Snail	Shell
Bear	Den
Gopher	Underground
Fish	Water

3. Explain that a spider is adapted to living in a web. The spider is adapted with spinnerettes that release strands that are woven together to make the web. Some of the strands are coated with sticky substances to trap the prey so that the spider can capture it.
4. In this activity, you will be making a spider web.
5. Pour 1 cup of liquid starch into a bowl.
6. Lay out a piece of wax paper and pass out a 7 inch piece of string to 4 students. Have students take turns dipping their entire piece of string in the liquid starch.
7. Lay down the first two pieces so that they make a plus sign on the wax paper as shown in box 1.
8. The next two students should lay down their strings as shown in box 2.
9. Next, soak the rest of the ball of string in the liquid starch.
10. With a continuous piece of string, have the children connect all of the 7 inch pieces in a spiral design as shown in box 3.
11. Allow the web to dry overnight. Remove them from the wax paper once they are completely dry and tape them to a window or dark surface.

EXTENSION:

Take a walking tour around the school and look for spider webs to get a closer look.

LESSON 5
GRADE LEVEL: K/1
ACITIVITY TITLE: Food Webs

ACTIVITY OBJECTIVES: Student will learn the importance of a food chain illustrate the interdependence of plants and animals in an ecosystem.

SUNSHINE STATE STANDARDS: SC.G.1.1

MATERIALS AND SOURCES: ball of yarn or string, name tags (you can also use masking tape or computer labels) food web chart, scissors, 12 index cards

ACTIVITY STEPS:

1. Before starting the activity, make name tags using the plants and animals of the food web chart. Write only one plant or animal name on each card. Attach string to each card so that it can be worn around the necks of the participants.
2. Have students form a circle.
3. Explain that plants and animals depend on each other for survival. Many plants and animals are connected to each other in what is called a food web. Food webs deal with the feeding habits of animals in a food chain.
4. Pass out the name tags so that only one tag goes to each student.
5. Explain that the game will begin with the student wearing the hawk nametag because the hawk is the highest animal on the food chain.
6. Hand the hawk the ball of yard and tell them to hold it.
7. Ask if anyone is wearing a tag with the name of an animal that a hawk might eat to raise their hand. (squirrel, rabbit, mouse, rat, bird)
8. When a student has one of the animals listed above, connect them with the hawk by rolling out the yarn and cutting it off so that the hawk is holding one end and the child with the animal is holding the other.
9. Connect each of the above animals with the hawk. The hawk should keep holding all the strings with the "animals" holding the other ends.
10. Next choose one of the hawk's prey. Ask if anyone is wearing a tag with the name of a food that animal might eat (nuts, vegetables, fruit, grass, grains, insects).
11. Continue connecting the students until they have all been strung together in a web of life.
12. Point out that each card in the game depends on each other. Ask what would happen if there was no rain for 6 months. How would that affect the food chain? (plants would die, insects and animals would have nothing to eat, and everything above them in the food chain would have nothing to eat)
13. Point out that even the smallest piece of grass is important to all animals in the food chain.

EXTENSION:

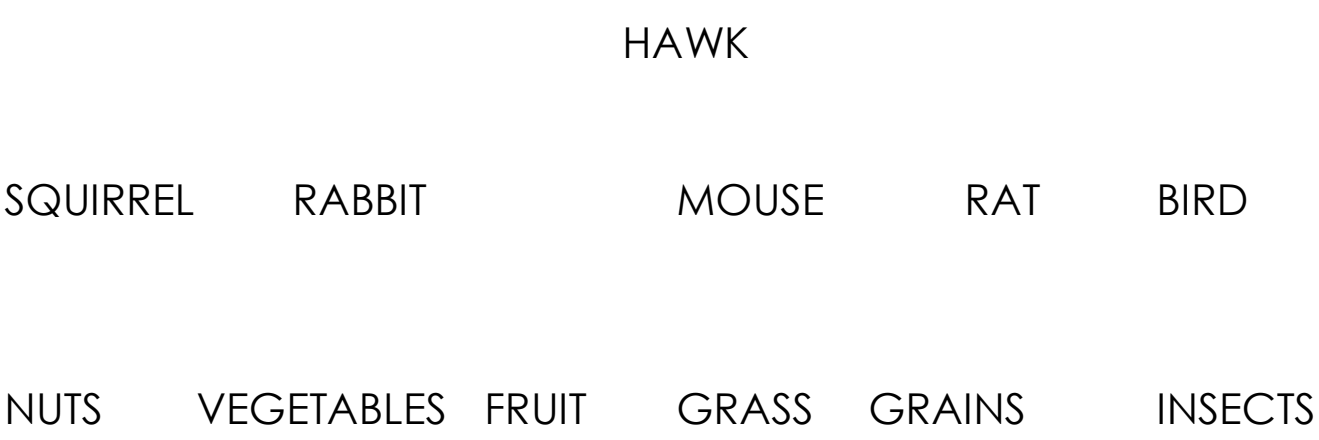
Discuss how we depend on the food chain as well. If there were no plant for the animals to eat, animals like cows would die out and we would have no milk to drink.

WRAP UP:

Ask students to go home an list or draw all the food that they eat that comes from a plant.

Lisa,
I need help with this. There should be lines connecting the various levels of the food web. Please see attached. (I will fax)

SAMPLE FOOD WEB



LESSON 6
GRADE LEVEL: K/1
ACITIVITY TITLE: Magnify It!

ACTIVITY OBJECTIVES: Students will identify that some things are too small to be seen with the eye alone. They will use a hand lens as a tool to take a closer at things that are microscopic.

SUNSHINE STATE STANDARDS: SC.A.2.1, SC.H.1.1

MATERIALS AND SOURCES: hand lenses, items with small print like the newspaper, a penny, candy wrappers

ACTIVITY STEPS:

1. Ask students what sense organ is used to see. (the eye)
2. Tell them that although the eye is used to see, some things are too small to be seen with the eye alone.
3. We use a microscope or a hand lens (magnifying glass) to see things that are microscopic (cannot be seen with the eye alone). These items magnify items (make them bigger) and easier to see.
4. Demonstrate the proper way to use a hands lens. Hold the hand lens in one hand and close one eye. Put the hand lens in front of the open eye and hold the item you wish to see in the other. Bring up the item you wish to see to the hand lens. Move the hand lens back and forth until you can see the item well.
5. Pass out hand lenses and small print items to each student. Give them a change to practice looking at each item. Students can also take a closer look at their hands with the hand lens.

EXTENSION: Bring in items with small particles like sugar, sand, salt, or coffee grounds. Have students take a pinch and put it in their hands to take a closer look.

WRAP UP: Have students bring in leaves from home and use the hand lenses to take a closer look at the leaves.

LESSON 7
GRADE LEVEL: K/1
ACITIVITY TITLE: Mold Me Again And Again

ACTIVITY OBJECTIVES: Mold Me Again and Again: Students will identify attributes and physical changes in matter.

SUNSHINE STATE STANDARDS: SC.A.1.1

MATERIALS AND SOURCES: Playdough or modeling Clay ball for each child

ACTIVITY STEPS:

1. Explain that everything is made up of matter. A pencil is matter, paper is matter, water is matter, air is also matter. There are 3 states of matter. They are solid, liquid, and gas. Some examples are; ice is a solid, water is a liquid, and air is a gas.
2. Matter can change states. Ice is a solid, but when it melts, it changes from a solid to a liquid.
3. Explain that physical properties of matter describe how the matter looks or feels. Some examples include the size, color, or shape. No matter how you change the physical properties, the matter stays the same.
4. Examples: If you have a red balloon and blow it up, the shape has changed, but it is still a red balloon.
   If you take a ball of clay and flatten it, it is still clay, you have only changed the shape.
   If you take a loaf of bread and slice it, it is still bread.
5. Pass out a piece of clay to each student. Have them describe its attributes (color, size, shape, texture)
6. Direct students to roll their clay in a ball. Ask them if it is still clay.
7. Direct students to flatten it. Discuss that the clay has changed physical characteristics, but it is still clay. Continue by making a snake and other shapes.
8. Be sure the students understand that just because the appearance changes, the matter remains the same. .

EXTENSION: Give each student a piece of paper. Have them fold it, ball it up, and rip it. Ask them if the matter has changed in any way but physically (it has not unless you burn it and it turns to ash).

WRAP UP: Have students find something at home to change physically. Ask them to come in and share their findings with groups.

LESSON 8
GRADE LEVEL: K/1
ACITIVITY TITLE: Parts of a tree

ACTIVITY OBJECTIVES: Students will identify the functions of a root, stem, leaf, and trunk. Students will also take a walking tour of their school and find a tree, pointing out the roots (if visible), stem, leaves, and trunk.

SUNSHINE STATE STANDARDS: SC.F.1.1

MATERIALS AND SOURCES: None

ACTIVITY STEPS:

1. Go over the information on the handout. Draw a tree on the board starting from the ground up.
2. First draw the roots. Explain that the roots hold the plant in the ground. They also send minerals and water throughout the plant.
3. Draw the trunk. Explain that the trunk holds up the tree. Draw the trunk coming off the roots.
4. Next draw stems on the trunk. Explain that the stems hold up the leaves and carry nutrients to the leaves.
5. Finally, draw leaves on the stems. Explain that the leaves use water, minerals, and light from the sun to make food for the plant.
6. Take a walk with students around the school. Have students point out trees. On each tree, choose students to identify the roots (you may not see them if they are underground), stems, leaves, and trunk.

EXTENSION: Pass out paper and have students draw a tree. Write the words roots, stems, leaves, and trunk. Instruct students to label each of the parts on their drawings. Discuss why trees are important and what we get from trees (oxygen, paper, wood, food).

WRAP UP: Ask students to count how many trees they can count from their home to school.

LESSON 9
GRADE LEVEL:
ACITIVITY TITLE: Seed Sort

ACTIVITY OBJECTIVES: Students will identify that plants come from seeds. They will also follow the scientific method to sort beans by physical characteristics.

SUNSHINE STATE STANDARDS: SC.F.1.1, SC.H.1.1

MATERIALS AND SOURCES: one bag of mixed beans, small Dixie cups, glue

ACTIVITY STEPS:

1. Go over the information on the top of the activity sheet. Be sure students understand that all plants start from tiny seeds.
2. Pass out a small cup of beans to each pair of students.
3. Explain that physical characteristics are ways to describe how something looks. Have students look into their cups and ask them how they might describe the beans in the cup. Acceptable responses include size, shape, or color.
4. Tell students to pour out their beans and put them in piles with ones that look the same.
5. After the beans are sorted, have student glue one type of bean in each box. Then instruct them to count how many were left and record that number under the glued bean.

EXTENSION:

Soak lima beans over night. Give each student a lima bean, a Dixie cup, and some soil. Instruct students to fill their cup with soil, poke a hole and drop in the seed. Cover over the seed with soil and lightly water. Send the cups home and tell students to keep them moist and put them in a place where they will get some sun (inside a window)

WRAP UP:

Students who have colored cereal like fruit loops can take a small cup and sort by color.

Name_____

Date_____

Seed Sort

Seeds come in different sizes and shapes, most are surrounded by fruit. Different types of fruit have different types of seeds. Most plants grow from seeds. Seeds are planted in the ground and as long as the seed has water and sunlight, it will grow into a new plant.

Problem Statement: How many of each kind of seed or bean are in the cup?

Materials: Cups with seeds or beans

Data Table: Glue one of each kind of seeds in the boxes in the first column. Pour out the seeds and sort them into piles of seeds that look the same. Count how many there are of each and write the number next to the glued seed.

Glue your seed here:	How many were there?

Count how many seed you have in all. Write how many you have in the box below.

Draw pictures of your favorite fruits. Draw the seeds inside them.

LESSON 10
GRADE LEVEL: K/1
ACITIVITY TITLE: The Atoms Family

ACTIVITY OBJECTIVES: Students will identify that the placement of atoms is solids, liquids, and gases by playing solid, liquid, and gas "atoms game".

SUNSHINE STATE STANDARDS: SC.A.1.1, SC.A.2.1

MATERIALS AND SOURCES: chalkboard or chart paper

ACTIVITY STEPS:

1. Explain that everything is made up of matter. Matter is made of molecules that are so small, they cannot be seen. The molecules are always moving whether they are a solid, liquid, or gas. Atoms are the basic component of molecules. Atoms combine together to form molecules.
2. Draw 3 boxes on the chalkboard or chart paper. Label one solid, one liquid, and one gas.
3. In the box labeled gas, draw a few dots scattered throughout the box. In the box labeled liquid draw several dots scattered evenly throughout the box. In the box labeled solid, draw many dots close together.
4. Explain that the dots are atoms. The dots (atoms) in solids are packed very close together. That is why cannot move. That is also why a solid generally does not change its shape.
5. In liquids, the dots (atoms) are spread out more. That is why you can move you fingers through a liquid.
6. In a gas, there are very few dots (atoms). This why a gas has no definite shape.
7. Explain to students that they are going to play a game and pretend they are atoms. Atoms just like children are always moving. Everything is made up of atoms, but atoms in solids, liquids, and gases move differently.
8. SOLIDS: Tell students that the atoms in a solid are very close together. Have a group of students act like atoms in a solid. They should huddle together in a very close area and try to move.
9. LIQUID: Explain that the atoms in a liquid are more spread out. Have students hold hands in groups of three as they move around a small area of the room. The room must be small enough that they will touch, but still move freely. Compare how they moved as the liquid to the solid.
10. GAS: Explain that a gas has no definite shape. Direct students to move freely throughout the room. As they move, they may explore all areas of the room, but they cannot touch each other. Molecules in a gas do not touch.
11. Discuss the difference from each round of the game.

EXTENSION: Draw a picture of a pencil, a cup of water, and a balloon. Have students copy them on their paper.

WRAP UP:

:

LESSON 11
GRADE LEVEL: 2/3
ACITIVITY TITLE: Water Testing: Hard and Soft Water

ACTIVITY OBJECTIVES: Students will follow the scientific method to compare properties of hard and soft water.

THE STUDENT WILL: Students will predict which type of water, hard or soft will produce better suds for cleaning. Students will also follow a recipe to create hard and soft water.

SUNSHINE STATE STANDARDS: SC.A.1.1, SC.H.1.1

MATERIALS AND SOURCES:
Prior to the activity, you will need to get 2 baby food jars with lids, 2 tablespoons of laundry soap, 2 tablespoons of Borax (laundry soap), 2 tablespoons of Epson Salt, water, and two plastic spoons

ACTIVITY STEPS:

1. Read the information out loud and have students follow along. Have them predict whether hard water or soft water will produce the most suds and be better for cleaning.
2. Remind student that it does not matter whether their guess is correct or not, in science, we learn from our predictions.
3. Have students make their predictions.
4. This will be a leader demonstration. Following the directions in the procedure to make Hard Water and Soft Water. Invite students to help add the ingredients and shake.

EXTENSION:
Discuss how people filter their water to get the minerals out. Ask how many students have water that comes out of the refrigerator or if they use a special pitcher (Brita) that filters the water.

WRAP UP:
Have students go home and come back telling the group if they use any type of water filtration system.

Name_____ Date_____

Water Testing

Background Information: Pure water is usually not found anywhere on Earth. As rain water soaks into the soil is picks up minerals. Water that is full of minerals is called **hard water. Soft water** has very little calcium and magnesium in it. Water that is **distilled** is water that has been softened and has very few minerals in it.

Problem Statement: Which type of water will produce the most bubbles; hard water or softened water?

Hypothesis:

Materials: distilled water, epson salt, borax, two baby for jars with lids for each group, graduated cylinders, syringe, jar 1 & jar 2 labels

Procedure:

1. Using the graduated cylinder to measure 100 ml of water and pour it into the first jar. When the first jar.
2. Measure 100 ml of water in the second jar.
3. Add 1 teaspoon of Espson Salt to Jar #1- Distilled water.
4. Add a pinch of Borax to jar #2- Soft water.
5. Add 1/2 teaspoon of soap powder to jar #1- Hard water.
6. Add 1/2 teaspoon of soap powder to jar #2- Soft water.
7. Take both jars and shake for 30 seconds.
8. Observe which jar has more bubbles.

Draw a picture of each jar with the bubbles. Show which one had more bubbles.

JAR #1 Hard Water	**Jar#2 Soft Water**

Results: Which water had the most bubbles?

Conclusion: Was you hypothesis supported? Explain why or why not.

Think of your favorite water activity. Tell about why it is your favorite activity.

Draw a picture of yourself taking part in your favorite water activity.

LESSON 12
GRADE LEVEL: 2/3
ACITIVITY TITLE: Air Pressure

ACTIVITY OBJECTIVES: Students will follow the scientific method the demonstrate the forces of air pressure.

SUNSHINE STATE STANDARDS: SC.H.1.1, SC.D.1.2

MATERIALS AND SOURCES: plastic bottle from bottled water, funnel, modeling clay, water, sharpened pencil or stick

ACTIVITY STEPS:

1. Tell students that air is all around us and just because we don't see it, it is always there. Air pushes down on the earth. We can't feel the pressure because there is equal air pressure inside of our bodies pushing out.
2. Have students help you to follow the steps in setting up the experiment. Place the funnel in the bottle and press the clay around the funnel to attach the funnel securely to the bottle. Be sure there are no gaps or holes.
3. Have student predict whether the water will go through the hole of the funnel and into the jar when it is poured in.
4. Slowly pour the water in the funnel. A few drops might go into the bottle, but most will stay in the top of the funnel.
5. Students will think this is magic. Here is what happened. The bottle is filled with air. By attaching the funnel, it makes an air tight seal trapping the air in the bottle. There is no room for the water to come in.
6. Puncture a hole in the clay until the water races into the bottle. Explain that the water comes in because the air was released from the jar making room for the water to come in.

EXTENSION:
Fill a container with water. Take a cup and ball up a piece of paper towel turn the cup upside down in the water (straight down) Take out the cup and students will see the paper towel is still dry. This is because the air in the cup would not let the water in. Next do the same thing, but tilt the jar when you are putting it in the water. The paper towel will get wet because the air escaped from the jar letting the water in.

WRAP UP:
Tell students to try the extension activity at home

NAME_____ **DATE**_____

AIR PRESSURE:

PROBLEM STATEMENT: Will water pass through a funnel if there is an air tight seal between the funnel and the glass jar?

HYPOTHESIS:

MATERIALS: funnel, glass jar, water, modeling clay, sharpened pencil

PROCEDURE:

1. Put modeling clay around the top of the jar so that the funnel is held in place in the middle.
2. Smooth down the modeling clay. Make sure that there are no holes for the air to escape through.
3. Pour the water slowly into the funnel.
4. Using a pencil, make a hole through the modeling clay.

RESULTS: (Tell what happened when you poured the water into the funnel. Why did it happen? Tell what happened when the air tight seal was broken with the pencil.)

CONCLUSION: (Was your hypothesis correct? Why or why not?)

Draw an illustration of the experiment.

LESSON 13
GRADE LEVEL: 2/3
ACITIVITY TITLE: Food Webs
ACTIVITY OBJECTIVES: Students will identify how a food chain works and that animals depend on each other for survival.
SUNSHINE STATE STANDARDS: SC.G.1.1

MATERIALS AND SOURCES: 10 sandwich bags or envelopes, bits of paper in two colors.

ACTIVITY STEPS:

1. Explain to students that we get energy from the food we eat. All living things we eat get energy from the sun. The sun gives energy to plants. When insects eat the plants, they get the energy the plants got from the sun. When larger animals eat smaller ones, they get the energy from what they eat.
2. Humans get energy indirectly from the sun when we eat plants or animals that got their energy from the sun. For example, grass gets energy from the sun. A cow eats the grass and gives the cow energy. We eat hamburger (cow) and get the energy from the grass the cow ate. It is like an energy chain.
3. Explain that in a food chain, animals survive by eating others. Plants are on the bottom of the food chain. We need a lot of plants to feed all the many things that eat them like insects or other plant eaters.
4. Choose half of the group to be grasshoppers, two or three to be hawk, and the rest to be mice. Spread out the colored paper bits on the ground, that will be the grass. Give each grasshopper a bag to be their stomach. When you tell them to, they will "eat" by picking up all the bits of paper and putting them into their "stomach" (bag). Hawks and mice watch.
5. Next, the mice will "eat" the grasshoppers. On your command, mice will "eat" the grasshoppers for 10-15 seconds. Go over rules for "eating". For a mouse to each a grasshopper, the mouse uses ONE FINGER to tap the grasshopper on the shoulder. When they are tapped, the mouse says "Thank you" and the grasshopper freezes and hands over their stomach bag.
6. Next the hawk can eat whoever is left in the same manner. Give them only 15 seconds to eat.
7. When the game is over, explain that if they got eaten, they died. Those who did not get eaten are losers as well. Explain that one of the colors in their bag is grass, the other color is pesticides. Pesticides are poisons to keep pests from eating our plants. The grasshopper who are still alive will see that they have pesticides in their bag. They will die. The mice who ate grasshoppers also ate the pesticides so they die too. The hawks ate the mice and grasshoppers. They will not die, but their eggs will be so brittle that their babies will die. In the end, everyone loses.

EXTENSION: Discuss the pros and cons of using pesticides. On the positive, they keep pests of our food. On the negative side, they kill and hurt animals all the way up the food chain.

WRAP UP: Have students talk with their parents about the importance of washing fruits and vegetables before eating them to get off any chemicals.

NAME _____ DATE _____

FOOD WEBS

A Food Web, is a set of interconnected food chains by which energy and materials circulate within an ecosystem. One type of food web is a grazing web. In a grazing web, materials pass from plants to plant eaters (**herbivores**) to flesh eaters (**carnivores**).

Food Chain

Grass ----------> grasshopper ---------- > mouse ---------- > hawk

In the food chain game, what animal ate the grass? _____

What ate the grasshopper? _____

What ate the mouse? _____

What animal was the highest on the food chain? _____

What animal was the lowest? _____

What is a herbivore? _____

What is a carnivore? _____

Tell why the hawks were unable to have healthy babies.

What animal were you in the game? Tell what happened to you.

What is meant by the saying, "In this game, nobody wins,"

Tell the advantages and disadvantages of pesticides.

LESSON 14
GRADE LEVEL: 2/3
ACITIVITY TITLE: Magnetic Attraction

ACTIVITY OBJECTIVES: Students will identify items that are magnetic and that not all metals are magnetic.

SUNSHINE STATE STANDARDS: SC.H.1.1, SC.C.2.2

MATERIALS AND SOURCES: magnets, items that are magnetic and items that are not (some examples include pennies, pencils, paper clips, brass fasteners, plastic straw, tacks, popsicle sticks, etc.)

ACTIVITY STEPS:

1. Go over the information in the box at the top of the page. Before copying, the activity sheet, fill in the names of the items that students will be testing. Place each item to be tested in a bag. If possible, have several bags and place students in groups to share the items.
2. Hold up each item and have student predict which ones will be attracted to a magnet.
3. Pass out magnets and let students take turns testing each item. Record whether they were magnetic or not.
4. Go over the findings as a group.

EXTENSION:
At the end of the activity, be sure that students know that not all metals are magnetic. A perfect example is a penny that is made of copper. Be sure students understand in order to be magnetic, items must be made of iron, steel, cobalt, or nickel. Tell students to never touch a computer or VCR. Both a computer and a VCR record data magnetically. Touching them with a magnetic would ruin material stored on the computer or on a video tape.

WRAP UP: If students have magnets at home, have them test items around the house and report back which ones were attracted to a magnet.

NAME_____ DATE_____

WHAT IS A MAGNET

BACKGROUND INFORMATION: A **MAGNET** is an object that **attracts** (brings near) metals such as iron and steel. The ends of a magnet are called **POLES**. A magnet has a **north pole** and a **south pole.** The poles are equal in strength. The north pole of one magnet attracts the south pole of another magnet. The south pole of a magnet attracts the north pole of another magnet. This is because opposite poles attract. The north pole of a magnet will **repel,** or push away, the north pole of another magnet. The south pole of a magnet will repel, or push away, the south pole of another magnet. This is because like poles repel.

PROBLEM STATEMENT: What kind of objects will be attracted to a magnet?

MATERIALS: magnet, 10 items that are examples of metals and non-metals

HYPOTHESIS: Predict which items will be magnetic.

PROCEDURE: 1. Test each of the items on your table. If it is attracted to the magnet, place a check in the magnetic section of the chart. If it is not attracted, place a check on the non-magnetic section of the chart. Also write what the objects are made of.

Name of item	The item is made of...	Magnetic	Non-magnetic

RESULTS: Write a sentence telling which items were magnetic and which were not.

The items that were magnetic were the
The items that were not magnetic were the

LESSON 15
GRADE LEVEL: 2/3
ACITIVITY TITLE: Sorting and Classifying

ACTIVITY OBJECTIVES: Students will identify ways to sort and classify items using attributes and physical characteristics.

SUNSHINE STATE STANDARDS: SC.G.2.2

MATERIALS AND SOURCES: bucket of buttons

ACTIVITY STEPS:

1. Tell students that they are going to play a game. Tell them that you are going to "sort" them into groups by how they are the same or similar. The point to students one at a time and point each student to one group or the other. Direct all boys on one side and girls on the other. Ask students how they were sorted. Next, have students line up again and choose another way to sort the students like shoes with laces and no laces, long hair and short hair, shorts and no shorts, jewelry and no jewelry, glasses and no glasses, etc. Keep sorting and having students guess how they were sorted.
2. Tell students that scientists sort things into groups so that they can be experts at what they study. A botanist studies plants, a zoologist studies animals, a dentist knows about teeth, and a nutritionist studies food. You would not want a dentist to check your eyes, because they are not an expert in that field.
3. Next, pass out a baggie of buttons to each group of 4 students. Have students share ways to sort them with the group. List all ways on the board and have students list on their paper all they ways. Some include two holes vs. four holes, solid vs. striped, small vs. large, rimmed vs. smooth.
4. For each category, have students sort them into groups. For example, students would divide their buttons into two piles, one with two holes and the other with four holes. Count up how many in each group and record the data (each group will have different numbers). The mix them all up and sort another way. Keep going until all data is recorded.
5. Finally, instruct students to fill in the ways sorted on the graph and color in the bar graph for their data. Model an example before beginning.

EXTENSION: Have students discuss other things that they can sort in their everyday life.
WRAP UP: Have students go home and sort the clothing in their closet and bring their data to the group.

NAME _____ DATE _____

Classification Systems

Scientist use **classification systems** to make it easier to study branches of science. By dividing objects into groups, scientists become experts in their fields. An **attribute** is characteristic used to group things.

ITEM BEING SORTED: BUTTONS

Name the different ways you can sort the buttons into two groups (Attributes).

Two holes	Four holes

Write the name of the items you are sorting. Sort the item by an attribute into two groups. Then count how many in each group and record the data on the data table.

Item being sorted:

Attribute	# in the group	Attribute	# in the group

Fill in the graph using the data on the table:

Graph Title

30							
29							
28							
27							
26							
25							
24							
23							
22							
21							
20							
19							
18							
17							
16							
15							
14							
13							
12							
11							
10							
9							
8							
7							
6							
5							
4							
3							
2							
1							

ATTRIBUTE

LESSON 16
GRADE LEVEL: 2/3
ACITIVITY TITLE: What's The Matter?

ACTIVITY OBJECTIVES: Students will identify the properties of all three states of matter. Student will follow the scientific method to verify their predictions.

SUNSHINE STATE STANDARDS: SC.H.1.2, SC.A.1.2

MATERIALS AND SOURCES: 24 zip lock bags, any 8 small objects, (ie: penny, block, cork, crayons, buttons), water 8 paper cups.

ACTIVITY STEPS:

1. Fill 8 bags with water, blow air in 8 bags, and place a small solid object in 8 bags.
2. Give each student one square and go over the properties of matter on the attached page with the students.
3. Divide students in groups of 4 and give each students a number either 1,2,3, or 4. These are their job numbers. Call up #1 to pick up a solid, liquid, and gas bag and place them on the table for their group.
4. Call job #2 to pick up the bag with the solid object. Have them empty it the cup.
5. Ask students the following questions: Did the object change shape when it landed on the table? #2 Pick it up, can you put your finger through it? Can you see through it? If it doesn't change shape, you can't see through it, and you can't put your finger through it, what type of matter do you think it is? (SOLID)
6. Call #3 to pick up the bag with the air. Have them open the bag and pour it in the cup. Ask the questions in #5. Students should infer that it is a gas.
7. Call #4 to pick up the water bag and pour it in the cup. Ask the questions in #5. Students should infer that it is a liquid.

EXTENSION: Have students brainstorm ten items that are solids, 10 liquids, and 5 gases.

WRAP UP: Have students go home and look in their refrigerator and list 5 solids and 5 liquids that they use in their daily lives.

The entire universe is made up of matter. There are 3 states of matter. They are solid, liquid, and gas. Each state has specific properties that make them unique.

- A **SOLID** has definite shape and volume. It doesn’t change shape easily. Another solid can’t be passed through it easily. You can see a solid.
- A **LIQUID** has a definite volume, but it can change shape depending on the container it is placed in. A solid can pass through it easily.
- A **GAS** has neither a definite shape or volume. A solid passes through it easily. You usually cannot see it with your eye.

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LESSON 17
GRADE LEVEL: 2/3
ACITIVITY TITLE: Silly Putty

ACTIVITY OBJECTIVES: Students will identify the difference between a mixture, solution, and suspension.

SUNSHINE STATE STANDARDS: SC.A.1.2, SC.H.1.2

MATERIALS AND SOURCES: two baby food jars, 6 toothpicks, 6 paperclips, 6 pennies, bits of paper, water, ½ tsp salt, ½ tsp sugar, for each students: 1 tsp liquid starch, 2 tsp white glue, popsicle stick or stirrer, 3 oz. cup

ACTIVITY STEPS:

1. Pass out the attached descriptions to each student and go over the difference between a mixture, solution, and suspension.
2. Demonstrate the following having the students be your helpers in the demonstration. Break the toothpicks in thirds and put them in one jar. In the same jar, add the paperclips, pennies, and bits of paper. Place the lid on the jar and shake it up. Ask students to tell you whether you just made a mixture, solution, or suspension. They should have said the jar was a mixture because each item kept their "identities.
3. Next, place water in the other jar and add the sugar and salt. Close the jar and shake it up. Ask students what was created here. They should say a solution because the sugar and salt dissolved and became part of the water.
4. Tell students that they are about to make a suspension. A suspension is "trapped" between two states a solid and a liquid.
5. Give each student a cup and a popsicle stick or stirrer. Next go around and add 2 tsp of white glue and 1 tsp on liquid starch to each cup.
6. Instruct students to mix with their stick until the starch is absorbed and is spread evenly. When the mixture sticks to the stick, tell them to remove it from the stick with their finger. Continue to kneed it until it is no longer sticky.
7. They can store it in a plastic egg or film canister* overnight. If the putty gets hard or dried out, they can add a little bit of water..."

*If you go to the photo department of most places like Costco, Eckerd, Target, or WalMart and tell them you are a "teacher", they will give you the empty film containers for free.

EXTENSION: Ask students when the ingredients are combined to bake a cake, the baked cake is a mixture or solution

- A **MIXTURE** is a combination of two or more substances that when mixed together still keep their separate identities.
- A **SOLUTION** is the combination of two or more substances. One is a liquid and the other appears to become part of the liquid and loses it own identity.
- A **SUSPENSION** is when the substances of a mixture do not combine. It seems to be between a liquid and a solid.

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LESSON 18
GRADE LEVEL: 2/3
ACITIVITY TITLE: Super Stems!

ACTIVITY OBJECTIVES: Students will identify the function of stems as a transport system in plants. They will also compare stems in plants to veins in humans.

SUNSHINE STATE STANDARDS: SC.F.1.1, SC.H.1.1

MATERIALS AND SOURCES: a stalk of celery or a white carnation, a clear cup or jar, water 10 drops of food coloring.

ACTIVITY STEPS:

1. Ask students what they think the stem of the plant is good for. Some ideas might be to hold up the plant, to give the plant strength, or they bring water from the roots.
2. Tell students that stems have many important functions in the growth of plants. One thing a stem does is act as a support system holding the plant upright so that it can grow toward the sun. Another important function is that a stem acts as a transport system. Water and minerals are carried through the stem to the roots and leaves of the plant. Students can observe the movement of liquids through the stem in this activity.
3. Cut off the bottom of the carnation stem or the celery stalk. Pour about 3 oz. of water in the cup. Add 8-10 drops of food coloring to the water. Place the flower or celery in the cup and leave it overnight.
4. Have students predict what they will see the next day.
5. The next day, discuss why the carnation or celery turned color (the colored water was transported through the stem.

EXTENSION: Discuss that our veins carry blood through our body. Have students find a vein in their arm. Veins transport blood just like the stem transports water and nutrients to the plant.

WRAP UP: Invite students to try at home with either a celery stalk or carnation.

LESSON 19
GRADE LEVEL: 4/5
ACITIVITY TITLE: Acid Rain

ACTIVITY OBJECTIVES: Student will identify the affects of air pollution on the environment as they simulate acid rain in a jar.

SUNSHINE STATE STANDARDS: SC.D.2.2, SC.H.1.2

MATERIALS AND SOURCES: two baby food jars, chalk, 1 cup vinegar, paper towels

ACTIVITY STEPS:

1. Go over the information in the box at the top of the activity sheet. Be sure students understand types of air pollution and well as ways to reduce pollution. Emphasize things like car pooling, riding bikes, and walking whenever possible.
2. Pass divide students into two groups and pass out a small container with vinegar, chalk, and a jar to each group.
3. Remind students that they cannot smell or taste activity materials.
4. Ask student to use their observation skills during the experiment. They should observe the vinegar and the chalk and what happens to both.
5. Choose one person in each group to place the jar on the paper towel and pour vinegar to fill 1/3 of the jar. Choose another person to break the chalk in half, place in the jar and put the lid on. Everyone else should observe what happened to the chalk and vinegar. You can have smaller groups by having more jars, vinegar and chalk.
6. Go over the student observations. Explain that the vinegar ate away the chalk just like acid rain will eat away buildings over long periods of time.

EXTENSION: Hold a poster contest and give students a chance to design a poster to teach people about acid rain and how to prevent air pollution.

WRAP UP: Have student discuss ways with their parents that they can reduce air pollution by car pooling with friends or walking and riding bikes to place that are close.

NAME:_____DATE:_____

ACID RAIN AS AN AIR POLLUTANT

BACKGROUND INFORMATION: Acid rain is more acidic than normal rain and forms through a complex process of chemical reactions involving air pollution. The two most important pollutants that contribute to the formation of acid rain are oxides of nitrogen and sulfur dioxide, which react with the moisture in the atmosphere to form nitric and sulfuric acid. The sulfur and nitrogen compounds that contribute to acid rain primarily come from manmade sources, such as industries and utilities. Emissions also come from automobiles and other forms of transportation. Acid rain can harm forests and crops, damage bodies of water, and contribute to the damage of statues and buildings. There are also possible negative affects on human health. These acidic pollutants can be deposited through rain, fog, dew, snow, or sleet. Large amounts can also be deposited through dust.

In this activity, you will simulate acid rain to see how it can affect our buildings. Acids react chemically to limestone. Vinegar will be used as the acid and chalk as the limestone.

MATERIALS: chalk, vinegar, a glass jar

PROCEDURE:

1. Fill the glass 1/3 full of vinegar.
2. Add a piece of chalk to the glass.
3. Record what you see.

RESULTS: Record your observations. How might this be like acid rain on a building?

Tell how we can help stop pollution by acid rain.

Design a poster to help educate people on air pollution, and acid rain.
Tell why it is harmful and how we can stop the problem.

LESSON 20
GRADE LEVEL: 4/5
ACITIVITY TITLE: Jet Propulsion

ACTIVITY OBJECTIVES: Student will identify the role that air pressure plays in propelling aircraft through the sky.

SUNSHINE STATE STANDARDS: SC.C.2.2, SC.H.1.2

MATERIALS AND SOURCES: string, tape, straw, balloon

ACTIVITY STEPS:

1. You can choose to reproduce the activity sheet, or just go over it with the students orally, reading the passage on the top of the page..
2. Ask students to tell all the types of transportation they can think of.
3. Go over the information in the box at the top of the page.
4. Choose one student to put the string through the straw. Choose another child to blow up the balloon. Have two students hold the string across the room. Choose another child to tape the balloon to the straw. On your command, have the student let go of the balloon.
5. Use your foot to pace off how many "feet" the balloon traveled. Repeat several times to compare the data. Choose different students for the jobs.

EXTENSION: Use different sized balloons to see if more air would make the balloon travel farther.

WRAP UP: Have students write a story about what it would be like to travel by hot air balloon.

NAME:_____ DATE:_____

List all the types of transportation you can think of.

JET PROPULSION

Background information: Have you ever wondered how aircraft fly around the world at great speed? They use the power of air to push them through the sky. The engines in airliners and some special, high-speed cars produce a powerful stream or jet of air. That is why they are called jet engines. **Jet Propulsion** is the thrusting forward motion of an object. A simple example of jet propulsion is the motion of an inflated balloon when the air is suddenly released. While the opening is held closed, the air pressure within the balloon is equal in all directions; when the stem is released, the pressure inside is less at the open end. Escaping air pushes against the outside atmosphere; the difference in air pressures is what propels the balloon. Jet-propulsion devices are used primarily in high-speed, high-altitude aircraft, in missiles, and in spacecraft.

Materials: string, tape, balloons of various sizes, drinking straw

Procedure:

1. Push the string through the straw.
2. Stretch the string across the room and attach two pieces of tape to the straw.
3. Blow up the balloon.
4. Hold the neck tightly and attach the pieces of tape to the balloon.
5. Let go of the neck of the balloon.

DRAW WHAT HAPPENED IN THIS EXPERIMENT:

LESSON 21
GRADE LEVEL: 4/5
ACITIVITY TITLE: Consumer Product Testing: The Paper Towel Test

ACTIVITY OBJECTIVES: The students will learn about how advertisers try to convince the consumer to buy their product. They will follow the scientific method to find out how many weights paper towels will hold. They will also identify variables and controls.

SUNSHINE STATE STANDARDS: SC.H.3.2, SC.H.1.2

MATERIALS AND SOURCES: One or more brands of paper towels (you can use the brown school paper towels), water, small cup or measuring cup, metal washers, marbles or pennies.

ACTIVITY STEPS:

1. Explain how advertisers try to get people (consumers) to buy their products buy having catchy slogans. Go over some slogans they might have heard.
2. Yo Quierro Taco Bell, Nike Just Do It, Subway Eat Fresh
3. Tell them that scientists use scientific tests to prove which items are better.
4. In this "test", students will test paper towel brands to see which ones are the strongest.
5. Follow the directions in the procedure to test the paper towels. You can do this outside and let the water poured through the paper towel drip on the floor.
6. Complete the test for the different brands and see which ones held the most.

EXTENSION: Discuss variables and controls. Scientists use controls to be sure a test is fair.

A **control** is anything that stays the same in the experiment. In this experiment each group will use the same amount of water, and the same "weights". That makes sure the experiment is fair. If one group used more water, the results might be different.

A **variable** is anything that changes in the experiment. In this experiment, the paper towel brand is the control. The strongest one will hold the most weight.

WRAP UP: Have students think up slogans with their family that they have seen on T.V. or heard on the radio and list them. Share them with the group the next day.

NAME _____ DATE _____

Consumer Product Testing: Paper Towels

Advertisers use tricks to get consumers to buy their products. They depend on the power of persuasion to make you think their brand is the best. Sometimes they are not truthful when they claim their product is "THE BEST". One way to test products is scientifically. In this activity, you will test paper towels using the scientific method to find out which one is REALLY the strongest.

PROBLEM STATEMENT: Which brand of paper towels will be the strongest?

HYPOTHESIS:

MATERIALS: 4 brands of paper towels, ½ cup water per group, washers or other weighted item

PROCEDURE:

1. Have two students hold the ends of a paper towel holding all four corners. Hold the paper towel tightly.
2. Another student should pour ½ cup of water on the center of the paper towel.
3. Stack one washer or weighed item at a time on the center of the paper towel.
4. Record how many washers the paper towel held before breaking.
5. Repeat steps 1-4 with each brand of paper towel.

VARIABLES	CONTROLS

DATA TABLE:

	Brand name	Number of weights it held
1		
2		
3		
4		

Graph Your Results

# of WEIGHTS					
	28				
	27				
	26				
	25				
	24				
	23				
	22				
	21				
	20				
	19				
	18				
	17				
	16				
	15				
	14				
	13				
	12				
	11				
	10				
	9				
	8				
	7				
	6				
	5				
		Brand 1	Brand 2	Brand 3	Brand 4

Paper towel brands

Results: Tell which paper towel help the most weight before breaking.

LESSON 22
GRADE LEVEL: 4/5
ACITIVITY TITLE: Solar Cooking
ACTIVITY OBJECTIVES: Students will identify solar energy and as renewable energy source. Students will examine which will melt faster, ice in a solar cooker or ice not in the cooker. They will also identify which colors absorb more heat.

SUNSHINE STATE STANDARDS:

MATERIALS AND SOURCES: Ice, shoebox, aluminum foil, black paint, brushes, tape

ACTIVITY STEPS:

1. Follow the directions and build the solar cooker.
2. Place a piece of ice in the cooker and time it to see how long it takes for the ice to melt.
3. Repeat by placing the ice outside the cooker on a white piece of paper.
4. Help the children to understand that the ice melted faster in the cooker because the foil reflects the heat and the black painted box absorbs more heat than the white paper.

EXTENSION:

Follow the directions to cook some of the solar cooking recipes.

WRAP UP:

Encourage students to build a solar cooker at home and make some yummy snacks.

BUILDING A SOLAR SHOEBOX COOKER

MATERIALS: shoebox, aluminum foil, tape, plastic wrap, black paint, brushes

PROCEDURE:

1. Paint the outside of a shoebox black.
2. When the paint dries, line the inside with aluminum foil.
3. Place item to be cooked on a piece of foil.
4. Place a thermometer inside the box.
5. Cover the top with plastic wrap and tape closed.
6. Prop the cooker on another box so that it sits on an angle facing the sun.

NACHOS & CHEESE: Place a small metal pan or on a piece of foil in the bottom of the cooker and remove the skewer. Put a layer of chips in the pan and top with cheese.

HOT DOGS: Place the hot dog on the bottom of the pan and place the cooker in direct sunlight.

SMORES: On a metal pan place a graham cracker. Lay two marshmallows on top. Place a Hershey bar on top of the marshmallows. Cook until chocolate it melted. You can also use a vanilla wafer with a marshmallow and Hershey Kiss on top.

NAME_____ DATE_____

TYPES OF ENERGY & SOLAR COOKING

BACKGROUND INFORMATION: Energy is available in two forms. **Potential Energy** is the stored energy found in such resources as coal, wood, and oil. **Kinetic energy** is found is such sources as heat light, sound, and motion. When potential energy is converted to kinetic energy, such as burning fuel to power a car, unwanted chemicals are released in the air. This is one of the causes of air pollution. Many of the resources used to produce kinetic energy are fossil fuels or non-renewable resources. This means they were formed over millions of years ago and when they are used up, there will be no more. One type of energy that does not cause air pollution and is renewable is solar energy. Solar energy uses the energy uses energy from the sun. Some homes have solar panels that collect and store the sun's energy for later use.

PROBLEM STATEMENT: How long will it take for ice to melt in a solar cooker?

MATERIALS: solar cooker, ice

HYPOTHESIS: (How long do you think it will take to melt the ice?)

PROCEDURE:

1. Set some ice on the bottom of the cooker
2. Record the time you placed the ice in the cooker
3. Record the time the ice melted.
4. Repeat the experiment with the ice on a white piece of paper out of the cooker. See which one melted faster.

Ice in the cooker	
Time Started	Time melted
Ice on white paper	
Time Started	Time melted

RESULTS: Tell which one melted faster and how long each one took to melt.

LESSON 23
GRADE LEVEL: 4/5
ACITIVITY TITLE: Understanding Respiration

ACTIVITY OBJECTIVES: Students will identify the lungs as the organ used for breathing. They will also find out how much air their lungs will hold.

SUNSHINE STATE STANDARDS: SC.F.1.2, SC.H.1.1

MATERIALS AND SOURCES: one balloon per student, string and a ruler for every two students

ACTIVITY STEPS:

1. Go over the information on the top of the page. Tell students that we have different organs in our body to make the body function. The sight organ is our eyes, the nose is the organ used to smell. The tongue is the organ used to taste. The lungs are the organs used in breathing.
2. Give each student a balloon. Have them stretch it out. Tell them not to blow it up. Students should work in pairs. Number the students 1 and 2. Number 1 should take ONE deep breath and blow all their air into a balloon without taking a second breath.
3. Student number 2 should take the string and wrap it around the balloon. Then place the string on the ruler to find the circumference (distance around the circle). Student 1 should record that number on their paper.
4. Next number 2 blows the balloon and their partner measures. Continue taking turns until each student has recorded 3 trials. Next demonstrate how they should add up all three numbers and divide by 3 to find the average. You might have to help students with the division.

EXTENSION:

Have student time each other holding their breath to see how much air their lungs could hold before exhaling.

Name_____ Date _____

Respiration: Exploring Lung Capacity

Background Information: Your lungs are essential in breathing, they are the organ you use to breathe. No two individuals breathe exactly alike. When you **inhale** air, you breathe the air into your lungs. When you **exhale**, you breathe air out of your lungs. When your lungs fill with air, your chest expands. **Tidal Air Volume** is the amount of air that your lungs contain during normal breathing. **Reserve Air Volume** is the amount of air that can be forced out of the lungs after you exhale normally. Vital air volume, or **vital capacity**, is the maximum amount of air that your lungs can hold. People who smoke, have asthma, or are severely overweight might experience difficulty in breathing.

In this activity, you will learn how much air your lungs can hold.

Procedure:

1. Take the deepest breath you can. Blow out every bit of air from your lungs into the balloon.
2. Hold the balloon closed while your partner uses the centimeter tape to measure the distance around the balloon.
3. Record the circumference (distance around the balloon) below for Trial 1.
4. Give your partner a chance to do steps 1-3.
5. Repeat steps 1-3 for two more trials, taking turns with your partner.
VITAL AIR CAPACITY
Trial 1: _____
Trial 2. _____
Trial 3: _____
Total: _____ (add up all three trials)
Average: _____ (divide the total by three to get your average)

Write a sentence telling your average for all three trials.

What is one reason you might hold your breath.

LESSON 24
GRADE LEVEL: 4/5
ACITIVITY TITLE: The heart and circulation

ACTIVITY OBJECTIVES: The student will identify the heart as the organ responsible for circulation. They will also find out which activity is the most strenuous on the heart.

SUNSHINE STATE STANDARDS: SC.F.1.2, SC.H.1.1

MATERIALS AND SOURCES: none

ACTIVITY STEPS:

1. Go over the information in the box at the top of the page. Show student how to find their pulse by placing their second and third finger together and placing them on the side of their neck. They must sit very still. Some students will not be able to find their pulse. Take everyone outside (or do during recess) and have them run around the field for 3 minutes. Then have them put their fingers on their neck. Their pulse rate will be up and they will be able to find it.
2. Get water and sit still to bring the pulse rate down.
3. Have students predict which activity will be the most strenuous, making the heart work harder. Choose between sitting still, marching in place, and jumping jacks.
4. Do each activity for one minute and have students find their pulse and record it for each exercise. Explain that they will count their pulse for ten seconds and multiply their number by six since there are 60 seconds in a minute.

EXTENSION: Discuss other activities they can do to get their pulse up. Also discuss the importance of exercise in staying healthy.

WRAP UP: Have student take their parents pulse and see if their pulse rate is faster or slower.

Name_____ Date_____

The Heart and Circulation

Background Information: The heart is the most powerful muscle in the body. Pulse is a measure of a heartbeat. Each throb of the pulse represents one beat of the heart. The heart pumps blood throughout the circulatory system of veins, arteries, and capillaries. Every second, the heart pumps 70 ml of blood. The total number of throbs in one minute is called the pulse rate.

PROBLEM STATEMENT: Which of the following activities will be the most strenuous on the heart? marching in place, or jumping jacks?

HYPOTHESIS:

PROCEDURE:

1. Sit very still for three minutes, then to find your pulse. This is your resting pulse rate.
2. Record the number of beats for ten seconds and multiply that number by 6 to get the number of beats per minute.
3. Walk in place for one minutes. At the end of one minute, find your pulse again.
4. Repeat step three for jumping jacks and chair steps.
5. Record your results on the Heart Rate graph.

DATA TABLE:

	PULSE RATE FOR 10 SECONDS			PULSE RATE FOR 1 MINUTE
Sitting/resting rate		X 6	=	
walking in place		X 6	=	
jumping jacks		X 6	=	

GRAPH YOUR RESULTS:

Round each number to the nearest 20

280			
260			
240			
220			
200			
180			
160			
140			
120			
100			
80			
60			
40			
	sitting	walking in place	jumping jacks

RESULTS:

LESSON 25
GRADE LEVEL: 4/5
ACITIVITY TITLE: Grocery Nutrition

ACTIVITY OBJECTIVES: Students will use coupons and the grocery ads to plan a healthy breakfast, lunch, or dinner following the guidelines of the food guide pyramid.

SUNSHINE STATE STANDARDS:

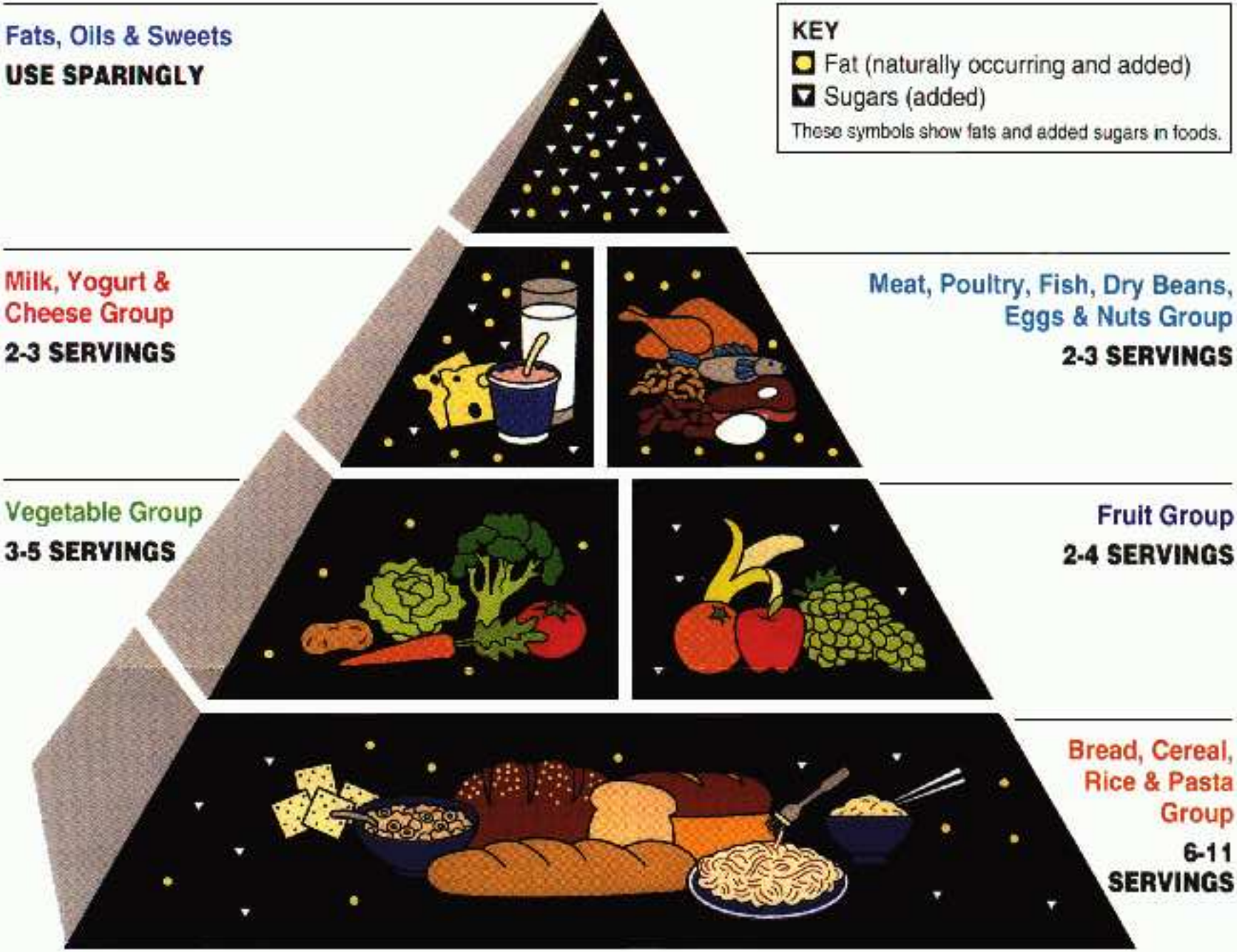
MATERIALS AND SOURCES: grocery coupons or grocery store ads, scissors, glue, paper

ACTIVITY STEPS:

1. Before the lesson, ask students to bring in grocery coupons. It would be best to ask students on a Friday and let them know that the coupons can be found in the Sunday newspaper. Students who do not get the paper at home can share with their peers. You can also go to any Publix and obtain enough sale ads for each child in the group. They are usually at the front of the store.
2. Pass out copies of the food guide pyramid on the next page or copy it on the board.
3. Go over how many servings per day that each person should have in order to stay healthy.
4. Give each student glue, scissors, and paper. Instruct them to cut out foods that fit in each level of the food guide pyramid. Have them draw the pyramid and cut out and glue the foods that fit in each section.

EXTENSION: Use the coupons or food section to plan a healthy breakfast, lunch, and dinner.

WRAP UP: Encourage students to plan healthy meals with the help of their parents. Have students share what they brought for lunch and see who had the healthiest lunch.


Fats, Oils & Sweets
USE SPARINGLY
KEY
Fat (naturally occurring and added)
Sugars (added)
These symbols show fats and added sugars in foods.
Milk, Yogurt & Cheese Group
2-3 SERVINGS
Meat, Poultry, Fish, Dry Beans, Eggs & Nuts Group
2-3 SERVINGS
Vegetable Group
3-5 SERVINGS
Fruit Group
2-4 SERVINGS
Bread, Cereal, Rice & Pasta Group
6-11 SERVINGS

LESSON 26
GRADE LEVEL: 4/5
ACITIVITY TITLE: Leaves and Their Function

ACTIVITY OBJECTIVES: Students will learn that plants make their food through a process called photosynthesis. They will collect and examine leaves, find the area of a leaf, and make leaf rubbings

SUNSHINE STATE STANDARDS: SC.G.1.2

MATERIALS AND SOURCES: Leaves from around the school, crayons, paper

ACTIVITY STEPS:

1. Go over the information on the top of the page. Explain that plants make their own food by a process known as photosynthesis. This should be a concepts first taught in third grade.
2. Take a walk around the school and have students choose a leaf to use for their rubbing. Leaves with textures work best.
3. Instruct students to place their leaf under their paper and make a rubbing by rubbing their paper with the side of a crayon.

EXTENSION:
On the bottom of the paper, instruct students to trace the leaf on top of the grid. Place and "x" in each box and count the number of "x's". The number of boxes will tell students the area of the leaf.

WRAP UP: Encourage students to make their own leaf press to dry leaves or flowers. By drying leaves, water is pressed out and leaves change qualities. To make a simple leaf press, take a phone book (like the yellow pages) and place leaves or flowers between the pages. Put a stack of books on top of the phone book for about two weeks. After that, open the phone book and examine how the leaves changed.

NAME:_____ DATE:_____

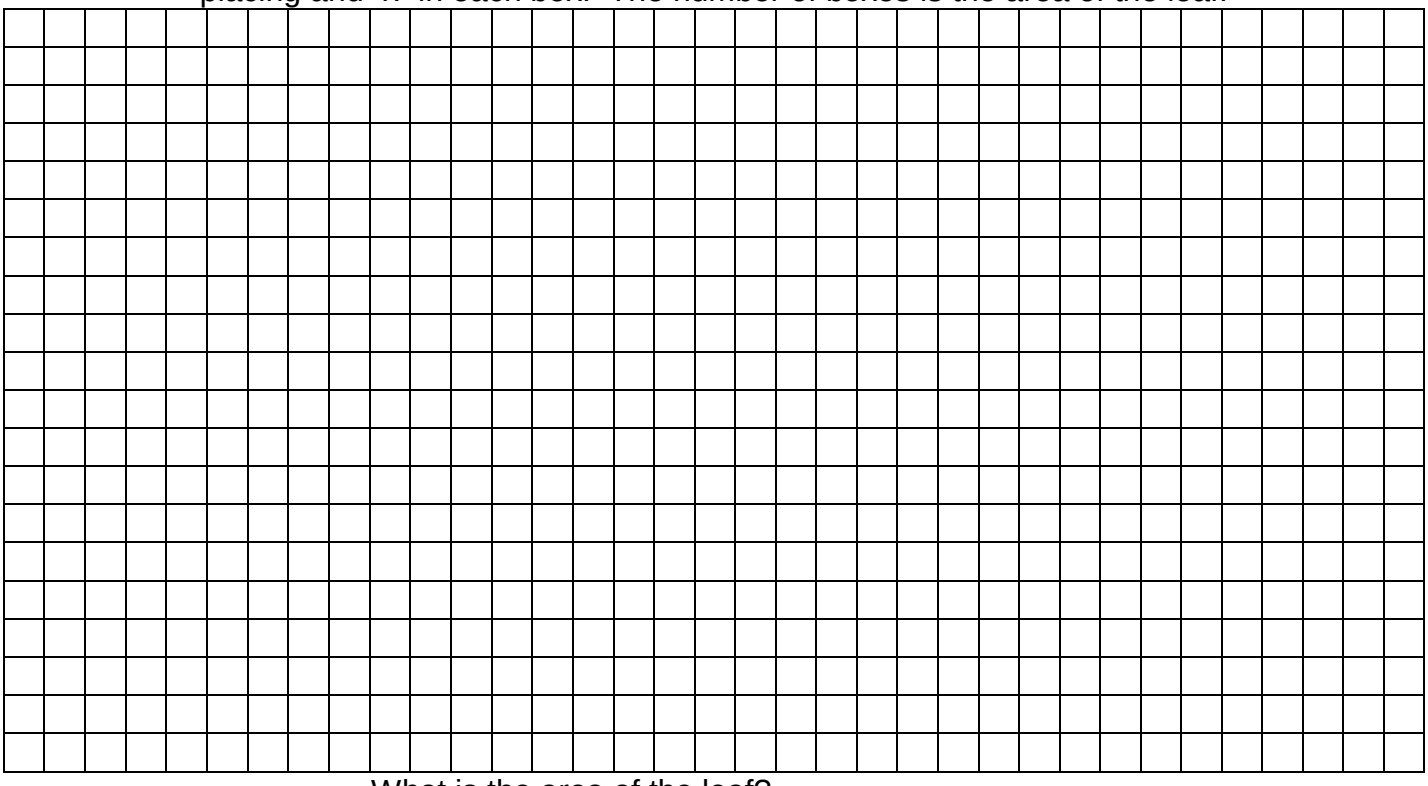
LEAVES

BACKGROUND INFORMATION: Green plants make their own food. That food is sugar. This process is called **photosynthesis**. Most of the food is made in the **leaves** of plants. Water is taken through the **roots** and carried to the leaf by the stems. Leaves need a gas called **CARBON DIOXIDE.** Carbon dioxide enters the leaf through small openings in the leaf's surface called **pores.** Plants also need energy that they get from the **sun.** Plants give off a gas called **oxygen.** Oxygen is needed by most living things to survive.

MAKE A LEAF RUBBING BELOW:

Place a leaf under the paper and gently rub the paper with a crayon.

Place your leaf on the grid below. Trace the leaf and count the number of boxes it takes up by placing and “x” in each box. The number of boxes is the area of the leaf.



What is the area of the leaf?_____

LESSON 27
GRADE LEVEL: 4/5
ACITIVITY TITLE: Surface Tension

ACTIVITY OBJECTIVES: Students will learn about how water molecules attach to one another and form and form an "invisible" skin. They will predict how many drops of water will fit on the head of a penny and follow the scientific method to test their predictions.

SUNSHINE STATE STANDARDS: SC.H.1.2, SC.A.1.2

MATERIALS AND SOURCES: 1 penny & 1 dropper for every two students, water, paper towels

ACTIVITY STEPS:

1. Go over the information on the activity sheet with student. After talking about water molecules, tell students that they are going to see how water molecules attract to each other by dropping water on a penny.
2. Demonstrate how to draw up water in the dropper by squeezing all the air out of the dropper, placing it in the water, and opening the dropper. When the dropper is opened, the water will fill the dropper.
3. Place the penny on the paper towel and demonstrate how to drop the water one tiny drop at a time. Drop the drops on top of each other to show how the drops join together to form one bigger drop.
4. Have students predict which will hold more drops, the head or the tail of the penny.
5. Pass out materials and have one student in the group go first on the head side of the coin. Students should keep dropping water until the surface tension breaks and the water rolls off the coin. The penny will hold many more drops than you would expect!
6. After each partner has a turn to try the head of the penny, both partners should flip the penny over and try the coin.

EXTENSION:

Try the same activity comparing the penny to a nickel, dime, and quarter. Predict which one will hold more drops.

WRAP UP:

Try it at home, but put a drop of dish soap in the water. See if changing the density of the water will change the results (you can use a medicine dropper for any pharmacy).

Name_____

Date_____

Surface Tension

Water is made up of tiny ***molecules***. Each one is like a little magnet. At the edges of each drop of water, the molecules line up like little mini magnets, attaching to each other. They form a kind of "skin" on the top of the drop of the water holding the rest of the water in. The "skin" is called ***surface tension***. When there is too much water on the "skin",the surface tension breaks and the water will overflow.

Problem Statement: Which side of a penny will hold more water, the head side or the tail side?

Hypothesis: Which side to you predict will hold more water?

Procedure:

Step 1: Place a penny head side up on a paper towel.
Step 2: Fill a dropper with water.
Step 3: Drop the water one drop at time on the penny.
Step 4: Count how many drops the penny holds.
Step 5: When the surface tension breaks, record how many drops the penny held on the data table. Graph your results.
Step 6: Repeat the experiment for the other side of the penny.

Data Table

Coin	Number of drops	Number of drops rounded to the nearest 10
Penny head		
Penny tail		

Results: Summarize your results using the data from the table.

The penny head held _____ drops of water.

Graph your data to the nearest ten on the graph below.

Surface Tension Graph

100				
90				
80				
70				
60				
50				
40				
30				
20				
10				
	Penny head		Penny tail	

Side of coin

LESSON 28

GRADE LEVEL: K/1

ACITIVITY TITLE: Digging In The Dirt

ACTIVITY OBJECTIVES: Students will learn about the role of a geologist as a rock scientist. Students will dig though a box of sand and pull out rocks and shells. Then they will describe the physical properties of their rocks and shells.

SUNSHINE STATE STANDARDS: SC.A.1.1, S.C.D.1.1

MATERIALS AND SOURCES:

Shoebox (paper or plastic) filled with sand, rocks and shells, hand lenses

ACTIVITY STEPS:

1. Go over the background information at the top of the page.
2. After students understand about the role of a geologist, tell them that they are going to practice being a "rock scientist".
3. Have students dig through the box(es) of sand and instruct them to pick out all the rocks and shells that they find. Discuss that physical properties describe how something is described, how it looks or feels.
4. Take out a shell or rock and describe its properties to the students.
5. Instruct students to choose one rock and one shell. Have them draw it and find words to describe it. Have students fill in the attached handout, or complete orally with the whole group.

EXTENSION:

Take a walking tour of the school and look for rocks. Use a hand lens to take a closer look.

Find a balance scale and demonstrate to students how to weigh them on the scale. Use the extension sheet as a guide or draw it on the board.

WRAP UP:

Tell students the next time they go to the beach to look for interesting shells or rocks. Encourage them to bring them to share with the group.

NAME _____ DATE _____

DIGGING IN THE DIRT

Background Information: A scientist that studies rocks is called a geologist. Rocks come in many shapes, sizes, and textures. Rocks are solid objects that make up much of the earth's surface. Below the earth's surface, are rocks that form the crust. Rocks can be found on the bottoms of oceans as well as the foot of mountains. Rocks are slowly broken down into smaller pieces in a process called weathering. Eventually, rocks are broken down so small that they form the soil. Rocks contain one or more minerals. The minerals give rocks color, hardness, and sparkle.

Pretend you are a geologist as you search for rocks. Carefully dig through the sand to find the hidden rocks and shells.

Choose one rock and one shell. Look at it closely with your hand lens and draw it in the spaces below.

Here is a drawing of my rock:	Here is a drawing of my shell:
Describe the physical properties of your rock; how it looks and feels. Tell about it's color, shape, size, and texture:	Describe the physical properties of your shell; how it looks and feels. Tell about it's color, shape, size, and texture:

EXTENSION ACTIVITY

PROBLEM STATEMENT: How much will the rocks and shells weigh together? (How many cubes will it take to balance the scale?

HYPOTHESIS: What is your prediction?

Weigh the shells by themselves. How many cubes did they weigh? _____

Weigh the rocks by themselves. How many cubes did they weigh? _____

How much did the rocks and shells weigh in all? _____

How much more did the rocks weigh than the shells? _____

Graph your results:

# of cubes				
	20			
	19			
	18			
	17			
	16			
	15			
	14			
	13			
	12			
	11			
	10			
	9			
	8			
	7			
	6			
	5			
	4			
	3			
	2			
	1			
		Rocks	Shells	Rocks and shells together

Item Being Weighted

Write About it: On a separate piece of paper, respond to the following prompt.

As an archeologist, you are on a very important dig to find ancient artifacts. You found a dinosaur skull. Tell about what it might have been like to live in the days of the dinosaurs.

LESSON 29
GRADE LEVEL: K/1

ACITIVITY TITLE: Comparing Liquids

ACTIVITY OBJECTIVES: Students will identify the three state of matter and compare two liquids (glue and water) to try and figure out their identities based on their physical properties.

SUNSHINE STATE STANDARDS: SC.A.1.1

MATERIALS AND SOURCES:

Paper plate or wax paper, two spoons per group, small portion cups with glue in one and water in the other.

ACTIVITY STEPS:

1. Go over the information in the box on the top of the handout.
2. Discuss the difference between solids, liquids, and gases.
3. Tell students that physical properties of matter describe how it looks, feels, and acts.
4. Pass out a paper plate or wax paper to each group along with a portion cup filled with water and one with glue. Pass out two spoons.
5. Help students list (on the board or on paper) ways to describe how the two liquids.
6. Put some of each on a spoon and describe how they pour.
7. Finally, let student feel each and describe how they feel.
8. Using all of the observations, have students speculate as to the identities of each.

EXTENSION:

Do this same activity on another day using other liquids such as syrup, milk, juice, or pancake batter.

WRAP UP:

Have students work at home with their parents to answer the following:

Think about what your favorite liquid is. Explain why it is your favorite.

Name_____ Date_____

Comparing Liquids

There are 3 states of matter. They are solid, liquid, and gas. You can see solids, they have a specific shape. Ice is a solid. You can also see liquids, but they have not specific shape. Melted ice or water is a liquid. Liquids take on the shape of the container they are in. You cannot see gases, they are invisible and they fill up the shape of the container they are in. When water is boiled, the gas that is released is water vapor. A physical property tells us what the matter it looks like, feels like, smells like and other characteristics that describe it. In this experiement, you will compare the physical properties of two liquids.

Problem Statement: What is the identity of the two mystery liquids?

Hypothesis: After listing the physical properties, predict what is the identity of each liquid.

Procedure:

Look at each liquid and fill in to table for each liquid. Write words to describe how each one looks.

Liquid #1	Liquid #2

Use a spoon to take a small amount of each liquid. Pour it on the table and tell what you observed about each.

Liquid #1	Liquid #2

Touch each liquid, tell what you felt for each.

Liquid #1	Liquid #2

Hypothesis:

I predict that liquid #1 was_____.

I predict that liquid #2 was_____.

LESSON 30
GRADE LEVEL: K/1

ACITIVITY TITLE: Aluminum Foil Figures

ACTIVITY OBJECTIVES: Students will recognize pattern and shapes to identify items found in their surroundings.

SUNSHINE STATE STANDARDS: SC.A.1.1

MATERIALS AND SOURCES: Aluminum foil

ACTIVITY STEPS:

1. We recognize items by their patterns and shapes. We store certain patterns and shapes in our memory and can recall them when we see them.
2. Give each child a piece of aluminum foil the size of a half sheet of paper.
3. Show students how to make a mold by placing a piece of foil on your hand and pressing it around the fingers to mold the shape of your hand.
4. Whisper in each child's ear what item they will make a mold of. (doorknob, lightswitch, pencil, crayon box, computer mouse, other objects around the room).
5. Give each child time to make their mold. Then, show the mold to the group and see who can guess what each mold was made with.

EXTENSION:
Make each child a mold of their hand. Staple it to a piece of posterboard and sent it home to share with their family.

WRAP UP:
Have students make mold of items around the house with their parents help.

LESSON 31
GRADE LEVEL: K/1

ACITIVITY TITLE: Molecules Making Sound

ACTIVITY OBJECTIVES: Molecules Making Sounds: Students will identify that sound can be absorbed differently on different surfaces due to the arrangement of molecules.

SUNSHINE STATE STANDARDS: SC.C.2.1

MATERIALS AND SOURCES: Deep and wide pots, metal pans, plates, cookie sheets

ACTIVITY STEPS:

1. Objects produce different echoes because of the materials they are made from. When sound hits them, some materials are more absorbent and some are more reflective. The arrangement of the molecules within the materials determines whether the sound is absorbed or reflected.
2. If molecules' bonds are strong, the sound is reflected. If they are weak, they are absorbed. If the sound echoes loudly and you can hear it well, it is reflected. If the sound echoes softly or not at all, it is absorbed.
3. Have student close their eyes, take a deep breath, and hum loudly as you hold one of the items about 12 inches from their face.
4. Ask them to describe what they hear. You may need to more the item closer.
5. Have them tell whether it is a vibration or an echo.
6. Continue with all the items and determine which will create a louder sound.

EXTENSION:
Fill glasses with different amounts of water. Strike with a spoon and listen to the different sounds that are produced.

WRAP UP:
Have students turn pots and pans of various sizes over on the carpet and the counter. Hit them with metal and wooden spoons to hear the different sounds that are produced. Note the differences in sound from the carpet to the counter or tile floor.

LESSON 32

GRADE LEVEL: K/1

ACITIVITY TITLE: Make It Soft

ACTIVITY OBJECTIVES: Students will identify changes in matter when pasta or rice softens when soaked in water

SUNSHINE STATE STANDARDS: SC.A.1.1

MATERIALS AND SOURCES: 2 bowls, 2 cups cold water, 2 cups hot water, 2 spoonfuls of uncooked rice

ACTIVITY STEPS:

1. Explain that most food will absorb water, which causes them to become soft. Both pasta and rice are hard before they are placed in water. The temperature of the water will affect how quickly rice softens.
2. Warm water causes the molecules to move quickly and loosen faster than cold water.
3. Have students predict whether warm or cold water will soften the rice or pasta faster.
4. Place the rice in a bowl. Have students feel it to see that it is hard.
5. Pour half of the rice in another bowl. Pour 2 cups of hot water in one bowl and two cups of cold water in another. Wait for two minutes and scoop out some rice from each bowl. Have students feel the difference. They will find that the one in the hot water was softer.

EXTENSION:

Try the same activity with pasta.

WRAP UP:

Share the findings with your parents. Next time your family cooks rice or pasta, ask your parents to let you measure the water and the rice or pasta and put it into the pot. Measure long it takes for the water to boil.

LESSON 33
GRADE LEVEL: K/1

ACITIVITY TITLE: Watch Muscles Work
ACTIVITY OBJECTIVES: Students will examine how muscles move by contracting.

SUNSHINE STATE STANDARDS: SC.F.1.1

MATERIALS AND SOURCES: Mirror (optional)

ACTIVITY STEPS:

1. Explain to students that bones and muscles help us to move. You can see muscles contracting and moving by making different facial expressions.
2. Simple muscle contractions make movement that you can see. If you do not have a mirror, students can sit facing each other and watch each other make muscle contractions.
3. Begin by having students look at each other or in a mirror while making no facial expressions. Have them feel their face to see how the muscles feel when they are relaxed.
4. Next have them smile and frown and watch as the facial muscles move up and down changing what the face looks like. Have them feel their face and feel the difference.

EXTENSION:
Have students flex other muscles like the biceps or calves and feel the muscles move as they flex.

WRAP UP:
Talk about the importance of drinking milk at home to help maintain strong bones.

LESSON 34

GRADE LEVEL: K/1

ACITIVITY TITLE: Watch It Fall

ACTIVITY OBJECTIVES: Students will investigate the force of gravity to determine whether the mass of an object will affect how fast it will fall to the ground.

SUNSHINE STATE STANDARDS: SC.H.1.1,SC.C.1.1

MATERIALS AND SOURCES: chair or balcony, object of varying weights

ACTIVITY STEPS:

1. Ask student the following question: If you drop two items, one heavy and one light, which one will hit the ground first?
2. Explain that gravity is the force that causes an object to fall to the earth.
3. The force of gravity pulls down equally on all objects, regardless of how much they weigh.
4. Gather item of different weights (cotton ball, penny, marble, ball of aluminum foil, different balls).
5. Give each child in the group an item. Each child should stand on a chair or on the second floor of a building. They should hold the items at the same height.
6. On the count of 3, all items get dropped.
7. They will find that all items will fall at the same rate.

EXTENSION:

Ask students if they dropped a hammer and a feather at same time, which would reach the ground first? If you try this, be sure to do it inside where there is no moving air. The air will cause a change in the experiment.

WRAP UP:

Try this at home with other objects.

LESSON 35

GRADE LEVEL: K/1

ACITIVITY TITLE: Liquid Magnifier

ACTIVITY OBJECTIVES: Students will observe how light bends when it passes through water the same way does through a magnifier.

SUNSHINE STATE STANDARDS: SC.B.1.1

MATERIALS AND SOURCES: zip lock bag, water, penny (optional)

ACTIVITY STEPS:

1. Explain to students that a magnifying glass is used to magnify or make things look bigger.
2. When light passes through a magnifying glass, the light bends and spreads out causing the image to look bigger.
3. Although we cannot see light bending, we can see the result in the magnified image.
4. Fill a zip lock bag with water and place the bag on top a sheet of paper with words on it.
5. Experiment by taking some water out of the bag. The more water in the bag, the more the image will be magnified. The less water in the bag, the less the image will be magnified.

EXTENSION:

Use the water bag magnifier to look at a penny. On the back of the penny, see if you can see Lincoln sitting inside the Lincoln Memorial.

WRAP UP:

Show your parents how to make a water magnifier and find Lincoln sitting in the Memorial.

LESSON 36

GRADE LEVEL: K/1

ACITIVITY TITLE: How Many Seeds?

ACTIVITY OBJECTIVES:

Students will predict how many seeds will be in different types of fruits.

SUNSHINE STATE STANDARDS: SC.G.1.1

MATERIALS AND SOURCES: knife, various fruits, crayons

ACTIVITY STEPS:

1. Prediction is the core of all science exploration. We make predictions based on experiences and knowledge. Students use observation skills to test their predictions . In this activity, students will predict how many seeds will be in different types of fruits.
2. Lay out various fruits on the table and list them on the board. Have students fill in the chart on the next page with their prediction of how many seeds will be in each fruits.
3. Cut open each fruit and count the seeds.
4. Record the number on the board and have students copy onto their charts.
5. Be sure they know that it is alright to have a prediction (guess) that is not the same as the results. Encourage students to NOT change their guesses. Let them know that we learn from our predictions. Have students draw the fruits on their handout.

EXTENSION:

Plant some of the seeds in soil and see if anything sprouts.

WRAP UP:

Tell students to predict how many seeds they will find in a cucumber or tomato slice. If they have cucumbers, peppers, or tomatoes and home, they can try it.

NAME_____

DATE_____

Seeds

Write the name of each fruit on the line. Predict how many seeds will be in each fruit and write it in the prediction box. Count the seeds in each fruit and see if you predictions were correct. Finally, draw a picture of each fruit.

Fruit Name				
How many seeds do you predict will be in the fruit?				
Count the seeds. Record how many you found in each fruit.				
Draw the fruit.				

LESSON 37
GRADE LEVEL: 2/3

ACITIVITY TITLE: Parts of a seed

ACTIVITY OBJECTIVES: Students will identify the part of a seed and their function. They will also compare a dry seed to a soaked seed listing ways to describe their physical properties.

SUNSHINE STATE STANDARDS: SC.G.1.1

MATERIALS AND SOURCES: lima beans (dry and soaked), paper towels, hand lenses

ACTIVITY STEPS:

1. Soak ½ bag of large lima beans overnight in a container of water.
2. Go over the information on the top of the handout with students.
3. Pass out a paper towel, dry lima bean, and soaked lima bean to each child.
4. Be careful as the wet beans are very delicate.
5. Write two columns on the board and have student give you ways to compare the seeds.
6. Examples:

The dry seed…	The soaked seed…
The dry seed is small.	The soaked seed is big.
The dry seed is white.	The soaked seed is yellow.
The dry seed is smooth.	The soaked seed is wrinkled.
The dry seed is closed.	The soaked seed is opening.

7. After describing the beans, have students remove the seed coat from the soaked seed, open the two cotyledons, and use the hand lens to find the embryo. By looking closely, students might even see the beginnings of leaves coming from the embryo.

EXTENSION:
Use a ruler or tape measure to compare the sizes of the dry and soaked beans. Be sure to measure in centimeters.

WRAP UP:
Have students respond to the following prompt with the help of their parents or siblings.

Write about it:
Pretend you found a bag of magic beans. Explain what happened after you planted the beans.

Name_____ Date_____

Parts Of A Seed

Seeds are alike in many ways. They develop in the ovary of a plant and contain a little plant called an embryo. Seeds are covered by a thin outer coating called a seed coat. The seed coat protects the seed. The tiny seed has its own food. The food storage of a seed is called the cotyledon. Seeds are different sizes and shapes. A corn seed is a monocotyledon and has a tiny embryo inside, but since it has only one cotyledon, it cannot be split in half. A bean seed is a dicotyledon meaning it has two cotyledons and can be split in half. The embryo is between the two cotyledons.

In this activity, you will have a chance to compare a dry and soaked bean seed. One lima bean has been soaked overnight. The other one is a dry seed that has not been soaked.

Materials (per person): one soaked seed, one dry seed, a hand lens, a ruler or tape measure

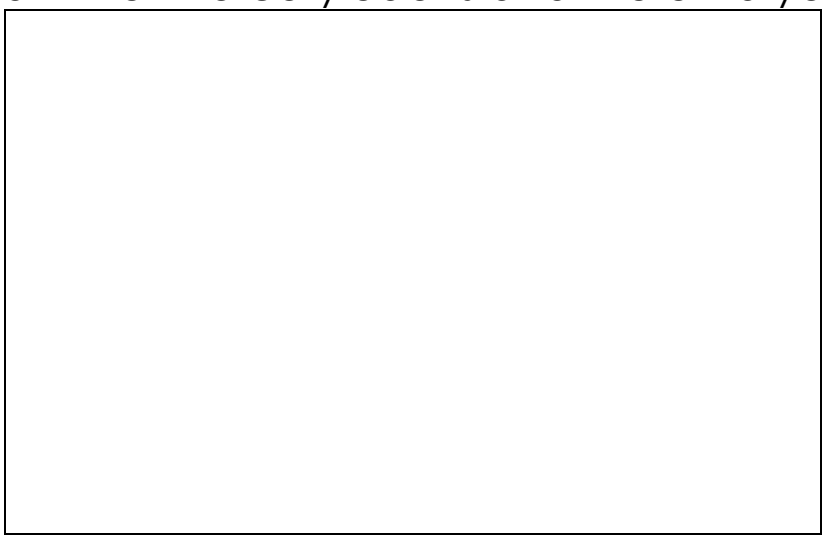
Procedure:

1. Lay out the soaked seed and the dry seed next to each other. Write down five observations of each seed on the chart below. Be sure to write down some physical properties to describe or compare the seeds.

The dry seed….	The soaked seed….
Draw the dry seed here:	Draw the soaked seed here:

(Procedure continued)

2. Carefully remove the seed coat.
3. Split the seed in two parts.
4. Look for the embryo in the middle. It may break off or fall out.
5. Draw the two cotyledons and the embryo here.



LESSON 38

GRADE LEVEL: 2/3

ACITIVITY TITLE: Oxygen in air

ACTIVITY OBJECTIVES: Students will learn about the components present in air. They will find through investigation that a candle cannot stay lit with out the longest.

SUNSHINE STATE STANDARDS: SC.H.1.2

MATERIALS AND SOURCES: candle, matches, 3 different sized jars

ACTIVITY STEPS:

1. Explain to students that air is a gas that is made up of different components. One component in air is called oxygen. We need oxygen to breathe. Plants produce oxygen. A candle needs oxygen in order to stay lit. Fire can also burn out the oxygen in air. When a fire has no more oxygen, it cannot stay lit and will go out.
2. Ask students to predict which candle will stay lit longer, the one under the large, medium, or small jar. Write tally marks on the board to show the student votes.
3. Light the candle and tell students once the candle is covered by the jar, to count how many seconds each candle stays lit. Record the data on the board (copy from attached worksheet).
4. You will find that the bigger the jar

EXTENSION:

Explain to students that they should never play with matches and how fire extinguishers are used to put out fires.

WRAP UP:

Tell students to talk to their parents about their emergency plans in case they ever have a fire or other emergency in their home.

Name_____**Date**_____

Oxygen in air

Problem Statement: Which candle will burn out faster; the one covered by the small jar, medium jar, or large jar?

Hypothesis: Write your prediction here:

Procedure:

1. Place a candle in a ball of clay
2. Light the candle
3. Place the jar on top of the candle
4. Time it to see how long it takes to go out
5. Repeat steps 1-4 for all three jars

jar size	small	medium	large
number of seconds			

Graph your data below:

Candle Graph

	20			
	19			
	18			
	17			
	16			
	15			
	14			
S	13			
E	12			
C	11			
O	10			
N	9			
D	8			
S	7			
	6			
	5			
	4			
	3			
	2			
	1			
		Small	Medium	large

Results: Tell how many seconds each jar took to extinguish the candle.

Conclusion: Was your hypothesis supported? Why or why not?

LESSON 39
GRADE LEVEL: 2/3

ACITIVITY TITLE: Mapping a magnet

ACTIVITY OBJECTIVES: Students will identify the north and south pole of a magnet and use a compass to map the poles. They will also investigate how magnets attract and repel.

SUNSHINE STATE STANDARDS: SC.H.1.2

MATERIALS AND SOURCES:
two wand magnets, a compass, and masking tape or white labels.

ACTIVITY STEPS:
1. Go over the information on the "Mapping a magnet" page.
2. Follow the steps listed in the procedure.
3. Give students a chance to investigate using the magnets.

EXTENSION:
Go on a magnet scavenger hunt. Give students a magnet and let the students find other things that are magnetic. IMPORTANT…Be sure that students know that they should never put a magnet near a computer or computer disks or cd's.

WRAP UP:
Tell students to go home and have their parents help them to list or draw pictures of things around their house that use magnets (electric can opener, refrigerator door, refrigerator magnets).

Mapping a Magnet

Just like the Earth has a north and south pole, magnets also have a north and south pole. A ***compass*** is a tool used to show direction. You can use a compass to map a magnet and find the north and south pole. When like poles are held together, they will ***repel*** (push away). When unlike poles are held together, they will ***attract*** (come together).

Problem Statement: What will happen when the north pole of one magnet is held next to the south pole of another magnet.

Hypothesis: What is your prediction?

_____

_____

Materials: two magnets, compass, masking tape

Procedure:

Step 1: Place a piece of tape on each side of the magnet.

Step 2: Hold the side of the magnet on the short side of the compass. Record where the red needle is pointing, either north or south. Mark "N" or "S" on the tape.

Step 3: Repeat step 2 for the other side of the magnet.

Step 4: Once you have mapped the magnet, make your predictions on the table and record what happened.

What do you predict will happen when you hold:	Are the poles alike or unlike?	What do you think will happen? Attract or Repel	Results: What happened? Attract or Repel	Was your hypothesis supported? Yes or No
North to North				
South to South				
South to North				
North to South				

LESSON 40
GRADE LEVEL: 2/3

ACITIVITY TITLE: Density

ACTIVITY OBJECTIVES: Students will identify density as a property of matter. They will combine 3 liquids and predict which one will be the most dense.

SUNSHINE STATE STANDARDS: SC.A.1.2

MATERIALS AND SOURCES:
Food coloring (red & blue), bottle of cooking oil, light corn syrup, water, empty water bottle or glass jar, 3 Dixie cups (5 ounce)

ACTIVITY STEPS:

1. Something that describes matter is a property. A **physical property** of matter is one that can be observed or measured without changing the matter. Examples include size, shape, or color of an object. Mass and volume are physical properties of matter. **Mass** is the amount of matter an object has. **Volume** is the amount of space it takes up. Density is another property of matter. **Density** describes the amount of matter that is packed into a given space. You can compare the density of water with that of other types of matter. An object that is less dense than water will float. An object that is more dense, will sink.
2. Tell students that they will find out which liquid, oil, corn syrup, or water is the most dense.
3. Show students a bottle of water (mixed with blue food coloring), a bottle of corn syrup (mixed with blue food coloring) and a bottle of cooking (naturally yellow). Ask them to predict which liquid is the most dense and will sink to the bottom when mixed together. Make a tally on the board to show their votes.
4. Pour the blue water in a Dixie cup and pour the water in the jar or. Next pour the oil in a cup and then into the jar or bottle with the water. Finally, fill a cup with the red corn syrup. Pour the corn syrup in the jar or bottle. Have students draw a picture of the bottle or jar showing the three colored liquids. Label the picture liquid layers. Have students label each liquid and write a sentence telling which one the most dense.

EXTENSION:

Try the same activity adding in other liquids like glue, maple syrup, and rubbing alcohol. They will all rest at different levels.

WRAP UP:

Encourage students to discuss the activity with their parents and encourage them to try it at home.

LESSON 41

GRADE LEVEL: 2/3

ACITIVITY TITLE: Plant Leaves & Plants used as medicines

ACTIVITY OBJECTIVES: Students will identify the function of the leaf of plants. They will also identify how plants can be used for medicinal purposes.

SUNSHINE STATE STANDARDS: SC.G.1.2

MATERIALS AND SOURCES: aloe leaf (can be purchased in the produce dept. of grocery stores for about a dollar), hand lens (optional), onion cut in quarters

ACTIVITY STEPS:

1. Go over the information in the box at the top of the "Plant Leaves".
2. After students understand the function of plant leaves, discuss how plants can be used as medicines and review some of the ways that aloe is used.
3. Slice a cross section of aloe and give each student a piece. If hand lenses are available, tell students to look at the vacuoles which send water to the plant. The vacuoles are the tiny spots found just below the surface of the leaf.
4. Give students a chance to rub the gel of the aloe on their skin. Instead of wiping it off, tell them to rub it in until it disappears. Discuss how it feels and smells.
5. Ask students how many of them have aloe plants at home and where they are kept. Many will tell you that they are placed in the kitchen. This is because aloe reduces pain from burns and most burns happen in the kitchen.

EXTENSION:

Complete page two using an onion section. Remind students that the layers of an onion are the leaves of an onion.

WRAP UP:

Encourage students to share what they learned about aloe with their parents and ask their parents to get aloe plants for the kitchen. Also tell them to find out where the first aid kit is kept at home and to help parents make sure it is stocked with supplies.

Name_____**Date**_____

Plant Leaves

Plant leaves are very important. Leaves are the part of the plant makes food by photosynthesis. Leaves take in carbon dioxide from the air, water from the soil, and energy from the sunlight. During photosynthesis, the leaves use light energy to change carbon dioxide and water into food called sugar. Some plants are used for medicinal purposes. The leaf of the ALOE plant is often used to help heal burns. The ALOE leaf has a thick fleshy outer layer called the epidermis. The inner layer, the dermis has a gel like substance that can be put on burns. The leaf stores water for the plant in the vacuoles.

Activity 1:
Look at the cross section of the aloe leaf with a hand lens. Find the vacuoles where it stores the water. Make a drawing below and also describe how it feels.

Draw the cross section here, label the vacuoles.	Describe how the inside of the aloe leaf feels. Use a complete sentence.

Tell about how the aloe plant is used as a medicine.

A bulb is a flowering plant that grows under the ground. An example would be an onion. Onion bulbs may be round, somewhat flat, or oblong and are 1 inch to 6 inches across. Under its thin, papery cover, the bulb consists of many layers surrounding one or more growing points. In this activity, you will peel away the thin outer skin of the onion and count its layers. The inner layers of the onion are the edible part.

Problem Statement: How many layers will an onion have?

Hypothesis: Predict how many layers the onion will have.

Materials: wax paper, onion, paper towel, plastic knife
Procedure:
Step 1: Carefully peel away the thin outer covering of the onion.
Step 2: Peel away each layer and count the layers. Record your data.
Results: How many layers did your onion have?

Conclusion: Was your hypothesis supported?

Tell three things you learned today that you did not already know.

1.
2.
3.

LESSON 42
GRADE LEVEL: 2/3

ACITIVITY TITLE: Pollution & Oil Spills

ACTIVITY OBJECTIVES:
Students will identify the affects of oil spills on the environment and wildlife.

SUNSHINE STATE STANDARDS: SC.B.2.2

MATERIALS AND SOURCES: a bird feather, cooking oil, container of water, hand lens
For extension activity: laundry soap, cotton, paper towel, an eye dropper, vegetable oil, food coloring, water, 4 metal pans

ACTIVITY STEPS:
1. Go over background information in the box on the top of the attached page.
2. Have students discuss how oil pollution can affect the ocean and wildlife.
3. Follow the steps listed in the procedure. After completing the activity, discuss how the oil changed the feather and how it can hurt birds.

EXTENSION:
In the next activity, students can explore how to clean an oil spill like the one they created. Follow the steps in the procedure to clean the oil spill.

WRAP UP:
At home, tell students to have their parents help them to pour oil on top of water to see that the oil is less dense and will sink to the bottom.

NAME_____DATE_____

AFFECTS OF OIL POLLUTION

BACKGROUND INFORMATION: Oil pollution causes major damage each year our oceans and ocean wildlife. Some oil tankers carry 500,000 tons of oil. In 1989, The Exxon Valdes tanker ran aground near Valdez, Alaska. It spilled oil that spread for miles, polluting the water and killing the ocean wildlife such and fish, birds, and sea mammals. One way that oil spills affect marine life is by coating bird's feathers with oil. The oil makes it hard for the birds to fly and float. It also interferes with the bird's insulation so it cannot stay warm. Finally, when the birds clean themselves, they become poisoned by the oil on their feathers.

PROBLEM STATEMENT: Will oil on a bird's feather affect the bird?

MATERIALS: a bird feather, cooking oil, container of water, hand lens

PROCEDURE:

1. Examine the feather with the hand lens.
2. Open the feather by pulling apart the barbs (the strands attached to the shaft of the feather).
3. Close the barbs by running your finger down the barbs like a comb.
4. Drop the feather in water. What record what happened.
5. Dip the feather in water and repeat steps 2 and 3.
6. Dip the feather in oil and repeat steps 2 and 3.
7. Drop the oily feather in water. What record what happened.

RESULTS:

1. What happened when you dropped the feather in the water? Did it remain buoyant or did it sink?

2. Did the water have an effect on the feather? Did the barbs close after the were wet?

3. What happened when you dropped the feather in the oil? Did it remain buoyant or did it sink?

4. Did the oil have an effect on the feather? Did the barbs close after the were wet?

5. Give **3** reasons why oil spills are harmful to birds. Use complete sentences.

CONCLUSION: (Was your hypothesis correct?)

CLEANING AN OIL SPILL

PROBLEM STATEMENT: Which of the following items will remove the most oil from the water; laundry soap, cotton, paper towel, or an eye dropper?

HYPOTHESIS:

MATERIALS: laundry soap, cotton, paper towel, an eye dropper, vegetable oil, food coloring, water, 4 metal pans.

PROCEDURE:

1. Create an oil slick by adding 100 ml of cooking oil to each container of water.
2. Try to remove the oil with using each item listed above.

RESULTS: Which item removed the most oil from the water?

Which item removed the least amount of oil from the water?

CONCLUSION:

WRITE ABOUT IT: **Oil spills cause great harm to our oceans and ocean wildlife. What consequences should there be for oil tankers that run aground and destroy our oceans by causing oil spills?**

LESSON 43

GRADE LEVEL: 2/3

ACITIVITY TITLE: Buoyancy and salt water

ACTIVITY OBJECTIVES:
Students will examine that an egg will sink in water. By adding salt to water, students will identify that the density of the water will change enabling the egg to float.

SUNSHINE STATE STANDARDS: SC.A.1.2

MATERIALS AND SOURCES:
large plastic cup or container, water, hard boiled egg, tablespoon, salt

ACTIVITY STEPS:

1. Go over the background information. Remind student of the density experiment when they found out that something that is more dense than water will sink.
2. Point out the by adding salt to water, you can actually change the density of water.
3. Place an egg in a container and fill the container with water.
4. Have student predict how many spoons it will take to change the density of the water.
5. Stir in one tablespoon of salt and observe what happens.
6. Continue adding tablespoons of salt until the egg floats.

EXTENSION:
Ask student if they have ever gone swimming at the beach. Explain that the salt in the ocean makes it easier to float.

WRAP UP:
Have students try the experiment at home using another item like a marble.

Name_____ Date_____

Buoyancy and Salt Water

Background Information: When salt is added to water, it increases its density. This means that it is easier for items placed in salt water to float or remain buoyant. The more salt in water, the easier it is for objects to float in the water. This is why it is easier to float in oceans containing salt water. Divers often wear heavy belts to keep them from floating. When an egg is placed in salt water, the salt water is more dense than the egg causing it to float.

Problem statement:
How many tablespoons of water will it take to float and egg?

Materials: water, salt, egg, large container, spoon

Hypothesis: (How many tablespoons will it take to float the egg?)

Procedure:

1. Place an egg in a container and fill the container with water.
2. Stir in one tablespoon of salt and observe what happens.
3. Continue adding tablespoons of salt until the egg floats.

Results: (Tell how many tablespoons of salt it took to float the egg.)

Conclusion: (Tell whether you hypothesis was supported and why.)

Draw the cup with the egg before the salt was added.	Draw the cup with the egg after the salt was added.

LESSON 44
GRADE LEVEL: 2/3
ACITIVITY TITLE: Solar Cooking
ACTIVITY OBJECTIVES: Students will identify solar energy and as renewable energy source. Students will examine which will melt faster, ice in a solar cooker or ice not in the cooker. They will also identify which colors absorb more heat.
SUNSHINE STATE STANDARDS: SC.B.2.2

MATERIALS AND SOURCES: Ice, shoebox, aluminum foil, black paint, brushes, tape

ACTIVITY STEPS:

5. Follow the directions and build the solar cooker.
6. Place a piece of ice in the cooker and time it to see how long it takes for the ice to melt.
7. Repeat by placing the ice outside the cooker on a white piece of paper.
8. Help the children to understand that the ice melted faster in the cooker because the foil reflects the heat and the black painted box absorbs more heat than the white paper.

EXTENSION:

Follow the directions to cook some of the solar cooking recipes.

WRAP UP:

Encourage students to build a solar cooker at home and make some yummy snacks.

BUILDING A SOLAR SHOEBOX COOKER

MATERIALS: shoebox, aluminum foil, tape, plastic wrap, black paint, brushes
PROCEDURE:

1. Paint the outside of a shoebox black.
2. When the paint dries, line the inside with aluminum foil.
3. Place item to be cooked on a piece of foil.
4. Place a thermometer inside the box.
5. Cover the top with plastic wrap and tape closed.
6. Prop the cooker on another box so that it sits on an angle facing the sun.

NACHOS & CHEESE: Place a small metal pan or on a piece of foil in the bottom of the cooker and remove the skewer. Put a layer of chips in the pan and top with cheese.

HOT DOGS: Place the hot dog on the bottom of the pan and place the cooker in direct sunlight.

SMORES: On a metal pan place a graham cracker. Lay two marshmallows on top. Place a Hershey bar on top of the marshmallows. Cook until chocolate it melted. You can also use a vanilla wafer with a marshmallow and Hershey Kiss on top.

NAME_____ DATE_____

TYPES OF ENERGY & SOLAR COOKING

BACKGROUND INFORMATION: Energy is available in two forms. **Potential Energy** is the stored energy found in such resources as coal, wood, and oil. **Kinetic energy** is found is such sources as heat light, sound, and motion. When potential energy is converted to kinetic energy, such as burning fuel to power

a car, unwanted chemicals are released in the air. This is one of the causes of air pollution. Many of the resources used to produce kinetic energy are fossil fuels or non-renewable resources. This means they were formed over millions of years ago and when they are used up, there will be no more. One type of energy that does not cause air pollution and is renewable is solar energy. Solar energy uses the energy uses energy from the sun. Some homes have solar panels that collect and store the sun's energy for later use.

PROBLEM STATEMENT: How long will it take for ice to melt in a solar cooker?

MATERIALS: solar cooker, ice

HYPOTHESIS: (How long do you think it will take to melt the ice?)

PROCEDURE:

1. Set some ice on the bottom of the cooker
2. Record the time you placed the ice in the cooker
3. Record the time the ice melted.
4. Repeat the experiment with the ice on a white piece of paper out of the cooker. See which one melted faster.

Ice in the cooker	
Time Started	Time melted
Ice on white paper	
Time Started	Time melted

RESULTS: Tell which one melted faster and how long each one took to melt.

LESSON 45
GRADE LEVEL: 2/3

ACITIVITY TITLE: Your Eyes

ACTIVITY OBJECTIVES: Students will examine to important role that both eyes play in sight.

SUNSHINE STATE STANDARDS: SC.C.1.2

MATERIALS AND SOURCES: Eye patch or bandana (optional), large ball

ACTIVITY STEPS:

1. Explain that our eyes allow us to see the world around us. They work together, but each sees an object from a different angle. Working together, our eyes allow us to see in depth. When only one eye is used to see, we lose our depth perception. This means that it is difficult for us to determine how far away or how close something is to us.
2. Line up students facing you about ten feet away. Throw a ball back and forth to each child. When they have caught and thrown the ball several times, instruct each child to close one eye or place an eyepatch or bandana covering one eye. The other eye should be looking straight. Toss the ball to each child with their eye closed. It will be hard to catch the ball.
3. Repeat throwing the ball with both eyes open so that they can see the difference.

EXTENSION:
Talk about what is would be like to be blind. Blindfold one child in each pair and have them lead each other around the school. Be sure to discuss safety and do not do this around stairs.

WRAP UP:
With your parents, discuss what is would be like to live with a disability.

LESSON 46

GRADE LEVEL: 4/5

ACITIVITY TITLE: Consumer Product Testing: The Dish Soap Test

ACTIVITY OBJECTIVES:
Students will follow the scientific method to determine which type of dish soap will make the biggest bubbles.

SUNSHINE STATE STANDARDS: SC.H.1.2

MATERIALS AND SOURCES:
4 brands of dish soap, water, corn syrup, straws, plastic garbage bags or wax paper, ruler or tape measure

ACTIVITY STEPS:

1. Discuss the importance of being informed consumers. Tell student that by following the scientific method, they can find out which brand of dish soap will make the biggest bubble.
2. Write the names of each soap brand on the board. It is best to use soaps that are different colors. Poll the group having each student tell which soap they think will make the biggest bubbles. Mark tallies on the board to show their votes.
3. Let students know that since each person will have a different technique for blowing the bubbles, that is a variable that should be factored into the experiment. What this means is that different students might have different results.
4. Cover the tables with garbage bags or give each child a piece of wax paper.
5. Follow the steps in the procedure on the next page.

EXTENSION:
Do the experiment on another day, but leave the corn syrup out of the mixture to see if bubble mixture made with corn syrup are better than those made without.

WRAP UP:
Place a straw in a cup and see if you can make bubbles in your drink. The bubbles are made because air is being forced in the cup. Do some drinks make better bubbles than others?

Name_____ **Date**_____

Consumer Product Testing: Dish Soap

Problem Statement: Which brand of dish soap will produce the largest bubbles?

Hypothesis:

Materials: 4 brands of dish soap, water, corn syrup, straws, plastic garbage bags, ruler or tape measure

Procedure:

1. Cover the table with a garbage bag.
2. Mix equal amounts of water, corn syrup, and soap in a container.
3. Use a straw to place a small amount of the mixture on the garbage bag in front of you.
4. Mix the mixture with the straw until you see tiny bubbles.
5. Place your straw in the bubbles and gently blow to make a bigger bubble.
6. When the bubble pops, measure how many centimeters wide the soap stain was on the garbage bag.
7. Record all the soap measurements on the data sheet and find the average size.
8. Repeat steps 2-7 for each color.

Data Table:

soap color	brand name	trial 1	trial 2	trial 3	trial 4	total	÷	avg.
							4	
							4	
							4	
							4	

Results:

Conclusion:

Application: Why is important to know which one made the biggest bubbles?

LESSON 47

GRADE LEVEL: 4/5

ACITIVITY TITLE: Erosion

ACTIVITY OBJECTIVES: Students will review the agents of erosion and simulate erosion by wind and water.

SUNSHINE STATE STANDARDS: SC.D.1.2

MATERIALS AND SOURCES:
one box half filled with sand, a paper cup with a hole covered with tape on the bottom, 4 straws, a container of water, sand colored with food coloring (optional), small rock

ACTIVITY STEPS:
1. Go over the background information.
2. Follow the steps of the procedure to demonstrate the processes of erosion.

EXTENSION:
Discuss that another type of erosion is the melting of glaciers. Although glaciers take thousands of years to melt down, you can simulate the melting with an ice cube. Have students predict how long it will take for an ice cube to melt. Go outside and place the ice cube on the basketball court. Time it to see how long it takes to melt.

WRAP UP:

Next time you are at the beach, build a mountain and pour water over it. Watch as the mountain erodes away.

NAME _____ DATE _____

OUR ERODING EARTH

Background Information: The earth is always changing. Erosion is the wearing down of the earth by natural forces such as wind, water, and ice. Erosion happens slowly over many years so sometimes it is hard to see. Over thousands of years, mountains and hills have been worn down and rivers have been widened. Water plays a very powerful part in erosion. Each year a quarter of the rainfall runs into oceans and streams carrying with it parts of the earth. Wind erosion carries off soil and small rocks and moves them from place to place. Strong winds can even uproot small plants. Snow collects on mountaintops and as its weight builds up, it becomes compressed into ice. The ice moves slowly downhill and glaciers are formed. Glaciers carry rocks that are frozen in the ice a great distance before dropping them. Glaciers cause erosion when the ice melts.

In this activity, you will be simulating erosion by wind and rain.

Safety Tip: Be sure to protect your eyes from flying sand.

MATERIALS**:** one box half filled with sand, a paper cup with a hole covered with tape on the bottom, 4 straws, a container of water, sand colored with food coloring (optional), small rock

PROCEDURE:

1. Create Erosion by wind: Spread some colored sand if available on top of the sand in the box. Be careful not to get too close or you might get sand in your eyes. Wear safety goggles if available.
2. Hold the box at an angle and gently blow through the straw and watch what happens to the sand in the box.
3. Smooth out the sand and place a rock on one side of the box. Prop the box at an angle with the rock on the top end of the box. Gently blow in the sand on both sides of the rock. Watch what happens to the rock.
4. Remove the rock from the box and smooth out the sand.
5. Fill the empty cup with water. Hold the box at an angle.
6. Carefully remove the tape from the cup and let the water drip out in one place at the top of the box. Observe the water and how it changes the surface of the sand. This is similar to what happens when it rains.

Draw the sand in the box before and after you changed it by the wind and rain erosion:

Box of sand before the simulation:	Box of sand after the wind test:	Box of sand after the rain test:

Math Connection:

During a bad flood, 12 inches of rain fell on Monday, 11 inches fell on Tuesday, and 9

inches fell on Wednesday. How much rain fell in all?

The sandbox at the park had 86 pounds of sand. During a heavy windstorm, 28 pounds flew away. How much sand was left in the sandbox?

Write About it: Have you ever seen snow? Tell about a time when you had a chance to be in the snow and whether you enjoyed it or not. Be sure to tell where you were. If you have never seen snow and would like to, tell about some things you would like to do in the snow.

LESSON 48
GRADE LEVEL: 4/5

ACITIVITY TITLE: Decomposition and Landfills

ACTIVITY OBJECTIVES: Students will identify where garbage goes, how it decomposes and how to make their environment fore eco-friendly.

SUNSHINE STATE STANDARDS: SC.G.1.2

MATERIALS AND SOURCES:
soda bottle, food scraps, Styrofoam, tin foil, measuring cup, water, scale (optional)

ACTIVITY STEPS:
1. Discuss with students what happens to their trash after they throw it in the garbage. Tell them that some trash is burned, other trash is recycled, and the rest goes into landfills.
2. Explain that landfills are like big trash piles. Over time, some materials will break down and decompose. Items like food scraps will decompose faster then items like diapers or Styrofoam.
3. Talk about how food is packaged. When making choices in the supermarket, ask students which would be a better choice, 8 individual juice boxes or a gallon of juice? (The 8 boxes go in the garbage. A gallon can be poured into 8 glasses and the glasses are washed and used again, the gallon can be recycled)
4. Ask which one is the better choice. Pose the same question with a big bag of chips or a 10 pack of individually wrapped bags.
5. Tell students that they are going to make a mini landfill and see how long it takes for things to decompose.
6. Follow the steps in the procedure.

EXTENSION:
Take a walk around the school and pick up trash that is on the floor. Make a conscious effort to always pick up trash and keep the school clean.

WRAP UP:
Next time you are at the grocery store, choose items with less packaging, buy in bulk.

Name_____

Date_____

DECOMPOSITION IN A LANDFILL

PROBLEM STATEMENT: Which items will decompose fastest in a landfill?

MATERIALS: soda bottle, food scraps, Styrofoam, tin foil, measuring cup, water

HYPOTHESIS: (Which item do you think will decompose fastest?)

Before starting, weigh the food scraps and garbage and record how much they weighed.

Trash mass:_____ **Food scrap mass:**_____

ROCEDURE:

1. Cut the top off of a soda bottle. Pour I cup of potting soil in the bottle.
2. Place garbage and food scraps on the soil and sprinkle with water
3. Pour another cup of potting soil in the bottle.
4. Place garbage and food scraps on the soil and sprinkle with water
5. Pour another cup of potting soil in the bottle.
6. Place garbage and food scraps on the soil and sprinkle with water
7. Cover the bottle and let it sit for two weeks.

List the items you placed in the bottle:

RESULTS: After waiting two weeks, open the landfill and pour out on a covered surface. Write about your discovery below.

Weigh the food scraps and garbage. Record the weight.

Trash mass:_____ **Food scrap mass:**_____

CONCLUSION: Was your hypothesis correct? What did you learn about decomposition?

Think about things that you use on a daily basis. Tell about what you can do to be more eco-friendly.

LESSON 49

GRADE LEVEL: 4/5

ACITIVITY TITLE: Changing Forms of Energy

ACTIVITY OBJECTIVES:
Students will distinguish between potential and kinetic energy by participating in a ball bouncing experiment.

SUNSHINE STATE STANDARDS: SC.C.2.2

MATERIALS AND SOURCES:
Graph paper, meterstick, tape, colored markers, ping pong ball or rubber ball

ACTIVITY STEPS:
1. Go over the background information in the box on the top of the next page.
2. Pass out materials, tape the graph paper to the wall.
3. Follow the step of the procedure.

EXTENSION:
Discuss how energy is stored by using different sports as example. Ask students where is the potential energy in the following examples.

Bowling: When the ball is in the air behind your arm before it is released.
Baseball: When the pitcher has his arm in the air before the ball is released.
Soccer: When the leg is pulled back before the kick.

WRAP UP:
Discuss with your family ways that they use energy at home.

Name_____ Date_____

Changing Forms of Energy:
Ball Bouncing Experiment

Energy can be changed from potential energy (energy at rest) to kinetic energy (energy in motion). An example can be seen in bouncing a ball. When you hold a ball in the air, before you drop it, the ball has stored energy. When the ball is dropped, it is energy in motion. In this activity, you will predict whether the height of the drop will affect the height of the bounce.

Problem Statement: Will the height of the drop affect the height of the bounce?

Hypothesis: What is your prediction?

Materials: Graph paper, meterstick, tape, colored markers, ping pong ball or rubber ball

Procedure:

1. Tape 5 sheets of graph paper on the wall, one on top of the other from the floor up.
2. Tape the meterstick on the side of the paper and mark the paper every ten centimeters from the bottom to the top of the paper.
3. Hold the ball at the 50cm line and drop the ball. Mark the height of the bounce. Repeat for a total of 4 trials.
4. Hold the ball at the 75cm line and drop the ball. Mark the height of the bounce. Repeat for a total of 4 trials.
5. Hold the ball at the 100cm line and drop the ball. Mark the height of the bounce. Repeat for a total of 4 trials.
6. Use a difference color marker or colored pencil to plot the points on the graph.

Data Sheet

height of drop	bounce height trial 1	bounce height trial 2	bounce height trial 3	bounce height trial 4	bounce height total	bounce height average
50 cm					/4	cm
75 cm					/4	cm
100 cm					/4	cm

Ball Bounce Graph

54					
52					
50					
48					
46					
44					
42					
40					
38					
36					
34					
32					
30					
28					
26					
24					
22					
20					
18					
16					
14					
12					
10					
8					
6					
4					
2					
0	trial 1	trial 2	trial 3	trial 4	average

KEY: Choose a color for each height. Make a dot on the line for each one

_____50cm _____75cm 100cm____

Results: Using the data table, summarize your results.

1. Name 5 forms of kinetic energy:

1.	4.
2.	5.

3.	

2. Name 2 forms of potential energy:

1.	2.

3. Define energy:

4. What is the difference between potential and kinetic energy?

5. In the ball dropping experiment, tell when potential and kinetic energy was being used.

6. If you toss a ball in the air, at what point does it have the most potential energy?

LESSON 50

GRADE LEVEL: 4/5

ACITIVITY TITLE: How Pores Work

ACTIVITY OBJECTIVES:
Students will use the leaves of a tree to examine how pores in plants and human release water.

SUNSHINE STATE STANDARDS: SC.G.1.2

MATERIALS AND SOURCES: Plastic bag, string, an outdoor leafy tree or bush

ACTIVITY STEPS:

1. Explain to students that leaves of plants and trees have pores. The pores expand and contract depending on the temperature.
2. In a warm environment, the pores will open and release moisture.
3. This is similar to how our bodies sweat when it is hot outside.
4. Go outside on a hot day and find a tree. Place the bag around a few leaves and tie it shut tight with the string.
5. Come back in an hour and check to bag to see if there was any change. Come back an hour later and look again.
6. Compare the leaves that were covered to see if there was any difference.

EXTENSION:
Return the next day and compare the leaves again to see if there were any changes.

WRAP UP:
Try this a home on a hot summer day. Leave the bag on for a day and observe what happened.

LESSON 51
GRADE LEVEL: 4/5

ACITIVITY TITLE: Food Testing Fats & Carbohydrates

ACTIVITY OBJECTIVES: Students will identify nutrients found in food and test foods to find out which ones have fats.

SUNSHINE STATE STANDARDS: SC.F.1.2

MATERIALS AND SOURCES: paper towels, brown lunch bag, foods containing fats such as peanut butter, mayonnaise, butter, cheese, and foods with no fat such as an apple slice, banana, and bread.

ACTIVITY STEPS:

1. Go around the room and ask student to share what they had for lunch.
2. Go over the information in the box on the top of the next page.
3. Follow the steps in the procedure.

EXTENSION:
Talk about making healthy low fat choices. Bring in a healthy snack that contains no fat.

WRAP UP:
Write down everything you eat for three days. Bring it back to school and circle all the foods that contain fat. Have your parents help you to identify the foods that have fat.

Name_____ Date_____

Testing Foods For Fat

Background Information: All foods contain chemical substances called nutrients. Nutrients have different jobs in the body. Some are fuel for the body and some are used for growth and repair of tissues. Nutrients are also involved in carrying on chemical reactions in cells. Fat and protein are two nutrients found in foods. Fats are important in fueling the body and proteins are used in building tissues. Some foods contain large amounts of some nutrients and smaller amounts of others. A brown paper bag will be used as an indicator for fat. If the food leaves a wet greasy spot on the bag, it will "indicate" that the food has fat.

PROBLEM STATEMENT: Which foods contain fat?

HYPOTHESIS:

MATERIALS: brown lunch bag, paper towels, various foods

PROCEDURE FOR TESTING FOR FAT:

1. Cut open a brown paper bag and lay it flat on the table.
2. Draw 7 circles and label each one with the foods being tested.
3. Smear each food in the circle with the name of the food and wipe it off with a paper towel.
4. Hold the bag up to the light and see which one makes a translucent greasy spot on the other side of the bag.
5. Record the items that left a grease spot on the other side of the bag. Those items contained fat.

DATA TABLE: Record each item and write yes or no to tell if it left a translucent spot.

Item being tested	Translucent spot yes or no	Does the item have fat?

Graph how many items contained fat and how many did not.

FAT GRAPH

6		
5		
4		
3		
2		
1		
	Fat	No fat

RESULTS: Summarize your results by telling which items contained fat and which did not.

Tell three things you learned today that you did not already know.

Draw the items that had fat below:

LESSON 52

GRADE LEVEL: 4/5

ACITIVITY TITLE: Sound Tubes

ACTIVITY OBJECTIVES: Students will examine how sound can travel through air.

SUNSHINE STATE STANDARDS: SC.C.1.2

MATERIALS AND SOURCES: toilet paper and paper towel tubes

ACTIVITY STEPS:

1. Explain that our ears can hear many sounds because the outer ear helps to collect sounds.
2. When we hold a paper tube against the ear, sounds are amplified because we are extending the outer ear.
3. Have students take turns whispering into the tubes. Compare the sound in the long and short tubes.

EXTENSION:

Make a circle and play the telephone game. Have students pass the tube to each person and whisper a message in each others' ear. See if the message is the same at the end of the circle.

WRAP UP:

Make a sound tube with newspaper. Compare how the sound is magnified through a long thin tube.

LESSON 53

GRADE LEVEL: 5/6

ACITIVITY TITLE: Structures

ACTIVITY OBJECTIVES: Students will experiment with different variables as they build a structure that will hold the most amount of weight.

SUNSHINE STATE STANDARDS: SC.H.3.2

MATERIALS AND SOURCES: six sheets of copy paper and 12 inches of tape for each group of 4 students, textbooks to be used as weights

ACTIVITY STEPS:

1. Go over the information on the top of the next page.
2. Tell students that they will have a chance to build a structure out of paper and tape that will hold the weight of several textbooks.
3. Tell students that "controls" are put in place to be sure an experiment is fair. In this experiment the controls will be that all groups will be that each group will have the same amount of paper and the same amount of tape.
4. A variable in an experiment is what changes that will have an effect on the outcome. In this experiment, groups can choose to roll the columns tight or lose, and how they will arrange them on the table.
5. Put students in groups of four. Pass out 6 sheets of paper and 12 inches of tape for each group.
6. Give groups 15 minutes to roll and tape their columns. Invite one group at a time to place their columns on in any arrangement on a table.
7. Place books one at time on the columns until the columns break.
8. Give each group a chance to test their structures.

EXTENSION:

Go around the school and discuss the physical appearance of the building.

WRAP UP:

Tell students when they are out with their families to look at buildings and notice how many are build on columns. A parking garage is another example.

Name _____ Date _____

STRUCTURES

Buildings need to be built on strong foundations so that they are safe for the people inside. Today you are going to build a structure using paper and tape that will support the weight of several books. You must follow several ground rules so that each structure has the same controls. A control is something that is the same for each experiment and does not change. There will also be several variables in the experiment. A variable is something that can change the outcome of an experiment.

Your task: Using six sheets of paper and 12 inches of tape, build a structure that will support the most weight. The paper must be rolled in columns that are 8 1/2 inches high.

Draw a diagram showing how you will position your columns here:

Problem Statement: How many books do you predict your structure will hold?

Hypothesis: (What is your prediction?)

Procedure: Tell how your group decided to make the structure:

Results:

Conclusion:

Tell what contributions you made to your group.