Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5 Grades
Lesson Title:	How to Grow Borax Crystals
Focus:	Chemical Reactions

Materials
Buttons, blue food coloring, glass jars, pencils, white pipe cleaners, cotton string, thin wires, box of toothpicks, spoons for stirring, hot water

Opening

State the Objective

Today we are going to learn how to make snowflakes (borax crystals) by using borax and a few other household items.

Crystals are made up of molecules arranged in a repeated pattern that extends in all three dimensions. Borax is also known as sodium borate. It is usually found in the form of a white powder made up of colorless crystals that are easily dissolved in water. When the solution cools, the water molecules move closer together. Crystals begin to form.

Gain prior knowledge by asking students, "What do you know about _____?"

1. Ask, "Have you ever seen a snowflake? Describe the snowflake. (Snowflakes have 6 sides.)
2. Borax is a mineral that comes from the ground. What is the most common use for borax? (All purpose cleaner, deodorizes, disinfects, repels cockroaches and ants)

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Provide each student with 3 toothpicks. Have students arrange the toothpicks in the shape of a 6-sided snowflake. Are these snowflakes the same? (No. Every snowflake is different.)
2. Draw several 6-sided snowflakes on a piece of paper. Create each snowflake different from the rest.
3. Ahead of time, demonstrate the activity for the whole class. See direction steps under Students Practice.

Students Practice ("You do")

1. Review the directions for the activity.
2. Provide each small group with supplies.
3. First, bend a pipe cleaner into the shape of a snowflake. If you don't have a pipe cleaner, use a thin wire or a button on a string.
4. Tie the wire, pipe cleaner or button to one end of a piece of string.
5. Tie the wire, pipe cleaner, or button on a string around the middle of a pencil.
6. The leader will pour about one cup of hot water into a jar. Preheat the jar.

Activity → Teachable Moment(s) *throughout

Tip: Listen for questions that begin with "what" or "how."

Student: "Cool!" How would I make a lot of crystals to show my friends?"

Teacher: "Students, is there a faster way to make a lot of crystals?"

7. Add 3 tablespoons of borax slowly, one teaspoon at a time, stirring continuously. 8. Add blue food coloring. 9. Place the pencil over the top of the jar so that the string is hanging down into the jar and the wire, pipe cleaner or button is submerged about ¾ of the way into the solution. 10. Allow the jar to sit for about 24 hours. You will see crystals around the object at the end of the string.	

Closing

Review

Say, "Let's review what we did today. First, we added borax slowly to hot water. Then we hung a string on a pencil, connected to a wire, pipe cleaner or button. Next we submerged the wire, pipe cleaner or button about ¾ of the way into the solution. Finally we let the jar sit overnight and watched the crystals begin to form."

Debrief

Likes and Dislikes

Create a chart and list what students liked and what students didn't like about the activity. You might begin by asking, "What about this activity . . . "

Reflection (Confirm, Tweak, Aha!)

1. What did we do today that you already knew how to do?
2. What did we do today that you knew how to do, but you learned something new to add to what you already knew?
3. What did we do today that was totally new to you?

Modification of Lesson

Other substances can be used to grow crystals. Sugar crystals use a similar process. Goggle "sugar crystals" for specific directions.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K - 5
Lesson Title:	How to Clean Pennies
Focus:	Chemical Reactions

Materials
Newspaper, paper towels, several spoons, white vinegar, table salt, assorted pennies, distilled water, timer

Opening

State the Objective

Today we are going to learn how to clean pennies with just a few simple steps.

Gain prior knowledge by asking students, "What do you know about _____?"

1. Ask, "Have you ever seen a very shiny penny, or a dull greenish penny?"
2. "How do you think we can clean pennies? Will it take a lot of scrubbing to do the job?"
3. "In your experience (prior knowledge), have you ever seen someone clean pennies?"

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

Students are fascinated when they see chemical reactions right before their eyes. People don't often think of vinegar as a cleaning agent. However, it is one of the most effective cleaning agents you can use. Vinegar contains acetic acid. The greenish coating on a penny is not dirt or tarnish, but actually copper oxide, which appears when the copper reacts with the air around it and forms a chemical bond with the oxygen. The acetic acid also forms a chemical reaction removing the oxide from the penny.

WARNING: Before cleaning your penny with vinegar, check the date it was minted. Pennies made before 1982 are over 90% copper. However, newer pennies are mostly zinc with a thin coating of copper. Why is this important? Vinegar can dissolve zinc. Choose pennies that are not scratched or dented. If the pennies are minted in 1982 or later, you should not let them sit in the bowl for an extended period of time.

1. Ask students what they think will happen when we put pennies in a vinegar solution.
2. Ask, "Why will we add salt to the solution?" (Salt acts as a catalyst, speeding up the chemical reaction.
3. Make a prediction as to how long it will take the pennies to be clean with salt?

Students Practice ("You do")

1. The teacher gives step-by-step directions.
2. Pour about a half-cup vinegar into a bowl or jar.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

Student: "Awesome! Would the pennies get clean if we didn't use table salt?"

Teacher: "Students, what do you think about that? Shall we try the experiment again without the table salt?"

3. Add a teaspoon of table salt to the mixture. 4. Stir the salt into the vinegar until it completely dissolves or seal the jar and shake it. 5. Drop the penny into the solution and let it set for 10 minutes. 6. Fish the penny out of the jar with a spoon and rinse it with lukewarm distilled water. 7. Set the penny on a paper towel to dry. 8. The penny should look brand new, without you having to do any rubbing or scrubbing!	

Closing

Review

1. First we mixed vinegar and salt.
2. Next we dropped a penny into the solution and waited 10 minutes.
3. Then we fished the penny out of the jar and rinsed it with lukewarm water.
4. Finally we set the penny on a paper towel to dry.

Debrief

Three What's

1. What did you enjoy most about this activity?
2. What was the biggest challenge with this activity?
3. What did you learn from the group?

Reflection (Confirm, Tweak, Aha!)

Sample: We learned that salt is a catalyst and speeds up the process of cleaning pennies.

Your Reflection:

Modification

Try other liquids to clean pennies: lemon juice, pickle juice, hot sauce, taco sauce, or ketchup.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	How to Peel a Raw Egg
Focus:	Chemical Reactions

Materials
Plastic jars with lids, masking tape, black marker, clear vinegar, several hard-boiled eggs, several uncooked eggs, paper towels

Opening

State the Objective

Today we are going to observe what happens when a raw egg is placed in a jar of vinegar for 24 to 48 hours.

Eggshells are made of calcium carbonate. When vinegar (acetic acid) reacts with calcium carbonate, the eggshell will gradually dissolve. Carbon dioxide bubbles will form. After 24 to 48 hours, the shell should have been removed from the egg. You may need to gently wipe the shell off the egg with a paper towel or place it under running water for a few seconds.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask, "What are some things made of calcium carbonate? Think of objects that have shells." (Egg shells, shells of marine animals, snails, classroom chalk, plaster, marble, limestone and The Great Pyramid of Egypt).

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Spin the hard-boiled egg. Notice that when you touch the egg, it should stop spinning quickly.
2. Spin a raw egg. It will take longer for the raw egg to stop spinning. Why? (The yolk and white keep banging against the shell, back and forth.)
3. Ask a student to demonstrate how to peel the shell off a hard-boiled egg.
4. If possible, separate the thin membrane from the shell. This thin membrane is what is keeping a raw egg together when the shell is removed.
5. Demonstrate the activity in front of the class. See directions under Student Practice.
6. Ask students to help in the demonstration.

Students Practice ("You do")

1. Place a strip of masking tape on the jar. Students write their names on the tape.
2. Fill the jar with some vinegar.
3. Gently place the uncooked egg into the vinegar without cracking the egg. The egg must be covered completely with vinegar.
4. Place the lid on the jar.
5. Do not shake or move the jar for 24 to 48 hours. Watch the carbon dioxide bubbles form on the egg.
6. After 24 to 48 hours, the shell should have been removed from the egg. You may

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

Student: "This was gross! How will I ever use this experiment in real life?"

Teacher: "Class, who can think of a way to use raw eggs without a shell in real life?"

need to gently wipe the shell off the egg with a paper towel or place it under running water for a few seconds. 7. Students write their names on a paper towel. Gently place the egg on the towel.	

Closing

Review

Say, "Let's review what we did today. First we put vinegar into a jar. Then we gently placed a raw egg in the vinegar. Next we waited 24 to 48 hours. Finally we carefully removed the egg from the vinegar and rinsed off the remaining shell."

Debrief

WHI?

Ask the following three questions:

1. What were some of the questions that came up in your group?
2. How did you about including everyone?
3. If you were to try this again, what might you do differently?

Reflection (Confirm, Tweak, Aha!)

Sample: "I now see why there is a thin membrane between the raw egg and the shell."

Your Reflection:

Modification of Lesson

K – 2 Grades: Ask volunteers to help students retrieve the raw egg from the vinegar. A tablespoon might be helpful. Younger students may draw a Before and After Picture showing what happened to the egg.

3-5 Grades: For the brave of heart, give students a felt-tipped black marker. With a light touch, ask students to draw a simple face on the raw egg membrane – eyes, nose, and mouth.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	Magic Potion
Focus:	Chemical Reactions

Materials
Newspaper, bowl, 2 Tablespoons vinegar, 1 tablespoon baking soda, several balloons, rubber bands, small juice bottle or small vinegar bottle, siphon made out of a paper cone.

Opening

State the Objective

Today we are going to observe what happens when baking soda is added to vinegar.

There is a chemical reaction that forms between vinegar (an acid) and the baking soda (a base). The bubbles that form are carbon dioxide gar. This is what happens when bakers add baking soda to cookie batter to make it rise. Also, vinegar and baking soda are used as cleaning agents. Vinegar kills bacteria, mold and germs. It is used to wash windows, leaving them sparkling clean. Baking soda removes stubborn stains, absorbs odors, and puts out grease fires.

Gain prior knowledge by asking students, "What do you know about _____?"

1. Ask, "How many of you have seen a box of baking soda? A jar of vinegar? In which room of the house do you see these items?" (Kitchen for baking, kitchen, bathroom or garage for cleaning)
2. Name a few foods that contain vinegar. (Catsup, pickle juice, taco sauce, and hot sauce)
3. "Have you watched someone cooking pancakes? Did you notice that bubbles form on the top of the pancakes? What is inside the bubbles?" (carbon dioxide gas)

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

Make a prediction about what will happen to the balloon when baking soda and vinegar are mixed.

1. Demonstrate the activity in front of the whole class.
2. Blow up a balloon several times so it is stretch out.
3. Pour 4 tablespoons of vinegar into a bottle with a small opening (juice bottle).
4. Make a siphon cone out of paper.
5. Pour 2 tablespoons of baking soda in a balloon.
6. Without tipping the baking soda in, put the balloon over the top of the container. Use your hand or a rubber band to hold the seal.
7. Jiggle the balloon so the baking soda is dumped in.
8. The balloon will blow itself up! This is carbon dioxide gas.

Students Practice ("You Do")

1. Students review each direction step.
2. Divide students into groups of 3 or 4.
3. Provide students with newspaper, balloon, vinegar, baking soda, tablespoon, and

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

Student: "Wow! How did that work?"

Teacher: "Class, why do you think the balloon blew itself up?"

bottle. 4. Students conduct the experiment, following the Direction Steps.	

Closing
Review Say, "Let's review what we did today. First we put vinegar into a bottle. Then we poured baking soda into a balloon. After that, we fit the balloon around the bottle opening and jiggled the baking soda into the vinegar. Finally, the balloon blew itself up."
Debrief **Liked Best, Next Time (LBNT) -** Students express an opinion about the lesson. 1. Share what you enjoyed most. 2. Share what else you would have liked to have done. 3. Share what you would have like to have spent more time on.

Reflection (Confirm, Tweak, Aha!)

Sample: "Now I know that when I bake cookies, the space inside those bubbles on top of the cookies, is carbon dioxide gas. So that means that the bubbles that form on top of pancakes on the griddle, is carbon dioxide gas, too!"

Your Reflection:

Modification of Lesson

K-1 Grades: Ask for volunteers to help with the experiment. Younger students may need help blowing up the balloon ahead of time, and attaching the balloon to bottle opening.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	Make Orange Soda
Focus:	Chemical Reactions

Materials
Plastic cups, water, orange juice, baking soda, sugar, orange soda can or bottle, spoons for stirring

Opening

State the Objective

Today we are going to learn how to make orange soda from water, orange juice, baking soda and sugar.

Sodas are very popular in our culture. Pepsi and Coke are sold all over the world. They were invented over 100 years ago. The question is, "Do you like the homemade soda better than soda in a can or bottle?" After this activity, decide for yourself.

Gain prior knowledge by asking students, "What do you know about _____?"

1. Ask, "What ingredients are in orange soda? Let's read the container: carbonated water, high fructose corn syrup, citric acid, caffeine, preservatives, and food coloring. Where is the orange juice?"
2. Are sodas a healthy food choice?

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. How would a soda taste without the carbonated water (carbon dioxide gas)? (Flat; no sparkle)
2. Which soda is more popular: Pepsi or Coke? Why?
3. Demonstrate the activity for the whole class. See directions below.

Students Practice ("You do")

1. Provide each small group with supplies. Allow each student to create their own orange soda.
2. First, fill the plastic cup half full with water.
3. Finish filling the cup with orange juice.
4. Add a half teaspoon of baking soda, and a half teaspoon of sugar.
5. Stir. What do you notice?
6. Taste the soda, if desired.

Activity → Teachable Moment(s) *throughout

Tip: Listen for questions that begin with "what" or "how."

Student: "How can they make orange soda without orange juice and still use the work *orange* on the label?"

Teacher: "Students, do you need orange juice in the soda to call it an orange drink?"

Consult 4 Kids Lesson Plans

Closing

Review

Say, "Let's review what we did today. First we filled a cup half full with water. Then we finished filling the cup with orange juice. Next we added baking soda and sugar. Now we have orange soda!"

Debrief

What's Important About That? Ask the students, "What was important about learning to make orange juice soda? When one student responds, it is important to listen for what the student says is important about the activity that was just completed. Building on that statement, the question again is, "What is important about that (whatever was stated second by the student.) Continue to ask the same question up to five times, each time taking the child's understanding of what is important to a deeper level. At the end, the teacher states, "Then what I heard you say is, 'The importance of Making Orange Soda is . . . '

Reflection (Confirm, Tweak, Aha!)

1. What did we do today that you already knew how to do?
2. What did we do today that you knew how to do, but you learned something new to add to what you already knew?
3. What did we do today that was totally new to you?

Modification of Lesson

Extend the lesson by making other flavors of soda. Add apple juice to make apple soda, or lemon juice to make lemon soda.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	Erupting Volcano
Focus:	Volcanoes

Materials: Large paper plate, bathroom 3 oz. disposable cup, aluminum foil, scotch tape, scissors, water, baking soda, vinegar, tablespoon, cup, pan or tray

Opening

State the Objective

Children will understand that there are different ways to conduct an erupting volcano experiment.

Gain prior knowledge by asking students, "What do you know about _____?"

Review with students what they have learned about volcanoes. Include the following information: At Earth's center is a core of hot liquid iron and nickel. The Earth is made up of interlocking pieces of land called tectonic plates. Heat from the Earth's core can escape to the outside through a gap between tectonic plates, or heat can "punch" through the middle of a tectonic plate, releasing pressure and heat to the outside.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Tell students they are going to create a model volcano that will help them visualize what a real volcanic eruption is like.
2. There are three different types of volcanoes: Cinder Cone, Composite, and Shield.
3. This volcano is a Cinder Cone. Lava ejects from a single vent and flows down the sides of the Cone.
4. Most cinder cones have a bowl-shaped crated at the summit.
5. Demonstrate the activity for the whole group. See procedure below.

Students practice ("You do")

1. Attach the paper cup to the plate by taping the bottom of the cup to the middle of the plate.
2. Tear off a piece of foil large enough to completely cover the cup and plate.
3. Place the foil over the cup and plate and turn the foil under the plate edge. Tape the foil in place.
4. Poke a hole through the foil into the middle of the cup.
5. Use scissors to make slits from the middle of the cup to the inside edge of the cup.
6. Tape the foil to the inside of the cup.
7. Place the volcano on a pan or tray.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- How would you rate this activity?
- How would you explain what made the volcano erupt?

8. Fill the volcano with 2 tablespoons of water and stir in a tablespoon of baking soda until it dissolves. 9. Measure 2 tablespoons of vinegar into a separate cup. 10. Pour the vinegar, all at once, into the water/baking soda mixture and watch the lava bubble up.	

Closing
Review 1. Build the aluminum foil volcano. 2. Add water and baking soda to the cup. 3. Measure 2 tablespoons vinegar. 4. Pour the vinegar into the cup.
Debrief **Liked Best, Next Time (LBNT)** Students talk about the activity and share what they enjoyed most and/or what else they would have liked to have done, or what they would have liked to have spent more time on. Students get to express an opinion about the day.

Reflection (Confirm, Tweak, Aha!)

Sample: I didn't know that the bubbles that are created are filled with carbon dioxide gas; that when you add an acid (vinegar) and a base (baking soda) carbon dioxide is formed.

Your Reflection:

Modification
Have volunteers ready to help younger students create the foil volcano. Better yet, have volunteers make the volcanoes ahead of time.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	Grades 4-6
Lesson Title:	Cake Batter Lava
Focus:	Volcanoes

Materials: Boxed cake mix without pudding added, water, wire whisk, bowl, baking sheet or wooden inclined board, grid with 10-cm spacing onto paper, plastic wrap, data tables, ruler

Opening

State the Objective

In this activity, students will use cake batter to simulate surface lava flows.

Gain prior knowledge by asking students, "What do you know about _____?"

Real lava flows are complicated. They have a prominent lava channel confined between levees. Shear zones, places where one portion of the flow is moving faster than an adjacent portion, usually occur. Levees form on the outer part of the flow. Inside the levees, the lava moves downhill. Ridges may develop in the flowing portions. The thickness of the flow varies with slope, time, and amount of lava.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Mix the dry cake mix with water only. Smooth with a wire whisk to the consistency of thick cream.
2. The final mixture should be fairly uniform with only a few lumps.
3. Draw a grid with 10-cm spacing onto paper taped to the baking sheet or wooden board. Then cover with plastic wrap.
4. Angle the baking sheet or board propped up to an angle of 15 degrees.

Students practice ("You do")

1. Have a group of students model the activity for the whole class.
2. Students should pour the batter slowly and at a constant rate down the inclined board.
3. First and foremost, is to observe the formation of distinct features in the flow: levees, ridges, and interior channel.
4. At each 10 cm mark the students will record the time the flow passes the mark, measure the length of the flow, measure the width of the flow, and measure the center dept of the flow. Record these values on a data sheet.
5. When the batter is flowing down the slope, look for areas near the edges where the flow rate is low or zero. These are the levees of the channel.
6. The part in the middle that is moving faster is called the channel interior.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- How do you know that . . . ?
- What would happen if . . . ?

Closing
Review 1. Prepare the cake mix, baking pan, or wooden board. 2. Look for levees, ridges and the interior flow. 3. Record the time the flow front passes the 10-cm mark. 4. Measure the length, width and center depth of the flow. 5. Record the data.
Debrief **Likes and Dislikes** Create a chart and list what students liked and what students didn't like about the activity.

Reflection (Confirm, Tweak, Aha!)

Sample: We learned that lava doesn't flow at the same rate.

Your Reflection:

Modification of lesson:

1. Sprinkle red confetti onto the flow to get a better view of the movement between the channel and the levees.
2. Add more flour to the batter to see the behavior of a thick flow.
3. How do the two flows compare?
4. Ask questions based on the information in Prior Knowledge.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	Giant Cooling Vent
Focus:	Volcanoes

Materials: Newspaper, modeling clay, salt dough, or soil, small empty plastic soda bottle, baking pan, red food coloring, liquid detergent, two tablespoons baking soda, funnel, and vinegar

Opening

State the Objective

Children will understand that a volcano can act as a giant cooking vent for Earth's inner core.

Gain prior knowledge by asking students, "What do you know about _____?"

Review with students what they have learned about volcanoes. Include the following information: At Earth's center is a core of hot liquid iron and nickel. The Earth is made up of interlocking pieces of land called tectonic plates. Heat from the Earth's core can escape to the outside through a gap between tectonic plates, or heat can "punch" through the middle of a tectonic plate, releasing pressure and heat to the outside.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Tell students they are going to create a model volcano that will help them visualize what a real volcanic eruption is like.
2. Demonstrate the lesson to the whole group. See procedure below.
3. Divide class into groups, distributing materials to each group.

Students Practice ("You do")

1. Cover the work area with newspaper.
2. In each group, place the soda bottle on the baking pan.
3. Mold the clay, dough, or soil into a "mountain" around the bottle. Do not cover the bottle opening.
4. Fill the bottle almost to the top with warm water mixed with a little red food coloring.
5. Add 6 drops of liquid detergent to the bottle.
6. Add two tablespoons baking soda to the bottle, using the funnel.
7. Also using the funnel, have students pour the vinegar slowly into the bottle.
8. Watch for a volcano explosion!

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

Here are sample questions to ask students:

- What questions would you ask?
- How would you improve this activity?

Closing

Review

1. First we covered the work space with newspaper. We placed a soda bottle on a baking tray.
2. Then we molded clay, dough, or soil around the bottle to make a mountain.
3. Next we filled the bottle almost to the top with warm water and red food coloring.
4. Then we added 6 drops of liquid detergent and two tablespoons of baking soda to the bottle.
5. Finally we watched a volcanic explosion.

Debrief

Three What's

1. What did you enjoy most about this activity?
2. What was the biggest challenge with this activity?
3. What did you learn from the group?

Reflection (Confirm, Tweak, Aha!)

Sample: We learned that the volcano did not erupt until we added the vinegar.

Your Reflection:

Modification of Lesson:

With younger students, do the activity with the whole group.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	Submarine Volcanoes
Focus:	Volcanoes \

Materials: Classroom white board, dry erase markers, individual white boards, white butcher paper, markers

Opening

State the Objective

In this activity, students will learn that volcanoes can be submerged under the ocean.

Gain prior knowledge by asking students, "What do you know about _____?"

Volcanoes are one of the most destructive forces in nature. They are found all over the world. Volcanoes are on land and under the sea. There are nine stages of development for submarine volcanoes. This lesson is all about how volcanoes develop, first as submarines, then as volcanoes above sea level. Here is an internet resource of Submarine Volcano Stages - Kamalli.k12.hi.us/CyberFair%2099/volcano_stages.htm

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Ask students, "What is a volcano? Where is the closest volcano? Is there a volcano that would erupt near your home? Can you touch lava? What would happen if lava touched a car?"
2. There is an idiom which is "Blow your top off." What does the idiom mean? (When a person gets very angry, he is letting off steam) Can you compare the idiom to a volcano?
3. Draw a picture of a volcano erupting and a person erupting, or blowing off steam.

Students practice ("You do")

1. Provide students with white boards or drawing paper. Tape a large piece of butcher paper on the wall. The teacher draws each stage on the white board, and then students draw each stage of submarine volcanoes. Here are the stages:
    - Deep Submarine – The volcano is completely submerged below sea level.
    - Shallow Stage – The volcano is just below the surface of the water.
    - Shield Building Stage – A broad, gently sloping cone with a flat top emerges above sea level.
    - Capping Stage – With each lava eruption, the cone continues to grow above sea level.
    - Erosion Stage – The volcano begins to wear down. In warm waters,

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- "How do volcanoes get underwater?"
- "What would happen if we plugged up the hole in the middle of the volcano?"

reefs begin to grow around the sides. ▪ Secondary Atoll Stage - New eruptions occur with an ash cloud. ▪ Atoll Stage – Land above sea level has eroded away. The reefs are still growing. ▪ Guyot (Underwater Mountain) Stage – The top is so eroded that the mount is left below sea level. 2. Students share drawings. If done on paper, glue them to the butcher paper.	

Closing
Review 1. Talk about the idiom "blowing your top off." 2. Discuss the difference between land and submarine volcanoes. 3. Teacher and students draw each stage of a submarine volcano. 4. Share drawings of each stage.
Debrief **Three Whats** Ask the following three "what" questions: 1. What did you enjoy most about this activity? 2. What was the biggest challenge with this activity? 3. What was one thing you learned about submarine volcanoes?

Reflection (Confirm, Tweak, Aha!)

Sample: "I learned that submarine volcanoes can be active and have lava flows."

Your Reflection:

Modification of lesson:

1. Younger students might choose one stage and paint a picture of that stage to be displayed on the butcher paper.
2. It isn't necessary to draw all the stages in one session. Divide the lesson over two or three days.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	Toothpaste Chain Volcanoes
Focus:	Volcanoes

Materials: Poster board or a thin cardboard (24" x 12"), marker, toothpaste, squeezable bottles of ketchup or mustard (optional), tool to punch several holes in the cardboard

Opening

State the Objective

Students will describe how chain volcanoes form over a hotspot.

Gain prior knowledge by asking students, "What do you know about _____?"

Unlike most volcanoes, which are found at plate boundaries, Hawaiian volcanoes are found in the middle of the Pacific Plate. A hotspot below the plate provides a source of magma that fuels volcanic eruptions. Long-lasting eruptions from the hotspot produced the Hawaiian Islands. In this activity, students will see how a plate moving over a hotspot can produce a chain of island volcanoes.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Check for understanding of these words: volcano (formed from lava flows), Hawaii (The big island in the Hawaiian chain of volcanoes), Hawaiian (anything from Hawaii), hotspot (hot lava close to the surface), plates (interlocking land masses on Earth. Show two pieces of a puzzle and how they fit together), magma (liquid rock or lava), chain of volcanoes (volcanoes connected in a chain-like formation).
2. Punch several holes resembling a chain, in the cardboard. On the last opening, punch 3 holes close together.
3. Explain that the cardboard represents one of the Earth's plates. The holes represent weak points in the crust that allow the formation of volcanoes.
4. The toothpaste and ketchup represents a hotspot.
5. Using student helpers, demonstrate this lesson for the whole class.

Students Practice ("You do")

1. Hold the toothpaste under the cardboard.
2. While squeezing the toothpaste tube, move the cardboard over the top to represent a plate moving over a hotspot to form a chain of volcanoes.
3. The toothpaste should squeeze up through the holes and form mounds.
4. A large mound should form over the three holes punched close together.
5. Ask students to discuss the shape and form of the toothpaste volcanoes you made.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- "How can one mountain be a volcano, and another mountain not a volcano?"
- "What do you mean by Pacific Plate? Are there paper plates out in the Pacific Ocean?"

6. Repeat the process using ketchup as the hotspot. 7. How does the thickness or thinness of the toothpaste and ketchup affect how the volcano looks?	

Closing

Review

1. Punch holes in a piece of cardboard.
2. Squeeze toothpaste under the cardboard as you move the cardboard.
3. Talk about how the toothpaste forms mounds. Do they look like volcanoes?
4. Repeat the process with ketchup.
5. Do the mounds or volcanoes look the same as toothpaste mounds?

Debrief

Best Learning

1. What was your best learning from this activity?
2. What didn't you like about the activity?
3. How can we change the activity to make it better?

Reflection (Confirm, Tweak, Aha!)

Sample: "I learned that the Hawaiian Islands are all volcanoes, or mountains which started below sea level in the Pacific Ocean."

Your Reflection:

Modification of Lesson:

1. Model the lesson for younger students.
2. If you divide students into groups to do the activity, have volunteers to monitor the squeezing of the toothpaste and ketchup tubes.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	Hurricane Safety
Focus:	Amazing Weather

Materials: Classroom white board, individual white boards, markers

Opening

State the Objective

In this lesson, students will have an understanding about hurricanes and learn valuable safety tips for any storm.

Gain prior knowledge by asking students, "What do you know about _____?"

A hurricane is a huge storm. It can be up to 600 miles across and have strong winds spiraling inward and upward at speeds of 75 to 200 mph. Each hurricane may last up to a week, gathering energy from warm tropical waters north of the equator. The winds rotate counter-clockwise around the "eye." In the center of the hurricane is an "eye." It is the calmest part of the storm. As the hurricane moves toward land, the heavy rain, strong winds and large waves can damage buildings, trees and cars. Eventually, the hurricane will lose its energy over land.

The Atlantic hurricane season is from June 1 to November 30, but most hurricanes occur during the fall months.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Imagine you are above a hurricane looking down. Have students draw a picture showing huge clouds rotating counter-clockwise, swirling very fast. Remember to place the "eye" of the hurricane in the middle. There are very light winds and fair weather in the "eye." Draw the hurricane over the ocean.
2. Ask questions about hurricane safety. Give no answers. Just ask the questions. For example: How can I keep my pet safe during a hurricane?"

Students Practice ("You do")

1. Divide students into groups.
2. Students brainstorm how to be safe during a hurricane. Give each group a different topic to brainstorm: Before a Hurricane, During a Hurricane, After a Hurricane, and Hurricane Supply Checklist.
3. The U.S. Weather Bureau gives names to hurricanes. Ask students to think of 26 names, one for each letter of the alphabet, ready to name hurricanes, should they occur. For example: Able-Ben-Charlie-David-Elizabeth-Frank and so on.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- "How many hurricanes does the state of Florida have in one year?"
- "What is the best way to dodge a hurricane?"

Consult 4 Kids Lesson Plans

Closing

Review

1. Draw a picture, from a bird's eye view, of a hurricane. Include the "eye" in the middle.
2. Students brainstorm in groups various safety topics relating to hurricanes.
3. Student groups give hurricanes names.

Debrief

Three-Step Debrief

1. What was your key learning from this activity?
2. What didn't you like about this activity?
3. How can we make this activity better next time?

Reflection (Confirm, Tweak, Aha!)

- Ask students to think about what they did today.
- Ask them to comment on what they did today was something they already knew how to do. (Confirmation)
- Ask them to comment on what they did today that was like something they had done before except in one particular way which was new to them. (Tweak)
- Ask them to comment on something (if anything) they have learned today that was brand new to them.

Modification of lesson:

1. Have younger students tell their partner one way to be safe during a very bad storm.
2. Ask students to share their ideas with the class.
3. Choose a class name for a hurricane.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	Make Lightning!
Focus:	Amazing Weather

Materials: Styrofoam plate, thumbtack, pencil with new eraser, aluminum pie pan, small piece of wool fabric

Opening

State the Objective

The purpose of this activity is to observe lightning formation.

Gain prior knowledge by asking students, "What do you know about _____?"

Lightning is an electric current. Have you ever gotten a shock by shuffling across a carpet and then touching something made of metal? Then you have experienced the same process that makes lightning. Within a thundercloud, many small bits of ice bump into each other as they swirl around in the air. All these collisions create a negative electrical charge, just like the one that built up in you when you crossed the carpet.

After a while, the whole cloud fills up with electrical charges. Since opposites attract each other, this attraction causes a positive charge to build up on the ground beneath the cloud. The charge streaming up from high points (mountains, trees, or people) connects with a charge reaching down from the clouds, and ZAP! - Lightning strikes!

To find out how many miles away the lightning is, when you see lightning, begin counting, "One Mississippi, two Mississippi, etc." If you counted, "Three Mississippi," you know that when you hear the thunder, the lightning was three miles away.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")	*Activity → Teachable Moment(s) *throughout*
1. Ask students what they know about lightning. A few students may be afraid of the sound of thunder. Let students express their feelings. 2. Lightning is dangerous. Talk about being safe in a thunderstorm. Brainstorm safety ideas: Get into a house or car. Stay away from tall trees or poles, open areas like field, bodies of water, like lakes or the ocean, metal fences, sports equipment, bikes, etc. **3.** Model the lesson for the students.	Tip: Teachers, listen for questions that begin with "what" or "how."
Students Practice ("You do") 1. Divide students into groups. Provide materials for each group. 2. Push the thumbtack through the center of the aluminum pie pan from the bottom. 3. Push the eraser end of the pencil into the thumbtack. The pencil becomes a handle to lift the pan. 4. Put the Styrofoam plate upside-down on a table. 5. Rub the underside of the plate with the wool for one minute. 6. Rub hard and fast for 30 seconds! 7. Replace the pie pan on the Styrofoam plate. 8. Touch the pie pan with your finger. If you don't feel anything when you touch the pan, try rubbing the plate again. 9. Try turning the light out before touching the pan. Do you see anything when you touch the pan? (You should see tiny flashes or sparks of static electricity.)	• "What does a bolt of lightning look like?" • How many people are struck by lightning each year? (about 500)"

Consult 4 Kids Lesson Plans

Closing

Review

1. First we attached the pencil to the pie pan with a tack.
2. Then we picked up the metal pan and rubbed it vigorously with the wool cloth.
3. Next we touched the pie pan so see if we could feel a shock.
4. Finally we turned the lights out before touching the pan.

Debrief

What's Important About That?

Unlike other debriefs, focus only on one student's opinion. Begin with, "What was so important about this activity?" He may respond with, "It is important to learn about lighting." Next question, "What's so important about lightning?" Student answers, "Lightning is important because it gives us electricity." Teacher, "What is so important about electricity?" Carry on the process for up to five questions. At the end, the teacher says, "Then what I heard you say is that the importance of electricity is . . . "

Reflection (Confirm, Tweak, Aha!)

Ask students to think about what they did today.

Ask them to comment on what they did today was something they already knew how to do. (Confirmation)

Ask them to comment on what they did today that was like something they had done before except in one particular way which was new to them. (Tweak)

Ask them to comment on something (if anything) they have learned today that was brand new to them.

Modification of Lesson:

1. Younger students may need help pushing the tack through the aluminum pie plate into the eraser.
2. You can provide this step already assembled.
3. Expand the lesson by rubbing a wool cloth on an inflated balloon for 30 seconds. Hold a paper clip close to the balloon. Watch the sparks of static electricity jump from the balloon to the paper clip.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	Make Lightning in Your Mouth
Focus:	Amazing Weather

Materials: Wintergreen or Pop-O-Mint Lifesavers®, mirrors for each partner-pair, a dark room

Opening

State the Objective

The purpose of this activity is to demonstrate that crunching on a Wintergreen Lifesaver® creates a mini-lightning storm in your mouth. Through a hands-on demonstration, participants will see sparks of electricity and make a comparison to lightning.

Gain prior knowledge by asking students, "What do you know about _____?"

Lightning is a bright flash of electricity produced by a thunderstorm. All thunderstorms produce lightning and are very dangerous. If you hear the sound of thunder, then you are in danger from lightning.

How can lightning occur in your mouth? When you break the lifesaver apart, you're breaking apart sugars inside the candy. The sugars release little electrical charges in the air. These charges attract the oppositely charged nitrogen in the air. When the two meet, they react in a tiny spark that you can see.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Review what students know about lightning.
2. Ask, "Where does lightning form?
3. Have students make predictions about what will happen when they break apart the Lfesaver® in their mouths. "I predict . . . "
4. Will there be more sparks if you chew more than one Lifesaver® at a time?

Students Practice ("You do")

1. Give each student a wintergreen candy.
2. Ask the students to go into a really dark room and stand in front of the mirror.
3. Wait a few minutes until their eyes get accustomed to the darkness.
4. Ask the students to place the mint Lifesaver® in their mouths.
5. While keeping their mouths open, ask them to break the candy with their teeth and look for sparks. If they do it right, they should see bluish flashes of light.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- "What other candy will make sparks in my mouth?"
- How can you make the sparks keep sparking?"

Closing

Review

1. First, go into a very dark room. Have a mirror in front of you.
2. Place the candy in your mouth.
3. Keeping your mouth open, begin chewing the mint.
4. You should see bluish flashes of light.

Debrief

Three Whats

Ask the following three "what" questions:

1. What were some of the questions that you thought of?
2. What was the biggest challenge of this activity?
3. What did you learn from the group?

Consult 4 Kids Lesson Plans

Reflection (Confirm, Tweak, Aha!)

Ask students to think about what they did today.

Ask them to comment on what they did today was something they already knew how to do. (Confirmation)

Ask them to comment on what they did today that was like something they had done before except in one particular way which was new to them. (Tweak)

Ask them to comment on something (if anything) they have learned today that was brand new to them.

Modification of lesson:

1. Are sparks in your mouth every time you do the activity? Why or why not?
2. With younger children, talk about the experience of being in a dark room. Practice this, so they will feel safe.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	Suck an Egg into a Bottle
Focus:	Amazing Weather

Materials: Glass bottle with a long, narrow neck (an apple cider jug works well), boiled egg, lighter or matches

Opening

State the Objective

In this activity students are learning about air pressure. Students should watch as an egg somehow amazingly, can pass through a bottle that has a smaller opening than the diameter of the egg.

Gain prior knowledge by asking students, "What do you know about _____?"

Did you know that there is a recipe for weather? Here it is. In order to have weather, you need four components: temperature, pressure, volume, and density. In this activity, students are learning about air pressure. Because there are miles of air above us and it is all pushing down, the air at the bottom gets squeezed like the pressure you feel at the bottom of a swimming pool.

The egg is actually pushed inside the bottle by atmospheric pressure. The match heats the air inside the bottle causing it to expand. When the match goes out, the pressure inside the bottle drops below the outside pressure, therefore pushing the egg in from the outside. Air pressure is always trying to equalize itself.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")	*Activity → Teachable Moment(s) *throughout*
1. Choose eggs that are more than 5 days old. Fresh eggs are hard to peel. Prior to the lesson, boil the egg. I would boil two or three eggs so you can repeat the activity. 2. Do this lesson with the whole class. Find a safe place to conduct the experiment far away from flammable materials. 3. Students make predictions about what will happen when you put the lighted match into the bottle.	Tip: Teachers, listen for questions that begin with "what" or "how."
Students Practice ("You Do") 1. Put the empty bottle on a table. 2. Peel the boiled egg. 3. Light a match. Place it inside the bottle while the match is still burning. 4. Quickly put the egg over the mouth of the bottle. 5. Watch as the egg gets sucked into the bottle.	• "How would this work if you used an unpeeled egg?" • "What would you do to *remove* the egg from the bottle?"

Consult 4 Kids Lesson Plans

Closing
Review 1. Peel a hard-boiled egg. 2. Drop a lighted match into a bottle. 3. Place the peeled egg over the top of the bottle. 4. Watch the egg being pushed into the bottle.
Debrief **Likes and Dislikes** 1. Create a chart and list what students like and what students didn't like about the activity. **2.** Share their responses.

Reflection (Confirm, Tweak, Aha!)

Ask students to think about what they did today.

Ask them to comment on what they did today was something they already knew how to do. (Confirmation)

Ask them to comment on what they did today that was like something they had done before except in one particular way which was new to them. (Tweak)

Ask them to comment on something (if anything) they have learned today that was brand new to them.

Modification of lesson:

1. Safety if your utmost priority. Keep matches with you at all times. Never leave them unattended.
2. You might have students act out how the air pressure pushes the egg into the bottle.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	Twister in a Jar
Focus:	Amazing Weather

Materials: Classroom white board, individual student white boards, markers, 8 oz, jar with lid, water, vinegar, clear liquid dish soap, pinch of glitter

Opening

State the Objective

The purpose of this experiment is to observe how a vortex (tornado) forms.

Gain prior knowledge by asking students, "What do you know about _____?"

A tornado is a space of very violent weather. It begins as an area of low pressure inside a thunderhead. The low pressure is caused by rising warm air. As the air rises, it pulls warm, moist air up into the cloud at very high speeds. The rising air begins to spin and soon picks up speed, whirling faster and faster. Moisture begins to condense forming a funnel. The funnel dips down from the cloud. The rain and hail in the thunderstorm cause the funnel to touch down creating a tornado. If the tornado reaches the ground, it races along, usually leaving a path of destruction. Tornados may last only a few minutes.

Most tornados in the United States occur in the Midwest, in an area known as Tornado Alley. This area includes Texas, Oklahoma, Kansas, Missouri, Nebraska, Iowa, Illinois, and Indiana.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Use white boards to draw a model of a tornado. Include ground with houses and trees, funnel cloud touching the ground curving upward, increasing in width, and the funnel merging into the giant thunderstorm.
2. Clarify these terms: vortex (tornado), thunderstorm (large clouds with flat tops and dark bottoms, rain, thunder and lightning), and funnel shaped (wide at the top getting progressively more narrow at the bottom).
3. Model the activity. See procedure below.

Students practice ("You do")

1. Divide students into groups. Provide each group with materials.
2. Fill the jar ¾ full of water.
3. Put one teaspoon of vinegar and one teaspoon of dish soap into the water.
4. Sprinkle a small amount of glitter into the mixture.
5. Close the lid and twist the jar to see a vortex or funnel shape form.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- "What causes the tornado to rotate?"
- "How can we keep safe during a tornado?"

Consult 4 Kids Lesson Plans

Closing
Review 1. Talk about tornados. 2. Fill jar ¾ full of water. 3. Add vinegar, dish soap and glitter. 4. Close the lid and twist the jar to see a vortex, like a tornado, form.
Debrief **WHI?** 5. What were some of the questions that came up in your group? 6. How did you go about including everyone? 7. If you were to try this again, what might you do differently?

Reflection (Confirm, Tweak, Aha!)

- Ask students to think about what they did today.
- Ask them to comment on what they did today was something they already knew how to do. (Confirmation)
- Ask them to comment on what they did today that was like something they had done before except in one particular way which was new to them. (Tweak)
- Ask them to comment on something (if anything) they have learned today that was brand new to them.

Modification of lesson:

1. Model how to twist the jar. Do students need to shake the jar, or will simple rotations do the trick?
2. Talk about houses with basements. Since violent tornadoes can rip roofs off houses, where is a safe place to stay during a storm? (basement, interior room with no windows, or bathtub) Often tornados don't pick up the bathtub in the house. Do you have a basement where you live?
3. Draw a picture of people in the basement during a storm. What supplies should be in the basement to keep people comfortable? (water, food, blankets, portable radio, first-aid kit, and flashlights)

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	Amazing Flying Machines
Focus:	Celebrating Traditions

Materials: Scissors, ruler, 3 x 5 inch file cards (or a file folder or some other stiff paper), clear plastic tape, plastic straws (not the kind that bend)

Opening

State the Objective

The objective is to teach kids that paper airplanes, made of hoops, can really fly.

Gain prior knowledge by asking students, "What do you know about _____?"

Mankind has always dreamed of being able to fly. In ancient times, there were attempts at flight. Even with one failure after another, each generation has kept up the effort. We could say that it has been a tradition over time, to build a better flying machine. People have experimented with wings attached to their arms, gliders, airships, balloons, kites, and fixed wing aircraft. Countless hours have been spent perfecting each machine. In 1480 Leonardo da Vinci dreamed about a flying machine. His sketches eventually led to the helicopter. Wilbur and Orville Wright in 1903 are given credit for the first fixed wing flying machine. In this activity, we take a different approach to see if paper hoops can fly.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Hoop Airplanes fly best outdoors on a day that's not too windy.
2. Demonstrate how to cut, make the hoops and tape them to the straw.
3. Give students plenty of time to experiment with their Hoop Airplane.
4. Allow group time to develop new designs for their Hoop Airplane.

Students Practice ("You Do")

1. Cut a file card the long way into three equal strips. If you are using stiff paper, make three strips that are 1 inch wide and 5 inches long.
2. Put a piece of tape on the end of one strip. Curl the paper into a little hoop and tape the ends together.
3. Put the other two strips end to end, so they overlap a little. Tape them together to make one long strip, and put another piece of tape on one end. Curl the strip into a hoop and tape the ends together.
4. Put one end of a straw onto the middle of a strip of tape. Put the big hoop on top of the straw and fold the tape up the sides of the hoop.
5. This part can be tricky. Put another strip of tape at the other end of the straw. Press the small hoop very gently onto the tape. Move it around until it lines up with

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- Student: "How could you make a really large Hoop Airplane?"
- Teacher: "What materials would you need?

the big hoop, then press the tape down firmly. 6. Let's fly our Hoop Airplanes! Hold the Hoop Airplane in the middle of the straw, with the little hoop in front. Throw it like a spear. It may take a little practice, but once you get the hang of it, your Hoop Airplane will really fly.	

Closing

Review

First we cut three 5-inch strips of stiff paper. Then we curled the first strip into a little hoop and taped it together. Next we taped two strips together to make a big hoop. We then attached the two hoops to the straw; the big hoop at one end and the small hoop at the other end. Finally we threw our hoop airplane like a spear to see if it would fly. It did!

Debrief

Ask the following three questions:

1. What were some of the questions that came up in your group?
2. How did you go about including everyone?
3. If you were to try this again, what might you do differently?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "I can't believe that something that looks so weird will actually fly."

Your Reflection:

Modification of lesson:

Here are other things you can try:

1. Put a paper clip at the bottom of the small hoop.
2. Make a really long Hoop Airplane with two straws. Cut a slit at the end of one straw and pinch it so it fits inside the other straw, then tape them together.
3. Make a double Hoop Airplane with two little hoops side by side on one end and two big hoops side by side on the other. You will need two file cards.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	Bubble Blowing
Focus:	Celebrating Traditions

Materials: For each group of 4 students you will need 4 personal plastic straws, 8 6-inch plastic coated wires, 4 small paper cups each with a hole one-inch from the bottom of the cup made slightly smaller in circumference than the plastic straw, 4 clear plastic cups, 4 shallow bowls, 1 whisk, 1 egg beater, 1 spatula, 1 spoon, 1 bucket, 1 bottle dish soap (Dawn works best), or Tide regular powder detergent, 1 bottle glycerin or Light Karo Syrup, and several containers of water.
.

Opening

State the Objective

Students will test bubble mixtures, design wands, and investigate the properties of bubbles.

Gain prior knowledge by asking students, "What do you know about _____?"

The tradition of bubble blowing has been around for many years. In fact, during the mid-1800's, an advertising campaign by the Pears Soap Company, showed Pears Soap being used to make soap bubbles. Soon, it became a child's toy. Even without money, children found they could bend wire into a circle and create bubbles by using soapy water. Since then, bubble blowers of all sorts have been invented, but most of us still use the hand-held wand and soapy water.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. CAUTION: Work outside. As soon as the activity is over, use a water/vinegar solution to mop over places where bubbles landed. Beware of slippery floors. Students should not drink the soap solutions.
2. There are many ways to extend this lesson. You may want to spread the activities over several days.
3. As a whole group, demonstrate these 3 recipes for making bubble mixtures.
   - Original Bubble: Mix 1 part liquid dish soap, 1 part glycerin (or Light Karo Syrup), and 20 parts water. Allow to stand overnight.
   - Dawn Delight: Mix liquid dish soap (Dawn words best) with water until soapy. The more soap, the more stable the bubbles.
   - Bubble Brew: Mix 1 gallon water with 2/3 cup Dawn dishwashing liquid and 1 tablespoon glycerin.
4. The possibilities for this lesson are endless and not all mentioned here. Take a look at the materials, and challenge kids to think of uses for the materials.
5. Depending on availability of materials, pass out unusual items for making bubbles, ice, a strainer, plastic rings from six-packs, pipe cleaners bent into different shapes, a wooden bead, a funnel, the circular end of a blunt scissors, berry baskets, fly swatters, and potato chip tube containers.

*Activity → Teachable Moment(s) *throughout*

Tip: Teachers, listen for questions that begin with "what" or "how."

- Student: "What would it take to blow a bubble around a person?"
- Teacher:"How many ways can you think of blowing a bubble around a person?"

Students Practice ("You Do")	
1. Divide students into small groups. 2. Provide students with materials. 3. Compare plain and soapy water. Students should be unaware of which bowl contains plain and soapy water. 4. Whisk and beat the solutions in each bowl. 5. Do the same using the spatula and spoon. 6. Describe what happened. 7. Ask students to make different shaped wands. 8. Pass a folded paper to each student and have them draw or trace their bubble wand on the left fold. 9. Have them look at their wand and predict the shape the bubble will be coming from their wand. Draw that bubble on the right side of the fold.	

Closing

Review

First we mixed three separate solutions of soapy water. Then we compared blowing bubbles with plain and soapy water. Next we made wands from different materials. Finally we used unusual items to make bubbles.

Debrief

WHI?

Ask the following three questions:

1. What were some of the questions that came up in your group?
2. How did you go about including everyone?
3. If you were to try this again, what might you do differently?

Reflection (Confirm, Tweak, Aha!)
Sample Reflection: "Students really liked experimenting with different wands and solutions. This was a great learning tool."
Your Reflection:

Modification of Lesson:

Finding a rainbow in a bubble is a great extension of this lesson. There are many lessons you can download that use bubbles to teach science lessons on light, rainbows, and surface tension.

Try these activities:

1. Catch a Bubble - Catch a bubble with a dry hand, then with a wet hand. Which bubble lasts longer? Why?
2. Lifetime of a Bubble – In partner-pairs, one person blows a bubble. The other person counts seconds to see how long the bubble will last. Try counting a few bubbles. Compare the number of seconds with classmates.
3. Read this poem by Carl Sandburg to the students. Talk about it.

Bubbles

Two bubbles found they had rainbows on their curves
They flickered out saying,
"It was worth being a bubble just to have held that
rainbow thirty seconds."

Consult 4 Kids Lesson Plans

Component	Science
Grade Level:	K-5
Lesson Title:	Building Towers
Focus:	Celebrating Traditions

Materials: Bags of mini-marshmallows, colored round toothpicks, spaghetti noodles, bag of larger marshmallows, individual white boards with markers, ruler or measuring tape for determining the winning group

Opening

State the Objective

The objectives of this activity are to help students become aware of the principles of structural engineering, including force, geometry, and teamwork.

The goal is to see who can build the tallest structure out of a limited number of toothpicks and/or spaghetti and marshmallows.

Gain prior knowledge by asking students, "What do you know about _____?"

People have been building towers for centuries. Mankind has always tried to build tall towers. Building towers is a tradition that is on-going. A tower can be an imposing structure, one that attracts tourists, with a WOW! factor. Each generation of young people likes to build towers with toy building blocks. The most fun part, of course, is knocking the tower down when they are finished!

Some basic principles of tower building are stretching and squashing. Even though these marshmallow structures are standing still, their parts are always pulling and pushing each other. The parts that are being pulled or stretched are in tension. The parts that are being squashed are in compression.

You can figure out whether something is in tension or compression by imagining yourself in that object's place. Strong building materials like cement blocks are strong and don't squash easily. Others like steel cables or rubber bands are strong under tension. Steel bars, toothpicks, or spaghetti are strong under both compression and tension.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")	***Activity → Teachable Moment(s) *throughout***
1. Motivate the kids by asking these or similar questions: ▪ What is a tower? Is this building a tower? ▪ How do you think engineers built this building? ▪ What are the steps in constructing a tower? ▪ Ask students to draw a tower on the class white board or on individual white boards. ▪ Should the tower be wider at the base or wider at the top? ▪ Do you know what the world's most famous towers are? (Big Ben Clock Tower, London England 1859, Leaning Tower of Pisa, Pisa, Italy 1178, and	Tip: Teachers, listen for questions that begin with "what" or "how." • Student: "How can marshmallows be a strong connector?

the Eiffel Tower, Paris, France 1889) 2. Demonstrate the activity with big marshmallows and spaghetti. Should we use a triangle or a square?	They are squishy." • Teacher: "What other connectors would you suggest?"
Students Practice ("You Do") 1. Split kids into groups of 2-3. 2. Give each group 50 marshmallows and 100 colored toothpicks, or 20-25 spaghetti noodles. 3. Let them build for about 20 minutes. 4. Help them along the way with hints: (1) Triangles are stronger than squares. (2) A strong foundation goes a long way. 5. Measure the height of each structure to determine the winning group.	

Closing
Review First we learned about towers. Then we learned which was the stronger building block – a square or a triangle. After that we worked in small groups to construct the tallest towers. Finally we measured the towers and determined the winner.
Debrief **Three Whats** Ask the following three "what" questions: 1. What did you enjoy most about this activity? 2. What was the biggest challenge with this activity? 3. What did you learn from the group?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "Human beings love to live in square shaped things (for example the room we are in). So how do we make things strong?"

Your Reflection:

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	Fireworks
Focus:	Celebrating Traditions

Materials:

- Fireworks in a Glass: Water, oil, food coloring, tall clear glass, another cup or glass, and a fork
- Fireworks in Your Mouth: Wintergreen or Pop-O-Mint Lifesavers®, mirrors for each partner-pair, a dark room

Opening

State the Objective

The purpose of Fireworks in a Glass is to experiment with safe underwater "fireworks."

The purpose of Fireworks in Your Mouth is to demonstrate that crunching on a Wintergreen Lifesaver® creates a mini-lightning storm, or fireworks in your mouth. Students will see sparks of electricity.

Gain prior knowledge by asking students, "What do you know about _____?"

Fireworks in a Glass: Food coloring dissolves in water, but not in oil. When you stir the food coloring in the oil, you are breaking up the coloring droplets. Oil is less dense than water, so the oil will float at the top of the glass. As the colored drops sink to the bottom of the oil, they mix with the water. The color moves outward as the heavier colored drop falls to the bottom.

Fireworks in Your Mouth: When you break the lifesaver apart, you are breaking apart sugars inside the candy. The sugars release little electrical charges in the air. These charges attract the oppositely charged nitrogen in the air. When the two meet, they react in a tiny spark that you can see.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

Fireworks in a Glass: Ask students to brainstorm what they think will happen when you add food coloring to the oil and water in the jar.

Fireworks in Your Mouth: Have students make predictions about what will happen when they break apart the Lifesaver® in their mouths. Will there be more sparks if you chew more than one Lifesaver® at a time?

Students Practice ("You Do")

Fireworks in a Glass:

1. Fill the tall glass almost to the top with room-temperature water.
2. Pour a little (1-2 tablespoons) into the other glass.
3. Add a couple drops of food coloring (one drop of red; one drop of blue)

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- Student: "What other candy will make fireworks in my mouth?"
- Teacher: "How do the fireworks explode underwater?"

4. Briefly stir the oil and food coloring mixture with a fork. You want to break the food coloring drops into smaller drops. 5. Pour the oil and coloring mixture into the tall glass. 6. Now watch! The food coloring will slowly sink in the glass, with each droplet expanding outward as it falls, resembling fireworks falling into water. **Fireworks in Your Mouth** 1. Give each student a wintergreen candy. 2. Ask students to go into a really dark room and stand in front of a mirror. 3. Wait a few minutes until their eyes get accustomed to the darkness. 4. Ask students to place the mint Lifesaver® in their mouths. 5. While keeping their mouths open, ask them to break the candy with their teeth and look for fireworks. If they do it right, they should see bluish flashes of light.	

Closing

Review

First we watched underwater fireworks in a glass. Next we created fireworks in our mouths by chewing on a Wintergreen Lifesaver®. For both activities, we worked in small groups.

Debrief

Four Step Debrief

This debrief helps students to "connect the dots" between the activities and apply how the learning may be used in everyday life.

1. Describe what they did.
2. Answer one of the following questions:
   - What were your key learnings?
   - What skills did you use during the activity?
   - How did you feel when participating in the activity?
3. Generalize: How can you use your key learnings in your life?
4. Apply: How can you use the key learnings in your work?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "Next time, I will provide small mirrors for each group."
Your Reflection:

Modification of lesson:

For younger students choose the Fireworks in a Glass activity.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	Great American Pastime – Baseball
Focus:	Celebrating Traditions

Materials: Several baseballs, golf balls and a freezer. To extend the lesson, you will need Silly Putty, ping pong balls, soccer ball, tennis ball, basketball, super ball, and a steel ball.

Opening

State the Objective

The purpose of this activity is to give students an idea of just how bouncy a baseball is.

Gain prior knowledge by asking students, "What do you know about _____?"

When the game of baseball was just beginning, the ball had plenty of "bounce." The earliest baseballs had a rubber core and were somewhat smaller. Today's baseball is about 9 inches in circumference, is made up of layers of yarn over a rubber-coated cork center and may not seem to have bounce to it. If you drop a ball on the field, it won't bounce back much.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Show students how to drop two balls from the same height. This may take some practice.
2. Follow the steps under Student Practice.
3. For slightly better results, try this same experiment with golf balls. The refrigerated ball should bounce about 70% as high.
4. Ask students, "What pulls the ball to the floor?" (Gravity) "Did you know that when the baseball hits the floor, the bottom of the ball is flattened for an instant, and then reshapes itself as it bounces back up?" "What would happen if you drop a ball of putty?" (Rather than bouncing, it hits the floor and flattens.) "Would a steel ball flatten on its bottom?" (No. That is why it bounces back 98 %.)

Students Practice ("You Do")

1. Divide students into small groups.
2. Provide each group with two baseballs.
3. Practice the balls from the same height.
4. Now provide a frozen baseball.
5. Have students drop a frozen baseball and a room temperature ball from the same height.
6. The frozen ball should bounce and 80% as high, or not as high as the room temperature ball.
7. Provide students with other balls to practice dropping.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- Student: "What is in the core of the Earth?"
- Teacher: "How can we find out what makes up the Earth's core?"

Closing

Review

1. First we dropped two baseballs from the same height.
2. Then we dropped a frozen baseball and a room temperature baseball from the same height.
3. We tried dropping a frozen golf ball and a room temperature golf ball from the same height.
4. Finally, we learned that when you lower the temperature of a ball, it doesn't bounce as high.

Debrief

Three Whats

Ask the following three "what" questions:

1. What did you enjoy most about this activity?
2. What was the biggest challenge with this activity?
3. What did you learn from the group?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "Now I know why sports teams don't use soccer balls to play basketball. Basketballs have a greater bounce."

Your Reflection:

Modification of lesson:

To extend this lesson, provide students with a ping pong ball, golf ball, soccer ball, tennis ball, basketball, super ball, and a steel ball. Students can practice bouncing the balls. The goal is for students to learn that a ball's bounciness is determined by the materials in the core of the ball. Hence, when dropped at the same height, the steel ball will get a 98% bounce, whereas the ping pong ball will have a 15% bounce.

Try a similar experiment using frozen hockey pucks. In the game of hockey, the pucks are frozen before every game to reduce their bounciness.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	Picnics – Let's Make Mayonnaise
Focus:	Celebrating Traditions

Materials
Measuring cup and spoon, vegetable oil, 2 mixing bowls, vinegar, mixing spoon, egg beater, 3-4 eggs, small dish, newspaper to cover the work area, white boards or paper, crayons or markers, white board erasers.

Opening

State the Objective

Today we are going to learn what extra ingredient we need to make oil and water mix.

When two liquids do not mix, they are said to be immiscible (Can't be mixed). There are some chemicals that help mx immiscible liquids. They are called emulsifiers. Detergents are emulsifiers. They break up oil into smaller sizes so it can be more easily washed from clothes or dishes. Egg yolks contain lecithin. The lecithin molecules surround oil molecules to keep them from coming together so they stay in a solution longer. Egg yolks are an emulsifier.

Gain prior knowledge by asking students, "What do you know about _____?"

The word 'picnic' began life as a 17th century French word which meant to pick or peck. Over time, the meaning shifted. Now, we think of a picnic as a casual meal eaten outdoors or indoors, usually with everyone expected to bring a covered dish for all to share. Many of these dishes are made with mayonnaise, i. e., sandwiches and salads. As we make our own mayonnaise, think about fun times at a picnic.

1. Ask, "What does it mean to separate an egg?" Demonstrate how to separate an egg.
2. Let's review, "What is an emulsion?" (A mixture of oil and water with an emulsifier.)
3. Name a few emulsions: mayonnaise, most cosmetics, medicines, and paint.

Content (the "Meat")	
Instruction / Demonstration ("I do" – "We do") Demonstrate how to make mayonnaise for the whole class. Use student volunteers. See directions below. a) Add ½ cup vegetable oil to a mixing bowl b) Add one-teaspoon vinegar. Watch what happens. c) Use the eggbeater to mix the vinegar and oil. Stop mixing. d) Watch the mixture for a few minutes. Notice what happens. Vinegar and oil do not stay mixed. e) This is the second activity. In another mixing bowl add one-teaspoon vinegar and one egg yolk. Beat the egg mixture until it is good and sticky. f) Add one-cup oil and two-teaspoons of vinegar. g) Beat the mixture together with an eggbeater. Have everyone watch. Now the	***Activity → Teachable Moment(s) *throughout*** Tip: Listen for questions that begin with "what" or "how." Student: "What would happen if . . . " Teacher: "How do you think we . . . "

oil and vinegar have been mixed. h) You have created an emulsion! Warning: Don't eat this mixture since it contains raw egg. i) To make real mayonnaise, add mustard and salt.	
Students Practice ("You do") Ask students to draw a 4-frame sequence of how to make mayonnaise. a. 1st Frame – Draw the materials b. 2nd Frame – Draw the bowl, eggbeater and oil-vinegar mixture c. 3rd Frame – Draw the bowl, eggbeater, oil, vinegar and egg yolk. d. 4th Frame – Draw the finished product – mayonnaise!	

Closing
Review Say, "Let's review what we did today. First we tried to mix oil and vinegar. The oil and vinegar did not stay mixed. In another bowl, we mixed oil, vinegar and a beaten egg yolk. We created an emulsion. The oil and vinegar stayed mixed."
Debrief **Three What's** Have a student lead the Debrief. Ask the class these three "what" questions: 1. What did you enjoy most about the activity? 2. What was the biggest challenge with this activity? 3. What did you learn from the group?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "I confirm that it would take too long to make mayonnaise at home on a regular basis."

Your Reflection:

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	Playing in the Mud
Focus:	Celebrating Traditions

Materials
Bowl, 1 cup cornstarch, about ½ cup water, spoon, pie plate, food coloring, waxed paper 12" x 12" squares, individual white boards, markers or crayons, newspapers to cover the work area

Opening

State the Objective

Today we are going to mix cornstarch and water to form a suspension.

When we talk about states of matter, we usually talk about the three types: solid like a rock, liquid like water, and gas like the air we breathe. A mixture of cornstarch and water makes what is known as a suspension. A suspension is another state of matter. It can act like a liquid, or when pressed together, it feels like a solid. Suspensions are a mixture of water and a non-dissolved material such as cornstarch.

Gain prior knowledge by asking students, "What do you know about _____?"

One of the fun traditions for children is playing in the mud. Even for older kids and adults, reconnecting with soil and the earth can be nurturing. The mixture we are going to create is great for kids that like to play in the mud.

Ask, "What happens to muddy water if it is allowed to sit for a period of time?" (The mud falls to the bottom. The water is clear again.)

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")	***Activity → Teachable Moment(s) *throughout***
1. "Let's name a few examples of suspensions. We know the first suspension is mud. What else?" (Flour, cornstarch, paint, chalk power suspended in water or air, dust particles suspended in air, algae suspended in water, fog – water suspended in air. 2. Ask students to draw pictures on their white board of bone of these examples. Show the class the pictures. Classmates ask, "What is the suspension?" 3. Make predictions about what will happen when cornstarch is mixed with water. 4. Demonstrate the activity as students gather round to watch. a) Empty 1 cup of cornstarch into a large bowl. b) Stir while you add water slowly. You need the consistency of thick pancake batter. c) It's better to add too little water than too much. d) Add a few drops of food coloring. e) Ask a student to stick his or her hand in the mixture. What does the mixture feel	Tip: Listen for questions that begin with "what" or "how." Student: "Are you sure that fog is a suspension?" Teacher: "Class, help out your classmate. Explain how fog is a suspension."

like? f) Ask a student to roll some mixture into a ball; then leave it alone. What happens? g) Pour water into a pie plate. Ask a student to smack the water with his/her hand. What happened? h) Empty the pie plate. Pour the cornstarch mixture into the pie plate. i) Check out the cornstarch mixture ball we left alone. What is beginning to happen? (Water will be separating from the cornstarch.)	
Students Practice ("You do") 1. Provide each student with waxed paper and a ball of the cornstarch mixture. 2. Students place the ball of cornstarch mixture on the waxed paper. 3. Students smack the cornstarch mixture with their hand. What happened? 4. How does the cornstarch mixture act differently than the water? 5. Quickly squeeze a handful of mixture. It freezes in place acting like a solid. The harder you squeeze, the thicker the mixture becomes. But when you open your hand, and let the mixture relax, it drips like a liquid through your fingers.	

Closing
Review Say, "Let's review what we did today. First we mixed cornstarch and water in a bowl. Then we stuck our hands into the mixture, rolled some of it into a ball, and left it alone. Next, we poured water into a pie plate and smacked it with our hands. Finally we emptied the pie plate, poured the cornstarch mixture into the pie plate and smacked it with our hands. We asked the question, "How does the cornstarch mixture act differently than the water?"
Debrief **WHI?** Ask the following three questions: 1. What were some of the questions that came up in your group? 2. How did you go about including everyone? 3. If you were to try this again, what might you do differently?

Reflection (Confirm, Tweak, Aha!)

Sample: "Now I know that when I mix cornstarch and water, the mixture will not last forever!"
Your Reflection:

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	Strike Up the Band
Focus:	Celebrating Traditions

Materials: Drum, paper clips, tuning fork or metal kitchen fork, basin of water, rubber band strung between two pegs or nails, metal fork and spoon, steel ruler, and a Slinky

Opening

State the Objective

There are four objectives. First, students will understand that sound is a form of energy that travels in waves. Second, they will understand that sound waves can travel through solids, liquids, and gases. Third, they will understand and observe that sound waves travel in a given direction. And fourth, they will observe a variety of sound waves.

Gain prior knowledge by asking students, "What do you know about _____?"

The tradition of people coming to watch and listen to a band, either marching, on stage, or sitting in the stands at an event, is enjoyed by all ages. Marching bands grew out of the military where there were thousands of people who needed to move in the same direction, all together. The troops moved best when everyone stayed in neat rows, spaced evenly apart. Drum beats made it easy to stay together and could be heard at a great distance. In the Congo, African tribes communicate with drum logs. There, the sound of a single drum usually travels 4-5 miles during the heat of the day and 6-7 miles during cool mornings or late evening.

Sound makes molecules of air vibrate (wiggle) which causes each air molecule to knock against the next until the sound travels in wave-like ripples like you would see in a pond. These sound waves travel through the air and are collected by the outer ear.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Have fun with these two lead-up activities:
   - How Sounds are Made: Have ten children line up shoulder to shoulder between the sound source and a giant ear. The child nearest the sound has a sign saying 'SOUND.' The child nearest the ear has the sign which says 'HEAR.' The remaining eight children have signs that say 'AIR.' When the sound is made, the first child wiggles back and forth. The next child wiggles when he/she feels the first child, and so on down the line. The last child holds up the HEAR sign as they feel the wiggle of the child next to them.
   - Voice Box Wiggle: Discuss the concept of the voice box. Have students make high sounds. They can feel the upper part of their vocal cord wiggles by putting their fingers o their throats. Now have the children make low sounds which will wiggle the vocal cords further down in the throat.
2. Ask students what they know about sounds. Brainstorm questions about sound. "Can sound travel in water? Can sound travel in solids? Can sound travel in gasses? Do all vibrations have sound?"

Activity → Teachable Moment(s) *Throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- Student: "How far does sound travel under water?"
- Teacher: "What tool would you use to measure this?"

3. Do the Sound Wave Demonstration: You will need a large bowl, a tuning fork or metal kitchen fork, and water. Fill the bowl half full of water. Ask students to gather round the bowl. Firmly pinch the tines of the fork and immediately dip the tips of the fork into the water. Rippling waves should appear in the water. Do the experiment several times so the maximum number of ripples can be seen. Ask students to visualize sound waves making the air ripple as sound travels to our ears. 4. Discuss moving effectively in groups from Station to Station.	
Students Practice ("You Do") Ahead of time, set up 7 Lab Stations for student to rotate through. 1. Station #1: Drum with Paper Clips on Top. This can be made with wrapping paper over a coffee can, secured with a rubber band. Students should tap on the drum and observe what happens with the paper clips. 2. Station #2: Touch Side of your Throat and Say "Ahh." What do you feel and hear? 3. Station #3: Tuning Fork in Water. Gently strike the tuning fork on the pad and then place it in the water. 4. Station #4: Rubber Band Strung Between Two Pegs or Nails. Pluck the rubber band. What do you see? What do you hear? 5. Station #5: Strike a Fork with another Utensil and Bring it Close to the Ear. What do you hear? What do you see? 6. Station #6: Steel Ruler on the Edge of a Table. Hold one end of the ruler firmly against the top of the table. Snap the other end. That do you see? What do you hear? 7. Station #7: Compare How a Slinky Moves to Sound Waves. Students move the Slinky and watch how the wire or plastic moves.	

Closing
Review First we watched activities that showed how sounds are made. Then we went to each station and did the activity. Finally we talked about what we learned.
Debrief **Liked Best, Next Time (LBNT)** In this simple debrief, students talk about the activity and share what they enjoyed most, what they would have liked to have done, and what they would have liked to have spent more time on.

Reflection (Confirm, Tweak, Aha!)
Sample Reflection: "I liked the way students could actually see the "waves" of sound, like ripples in a pond."

Your Reflection:

Modification of lesson:

There are many activity choices in this lesson. You may want to extend the lesson over two or three days.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	Watching Rainbows
Focus:	Celebrating Traditions

Materials

Catch a Rainbow Demonstration: Red, blue, and yellow food color, 1 cup milk, dish soap, shallow bowl, newspaper to cover the work area

Student Small Groups: Reduce the amount of milk in each shallow bowl.

Reflecting Rainbows: 12-15 Compact discs (CD) (If you don't own any CD's, you can buy old ones at garage sales. Or ask at a record store if they will give you CD's that won't play.), white paper, sunshine or a bright flashlight.

Opening

State the Objective

Catch a Rainbow: Today we are going to mix primary colors and watch what happens.

Reflecting Rainbows: The objective is to learn that colors you see on the CD are created by white light reflecting from small ridges or scratches in the metal.

Gain prior knowledge by asking students, "What do you know about _____?"

Catch a Rainbow: Red, blue and yellow are called primary colors. Just by mixing these colors, you can get all the colors of the rainbow. To make secondary colors, mix red and yellow to make orange; red and blue to make purple; blue and yellow to make green. Students can make a color wheel with crayons to show primary and secondary colors.

1. Ask, "Have you ever seen a rainbow? What kind of weather conditions do we have to have to make a rainbow?"
2. "What colors do you see in the rainbow? Are the colors in a particular order?"

Reflecting Rainbows: Like water drops in falling rain, the CD separates white light into all the colors that make it up. Think of light as being made up of waves like waves in the ocean. When light waves reflect off the ridges on the CD, they overlap and interfere with each other. Sometimes the waves add together, making certain colors brighter, and sometimes they cancel each other, taking certain colors away.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")	*Activity → Teachable Moment(s) *throughout*
Catch a Rainbow: 1. Brainstorm where you see primary colors in nature (Blue sky, oceans; red/yellow sunrise and sunset; yellow sun). 2. Brainstorm where you see secondary colors in nature (Orange fruit, purple mountains, green grass). 3. Demonstrate activity for the whole class. Use student helpers. See directions below.	Tip: Listen for questions that begin with "what" or "how." Student: "What would happen if we add more dish detergent to the milk? Teacher: "Let's try it."

Students Practice ("You do")	
Catch a Rainbow: 1. Pour some milk into the bowl. 2. Place 3 drops each of red, blue and yellow food color evenly spaced on top of the milk. 3. Don't mix or jiggle the bowl. 4. Squeeze a drop of dish soap in the center of the bowl. 5. Record what you see. 6. What do you think happened? **Reflecting Rainbows:** 1. Divide students into partner pairs. Provide each partner pair with a CD and white paper. 2. Take the CD out of the case and take a look at the blank side. You will see bands of shimmering color. 3. Tilt the CD back and forth and the colors will shift and change. 4. Hold the CD in the sunshine. 5. Hold your piece of white paper so that the light reflecting off the CD shines onto the paper. The reflected light will make rainbow colors on the paper. 6. Change the distance from the CD to the paper. What happens to the colors? 7. Take a close look at your CD. It is made of aluminum coated with plastic.	

Closing
Review Catch a Rainbow: We dropped 3 primary food colors into a bowl of milk. We added dish soap in the center of the bowl. The dish soap did not mix with the milk. It floated on top and spread over the surface. As it spread, it grabbed the food color w dropped into it. Where the colors met, they combined to form new colors." In Reflecting Rainbows, we held the CD in the sunshine, placed the white paper so the light reflected off the CD onto the paper.
Debrief **Three What's** Have a student lead the Debrief. Ask the class these three "what" questions: 1. What did you enjoy most about the activity? 2. What was the biggest challenge with this activity? 3. What did you learn from the group?

Reflection (Confirm, Tweak, Aha!)

1. What did we do today that you already knew how to do?
2. Did you learn something new to add to what you already knew?
3. What did we do today that was totally new to you?

Modification of Lesson

Catch a Rainbow can be used with younger students.

In Reflecting Rainbows, if it is a cloudy day, turn out the lights and shine your flashlight at the CD.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	Germinating Seeds
Focus:	Renaissance—A New Year

Materials:
The Inside Story: Soaked lima or pinto beans, small knife for teacher only, paper plates, toothpicks, magnifying glasses

Germinating Seeds: Seeds – any kind – just a few, paper towel, stapler, plastic bag that zips, ruler, and a half cup of water

Opening

State the Objective

The purpose of this lesson is to germinate some seeds, watch as they grow and change into full size plants. Students will build basic science and nature knowledge along the way.

Gain prior knowledge by asking students, "What do you know about _____?"

The word "renaissance" means rebirth, reborn, a new beginning. In this lesson, seeds experience a new beginning.

Seeds are actually immature plants. Think of them as baby plants with a thick, hard coat on them, like a baby chick inside an egg. The hard seed coat gives the baby plants protection until the right conditions are available for them to grow. When those conditions are right—good light, warm temperature, and ample moisture—the seedling comes out to start life as a new plant.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")	***Activity → Teachable Moment(s) *throughout***
1. Do the Inside Story Lesson with students. 2. Using a soaked bean, show students the paper-thin seed coat. By rubbing the bean between your thumb and finger, you can remove the coating. 3. Split the rest of the soaked beans into their two sections. Students examine closely under a magnifying glass. Make sure they understand that the bean is the seed of a bean plant. 4. Ask students if they can see a tiny plant already inside the seed. Explain that this baby plant is called the embryo. Look for tiny leaves and roots. The rest of the seed contains food for the baby plant. 5. Look for the spot where the bean was attached to the plant.	Tip: Teachers, listen for questions that begin with "what" or "how." • Student: "What is the seed coating for?" • Teacher: "How can you compare the seed coating to a house?"
Students Practice ("You Do") Germinating Seeds: 1. Place of piece of masking tape on the plastic bag. Students write their name on	

their own plastic bag. 2. Fold a paper towel so that it fits just inside the plastic zip-top bag. Place the paper towel in the plastic bag. 3. Help students use the ruler and measure 3 inches from the top of the bag. Staple a bunch of staples in a row across the bag. Now you should have a miniature pocket. Your seeds will sit here. 4. Pour the half cup of water into the bag so your seeds have something to drink. 5. Put your seeds into the bag so they rest between the plastic and paper towel. Then zip the bag so no air can get in or out. 6. Tape your mini green house to a window so it gets plenty of light. 7. Track your seedlings' progress. 8. After a week or two, help students remove their sprouted seeds from the bag. The seedlings are very fragile, so handle with care. 9. If desired, plant the sprouted seeds into a pot of planting soil.	

Closing

Review

First we looked at the inside of a bean seed and found the tiny plant. Then we created a mini greenhouse with seeds in plastic bags. Finally we watched the seeds sprout into seedlings.

Debrief

Three Whats

Ask the following three "what" questions:

1. What did you enjoy most about this activity?
2. What was the biggest challenge with this activity?
3. What did you learn from the group?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "These two activities confirmed for me that students are intrigued by new growth and life cycles."

Your Reflection:

Modification of lesson:

Older youth may want to plant their seedlings in potting soil. If so, make sure you only cover the seeds with an inch of soil. You don't want to bury them. Place the pot near a good light source and water when the soil begins to dry.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	Mystery Seeds
Focus:	Renaissance—A New Year

Materials: Samples of several seeds from unfamiliar fruits and vegetables, water, plastic bags or milk cartons with potting soil, magnifying glasses. Recommended seeds are radish, pea, sunflower, broccoli, wheat or barley grass, mustard, onion, pumpkin and lentil.

Opening

State the Objective

The objective of this lesson is to have students predict what kind of fruit or vegetable will grow from these unknown seeds, and then compare the results with their predictions.

Gain prior knowledge by asking students, "What do you know about _____?"

The word "renaissance" means rebirth, reborn, a new beginning. In this lesson, unknown seeds grow into a new beginning as a fruit or vegetable plant.

This type of activity lends itself to discussions about how the seeds might travel, could they float, be carried by the wind, would animals transport them and what type of climate do they need.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Review with students the right conditions that most plants need to grow: good light, warm temperature, and ample moisture.
2. Soak a sample of the seeds overnight.
3. Try to float the seeds in a bowl of water.
4. Place a few seeds in the palm of your hand. Ask a student to blow on the seeds. Can they be blown with the wind?
5. Name a few animals that eat seeds: birds, black bears, squirrels, chipmunks and mice.

Students Practice (You Do")

1. Students work in partner-pairs.
2. Provide students with 2 or 3 different unknown seeds.
3. Students predict what the the inside of the seeds will look like.
4. Students open soaked seeds and look for a tiny plant, tiny leaves and roots. Identify the seed coat and the food supply. Look for the spot where the seed was

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- Student: "My grandma eats sprouts. How can they be good for you?"
- Leader: "What kinds of sprouts does she eat?"

attached to the plant. 5. Draw pictures of seeds in 3-in. grid blocks. 6. Plant the seeds in either plastic bags with a moistened paper towel, or in a clean student milk carton with potting mix. 7. Measure the progress of the sprouting seeds. Transplant if desired. 8. Match students' predictions with the actual plants.	

Closing

Review

First we looked at the different kinds of seeds. Then we predicted what the mystery seeds were. We split open the seeds and looked for tiny leaves and roots. We drew pictures of our seeds, and then planted them. Over time, we measured (Math) the length of the sprouts and leaves. Finally we matched the mystery with the real plant.

Debrief

Three Whats

Ask the following three "what" questions:

1. What did you enjoy most about this activity?
2. What was the biggest challenge with this activity?
3. What did you learn from the group?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "I confirm that this is a fun activity. Students were quite curious about matching the growing plants with the ready-to-eat food."

Your Reflection:

Modification of lesson:

To extend the lesson, the leader might bring in a mature broccoli plant, pea pod, radishes, and/or onions. Students can use the clues from the fruits or veggies ready to eat to help solve the mystery of the unknown seeds.
Extend the lesson by asking students to use colorful adjectives to describe their plants: size (gigantic), shape (Looks like a palm tree), number (single), edible (sweet) or inedible (bitter), color (vibrant green) etc.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	How Stars Are Born
Focus:	Renaissance—A New Year

Materials: Student whiteboards, markers, paper and crayons. Internet access, if available.

Opening

State the Objective

The objective is to introduce students to the four stages of how stars are born.

Gain prior knowledge by asking students, "What do you know about _____?"

The word Renaissance means rebirth, revival, a new beginning. In this lesson, we will learn how a star gets a new beginning.

Space may seem empty, but is actually filled with thinly spread gas and dust. When dust and gas join together they form a nebula. A nebula is a large collection of dust and gas. Our sun was born in a nebula nearly 5 billion years ago.

A star is formed from the condensation of a hot cloud of gas and dust in space. When the cloud gets hot and dense enough, fusion (the combination of hydrogen atoms into helium atoms) begins to occur, producing starlight. The main phase of a star's life lasts as long as the star has plenty of hydrogen fuel. A star enters the final 10% of its life once its hydrogen supply runs low.

An average-sized star, like our sun, will spend its final phase as a red giant. Is our sun in the final phase now?

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")	***Activity → Teachable Moment(s) *throughout***
WARNING: Caution students never to look at our sun to see what a star looks like. The sun's rays can damage the retina of the eye. 1. Ask students what they know about stars. Introduce the idea that a star has a life cycle, just like other living things. Name other life cycles: butterfly, silk worm, plants, humans. 2. Talk about the concept of space. Introduce the words gas, dust, nebula, atoms, fusion, and hydrogen. 3. Outline the four phases of a star's life cycle: (1) gas and dust are pulled together by gravity (2) Gas and dust get very hot and form a huge cloud (3) Atoms fuse together generating more heat. (4) Energy (electrons) is released, producing star light.	Tip: Teachers, listen for questions that begin with "what" or "how." • Student: "What phase is our sun in now – young, middle or old?" • Teacher: "How many phases are in a star's life?"

Students Practice ("You Do")	
1. Students use white boards. Draw the life cycle of humans: (1) Newborn (2) Infancy through adulthood (3) Middle Age (4) Old Age. 2. Provide students with whiteboards, or paper and crayons. 3. Fold paper into four equal sections. Draw each of the stages, one in each frame. 4. Frame 1: Gas and dust are pulled together by gravity. 5. Frame 2: Gas and dust get very hot and form a huge cloud. 6. Frame 3: Atoms fuse together generating more heat. 7. Frame 4: Energy (electrons) is released, producing star light.	

Closing
Review First, we drew the life cycle of humans. Then we drew the four steps of how a star is born. Finally we shared our pictures with the group.
Debrief **Liked Best, Next Time (LBNT):** In this simple debrief, students talk about the activity or the day and share what they enjoyed most and/or what else they would have liked to have done, or what they would have liked to have spent more time on. LBNT allows students to express an opinion about the day.

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "I am amazed that we know so much about the life of a star! There is so much we still don't know!"

Your Reflection:

Modification of Lesson:

If you have internet access, there are several valuable web sites with photos of the life cycle of a star. Check out NASA Hubble Space Telescope and/or Images of a Star Being Born.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	New Moon
Focus:	Renaissance—A New Year

Materials:

New Moon: Poster board, large circle template, scissors, aluminum foil, paper punch, string, flashlight.
First and Third Quarter Moons: Dark color modeling clay, light colored modeling clay, flashlights
Full Moon: Construction paper, large circle template, scissors, pencil, craft glue, watercolor paints, flashlights
Make Craters: Baking pan, white flour, cocoa powder, marbles

Opening

State the Objective

The objective is to introduce students to the study of astronomy. Moon phases are introduced with the emphasis on New Moon.

Gain prior knowledge by asking students, "What do you know about _____?"

The world "renaissance" means rebirth, reborn, and new beginning. Students are naturally curious about the world around them, even in the night sky. The moon goes through different phases, or periods of time when we see different parts of the moon. The first phase in this cycle is the new Moon. We do not see the Moon in the sky at all during this phase because the Sun shines on part of the Moon that faces away from the Earth. After the new Moon, we begin to see the Moon get bigger in the sky. It turns into a crescent Moon, then a half Moon (also called a quarter Moon) and then after 14 days, we see a full moon. Then we see the Moon get smaller. It changes to a half Moon, then a crescent Moon, then it becomes a new Moon again and the cycle starts over.

Here is a Moon Model: Choose three students, the Sun, Earth and Moon. Give the Sun a flashlight to shine both on the Earth and Moon. Line up the Moon behind the Earth. Gradually the Moon will rotate around the Earth. Note that the Sun (Flashlight) only shines on part of the Moon and that is why we see different parts of the Moon from Earth.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Find out what students know about the Moon. Create a KWL Chart: **W**hat We Know, **W**ant to Find Out, and What We **L**earned.
2. Do the New Moon activity with the whole group.
   - Cut a large circle from poster board. Cover it with aluminum foil.
   - Punch a small hole in the top of the moon and hang it from the ceiling with a piece of string.
   - Use a flashlight to show how the moon lights up only when it reflects light from the flashlight.
3. Demonstrate First and Quarter Moon activity for the whole group.
   - Use a dark-colored modeling clay to form a fist-sized ball.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- Student: "How do we know if there is a man in the moon?"
- Teacher: "What do you think?"

▪ Apply a thin layer of bright-colored clay to one quarter of the ball from top to bottom. ▪ The ball now models a first=quarter moon when the right illuminated side is facing the earth and a third-quarter moon when the left portion is illuminated.	
Students Practice ("You Do") 1. Full Moon Activity. Two weeks into the moon's cycle, the entire illuminated half can be seen from the Earth and is called a Full Moon. 2. Students work in partner-pairs. 3. Cut a piece of construction paper into a large circle. 4. Draw lines that simulate moon craters on the paper. 5. Cover the lines with craft flue. 6. When the glue dries, paint the glue lines with watercolor paints.	

Closing
Review First we talked about the Moon. Then we did three activities: New Moon, First and Quarter Moon, and Full Moon. Finally we reviewed each Moon activity.
Debrief **WHI?** Ask the following three questions: 1. What were some of the questions that came up in your group? 2. How did you go about including everyone? 3. If you were to try this again, what might you do differently?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "I found out the meaning of waxing and waning: When the Moon gets bigger, we say that it is waxing. When we see it get smaller, we say that it is waning."

Your Reflection:

Modification of lesson:

For younger students, do this activity -- Make Craters. To make the lunar surface, put a layer of white flour in a pan to a depth of a few cm. Then cover it with a thin layer of something dark, like cocoa powder. When you drop the marbles into the material, it will create very familiar-looking craters.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	King of the Mountain
Focus:	Renaissance—A New Year

Materials

Small corks or other small objects that will float in a plastic cup, plastic cups for each partner-pair, pepper, water, newspaper

Opening

State the Objective

The word "renaissance" means rebirth, reborn, and a new beginning. When we observe what happens when water is allowed to bulge, our minds are opened to new knowledge about surface tension.

Today we are going to observe what happens when we try to make the cork float in the center of the water when the cup is half full. Then we are going to observe what happens to the cork when the level of water is at the top of the cup (convex water surface). Finally we are going to observe what happens to pepper when the water is convex.

Surface tension is caused by the attraction of water molecules to each other, just as a magnet is attracted to metal. A molecule is a single part of something that goes into making a completed whole. Think of a house being built brick by brick. Each brick (molecule) helps make a whole house. Water has its own skin (surface tension). This "skin" allows water to do many things. Surface tension (water skin) can be broken.

Gain prior knowledge by asking students, "What do you know about _____?"

1. Ask, "What is a bulge?" (Something that swells, sticks out almost to the point of bursting) Give an example of something with a bulge: blister, bubble.
2. Draw a picture of the word *convex.* Think of an arc, part of a circle, or a contact lens that would fit over your eye.

Content (the "Meat")	
Instruction / Demonstration ("I do" – "We do") 1. Ask students to draw an arc (convex line) in the air with their arms. Then make a drawing of "convex." Ask students to look for something that will be convex in the experiment. 2. Ask students to make a prediction. "What will happen when we fill the plastic cup to the very top with water?" 3. Demonstrate the activity for the whole group. See directions below.	***Activity → Teachable Moment(s) *throughout*** Tip: Listen for questions that begin with "what" or "How." Student: "How does this work? I can't see the bulge of water."
Students Practice ("You do") 1. Provide partner-pairs with materials. 2. Fill the plastic cup to the very top with water.	Teacher: "Look so your eye is level with the rim of the cup. Add another drop of water. What do you see?"

3. Fill the eye-dropper with water. 4. Without touching the water in the cup, release one drop of water at a time into the plastic cup. 5. Count the number of drops. See how many drops you can add before the water runs down the side of the cup. 6. Look for the oval shape of water on the rim of the cup. The water is now convex or has formed a bulge, the "skin" or surface tension keeps the water from overflowing. 7. Gently place a small cork or other small object in the cup. Does it float to the top? 8. **CAUTION:** Supervise students so they don't inhale the pepper. Sprinkle a little pepper on the water? Where does it go?	

Closing
Review Say, "Let's review what we did today. First we filled a cup of water to the very top. Then we added more water, one drop at a time. We looked for the bulge or oval shape of the water before it leaked over the edge of the cup."
Debrief **WHI?** Ask the following three questions: 1. What were some of the questions that came up in your group? 2. How did you go about including everyone? 3. If you were to try this again, what might you do differently?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "This activity required a steady hand. A few children were impatient and just wanted to see the cup overflow. At any rate, the activity required clean-up. It was worth it because a few kids got the idea saw how the cork was King of the Mountain."

Reflection:

Modification of Lesson

Younger students may not be able to see the bulge of water. Be sure they get eye-level with the rim of the cup. After adding a few more drops, they should be able to see the bulge. The leader may need to place the cork on the water.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	Properties of Egg Whites
Focus:	Renaissance—A New Year

Materials: For one experiment you will need 3 eggs, water, a knife, a deep bowl, plastic wrap, 2 small transparent plastic cups, a flashlight, a spoon, an electric mixer or egg beater, a magnifying glass

Opening

State the Objective

The purpose of this activity is to demonstrate that the protein in an egg white makes it very useful for preparing food with different textures and consistencies.

Gain prior knowledge by asking students, "What do you know about _____?"

An egg white is a good place to start learning about proteins. It is made up of about 87 percent water; a trace of minerals, and about 9 percent protein. The shape of protein molecules plays an important part in determining how it behaves. Protein molecules in egg whites are like tiny balls of yarn. Their round, compact shape enables them to dissolve in water. When you beat egg whites, you are unraveling these balls of yarn. This process of changing protein from its natural form is called denaturing.

The word Renaissance means a new beginning. Since it is impossible for egg whites to return to their original form, we can say that foamy (denatured) egg whites have a new beginning.

Protein is an essential component of good nutrition for our bodies. Good sources of protein are meat, fish, beans, nuts soy, milk, cheese, and yogurt.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")	*Activity → Teachable Moment(s) *throughout*
1. Demonstrate this activity for the whole class. 2. Let 3 eggs come to room temperature. 3. Separate the whites from the yolks putting the whites into a deep bowl. Discard the yolks. 4. Pour enough egg white into a glass to make a depth of two inches. 5. Shine a beam of light through the egg white. Can you see the beam as it passes through? 6. Pour the egg white back into the bowl. 7. Put some water into a glass. 8. Take about a teaspoon of egg white and stir it into the water. Does the egg white dissolve? 9. Beat the egg whites in the bowl with an electric mixer or eggbeater until they are foamy but will still flow if poured.	Tip: Teachers, listen for questions that begin with "what" or "how." • Student: "What do you add to this foamy mixture to make lemon meringue pie?" • Teacher: "How about cream of tartar, salt, vanilla

10. Take about ½ teaspoon of foam and put it into a fresh glass of water. Does it dissolve? What shape are the tiny particles that are suspended in the water? Use a magnifying glass.	extract and sugar?"
Students Practice ("You Do") 1. Provide student groups with transparent plastic cups, magnifying glasses, flashlights, and teaspoons. 2. Students do #7, 8 and10 In their small groups.	

Closing
Review First we separated the egg white from the yolks. Then we shone a beam of light through the egg whites in a clear plastic cup. Next we added water to a cup and stirred in some egg white. We looked to see if the egg white dissolved. Finally we put a teaspoon of foam into a cup of water and looked to see if it had dissolved.
Debrief **DIGA** There are four steps in this activity to help students connect the dots between the activity and learning. 1. Describe what you did in the activity. 2. Interpret the skills you needed in the activity. 3. Generalize how you can use your key learning in your life. 4. Apply how you can use the skills in your work?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "I wanted to make meringue, but it should be baked at 175º, and we didn't have an oven in the classroom."

Your Reflection:

Modification of Lesson:

If you have an oven available, make meringue, a stiff, snow-white confection that will keep for weeks in an airtight container. Then fill the meringues with fruit or ice cream and top with whipped cream or chocolate sauce.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	Water Loves Itself
Focus:	Renaissance—A New Year

Materials
Eye droppers, sheets of plastic, dish detergent paper clips, water, newspaper

Opening

State the Objective

The word "renaissance" means rebirth, reborn, and a new beginning. When we observe what happens when water is allowed to bulge, our minds are opened to new knowledge about surface tension.

Today we are going to observe what happens when we drop water onto plastic. We will also observe what happens when we push a drop into another drop. Finally we will observe what happens when we touch a drop of water with a tiny bit of dish soap.

Surface tension is caused by the attraction of water molecules to each other, just as a magnet is attracted to metal. A molecule is a single part of something that goes into making a completed whole. Think of a house being built brick by brick. Each brick (molecule) helps make a whole house. Water has its own skin (surface tension). This "skin" allows water to do many things. Surface tension (water skin) can be broken.

Gain prior knowledge by asking students, "What do you know about _____?"

1. Let's review. "What is "water skin" or surface tension? What does the word convex mean?" (Shaped like an arc; a bulge)
2. Sometimes water forms droplets. "Where have you seen water droplets?" (On leaves, the outside of a glass filled with cold water, and windows)

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")	***Activity → Teachable Moment(s) *throughout***
1. Make a prediction. "What will happen to the water droplets when we push them together?" 2. Make another prediction. "How can we relax the surface tension (break the skin) of the water droplets?" 3. Demonstrate the activity for the whole group.	Tip: Listen for questions that begin with "what" or "how." Student: "What makes the water droplets stick to the side of a glass filled with cold water?"

Students Practice ("You do")	
1. Provide partner-pairs with materials. 2. Cover the workspace with newspaper. Then place a plastic sheet on top of each workspace. 3. Using the eye dropper, gently squeeze out several drops of water onto the plastic sheet. 4. What do you see? What shape do the drops have? Is the water surface of the drops convex? 5. Take the paper clip and gently push one droplet into another droplet. What happens? Do the drops "love" or cling to each other? 6. Carefully dip the end of the paper clip into the top of the dish detergent. A very small amount is all you need. 7. Touch a droplet of water with the paper clip. What happened to the droplet? Can you make the droplet go back to its original shape?	Teacher: "Can anyone help answer this question? Is there some sort of glue that helps the water stick to the glass?" (The droplets are not heavy enough to make them fall.)

Closing

Review

Say, "Let's review what we did today. First we used an eye dropper to squeeze out several drops of water onto a plastic sheet. Next we gently pushed one droplet into another droplet. Finally we touched a droplet of water with a bit of dish detergent."

Debrief

Liked Best, Next Time (LBNT)

1. What did you like most about this activity?
2. What else would you have liked to have done?
3. What would you have liked to have spent more time on?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "Everyone got to participate and learned what happens to water when you drop it on plastic. It was fun."

Reflection:

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	Water's Skin
Focus:	Renaissance—A New Year

Materials
Eye droppers, plastic cup for each partner-pair, water, newspaper

Opening

State the Objective

The word "renaissance" means rebirth, reborn, and a new beginning. When we observe what happens when water is allowed to bulge, we open our minds to new knowledge about surface tension.

Today we are going to observe what happens when water is allowed to bulge over the edge of a plastic cup without leaking down the edges of the cup.

Surface tension is caused by the attraction of water molecules to each other, just as a magnet is attracted to metal things. A molecule is a single part of something that goes into making a completed whole. Think of a house being built brick by brick. Each brick (molecule) helps make a whole house. Water has its own skin (surface tension). This "skin" allows water to do many things. Surface tension (water skin) can be broken.

Gain prior knowledge by asking students, "What do you know about _____?"

1. Ask, "What is a bulge?" (Something that swells, sticks out almost to the point of bursting) Give an example of something with a bulge: blister, bubble, cheeks puffed out.
2. Draw a picture of the word ***convex***. Think of an arc, part of a circle, or a contact lens that would fit over your eye.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")	*Activity → Teachable Moment(s) *throughout*
1. Ask students to draw an arc (convex line) in the air with their arms. Then make a drawing of "convex." Ask students to look for something that will be convex in the experiment. 2. Ask students to make a prediction. "What will happen when we fill the plastic cup to the very top with water?" 3. Demonstrate the activity for the whole group. See directions below.	Tip: Listen for questions that begin with "what" or "How." Student: "How does this work? I can't see the bulge of water."
Students Practice ("You do") 1. Provide partner-pairs with materials. 2. Fill the plastic cup to the very top with water. 3. Fill the eye-dropper with water.	Teacher: "Stand down so your eye is level with the rim of the cup. Add another drop of water. Can you see the bulge now?"

4. Without touching the water in the cup, release one drop of water at a time into the plastic cup. 5. Count the number of drops. See how many drops you can add before the water runs down the side of the cup. 6. Look for the oval shape of water on the rim of the cup. The water is now convex or has formed a bulge, The "skin" or surface tension keeps the water from overflowing.	

Closing
Review Say, "Let's review what we did today. First we filled a cup of water to the very top. Then we added more water, one drop at a time. We looked for the bulge or oval shape of the water before it leaked over the edge of the cup."
Debrief **WHI?** Ask the following three questions: 1. What were some of the questions that came up in your group? 2. How did you go about including everyone? 3. If you were to try this again, what might you do differently?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "I thought about the curved surface of the Earth when we looked at the bulge of water. I wonder if there is surface tension in the ocean."

Your Reflection:

Modification of Lesson

Younger students may not be able to see the bulge of water. Be sure they get eye-level with the rim of the cup. After adding a few more drops, they should be able to see the bulge.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	Wet Seeds, Dry Seeds
Focus:	Renaissance—A New Year

Materials: Lima beans, plant mister, twist ties, paper toweling, plastic bags, freezer compartment of a refrigerator

Opening

State the Objective

The purpose of this lesson is to create awareness of what makes seeds start to grow.

Gain prior knowledge by asking students, "What do you know about _____?"

A seed is already a tiny plant, an embryo all ready to grow. It has stored food material to live on until it can put out green leaves and make its own food. How does a seed know what it is time to grow? First something must happen inside to get the embryo ready. Most seeds need to wait until the next spring before they start to grow. Some need to get cold; some need to dry out. Certain chemicals in the seeds make them start to grow. These chemicals can't do their job when they are dry or too cold. They need warmth and water to become active.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Review with students where seeds come from and what is inside them.
2. Ask them if they have any ideas about what makes seeds start to grow.
3. "Why do seeds start growing when we put them in the ground, but not if we leave them in a bag or a jar? Motivate students to complete the activity to find the answer.
4. Talk about why seeds fail to germinate properly. Seeding too deeply, planting in cold soil, extremes of watering, improper soil preparation, poor seed, and birds or squirrels are common causes for seeds failing to germinate.
5. Form small groups to act out these scenarios for the class.

Students Practice ("You Do")

1. Students work with a partner.
2. Give each pair a handful of lima beans and two sheets of paper toweling. Show the children how to put some of the beans on the toweling, rolling each sheet with the seeds inside to make a "seed roll."
3. Students take turns using a plant mister to thoroughly moisten **one** of the seed rolls. Then ask students to place each seed roll in separate plastic bags and close the bags with twist ties.
4. Students keep the bags in a dark place.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- Student: "What happens to make white sprouts come out of potatoes even if they stored in a dark cupboard?" (They don't have enough light.)
- Teacher: "How do you know that potatoes have sprouts?"

5. Make one moist bag to put in the freezer compartment of a refrigerator and another to put in your desk. 6. Have the children predict what will happen to the seeds in the moist roll, the seeds in the dry roll, and the seeds in the freezer roll. Record their predictions. 7. After three or four days, check the wet seed roll in your desk to see if any seeds have germinated. When you can see roots growing out of the seeds, have the children open both of their rolls and compare the wet seeds with the dry ones. The dry ones will look the same as they did at the beginning of the experiment. Take the moist seed roll out of the freezer compartment and have the children examine it. Why didn't any of the seeds start to grow? 8. Talk about what conditions are needed for seeds to germinate: warmth, moisture, and light.	

Closing
Review First we talked about what makes seeds grow. Then we acted out reasons why seeds don't grow. Next, we "planted" seeds in moist paper toweling, dry paper toweling, and in the freezer. Finally, we compared which seeds grew best.
Debrief **What's Important About That?** Talk with just one student. Ask, "What was important about . . . (Use words to describe the activity.) When the student responds, listen to what the student says is important about the activity. Building on that statement, the question is, "What's so important about . . . (whatever was stated by the student)." Use this process up to five times, each time taking the child's understanding of what is important to a deeper level. At the end, the facilitator states, "Then what I heard you say is that the importance of (the activity we just finished) is . . . (Fill in with the last thing that the student said.)"

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "Even if this activity wasn't completed in one afternoon, students were willing to wait to check their "seed rolls" to see what had happened."

Your Reflection:

Modification of lesson:

If you don't have plant misters, use clean spray bottles.

Consult 4 Kids Lesson Plans

Component	Science
Grade Level:	K-5
Lesson Title:	Crispy Chips
Focus:	The American Story

Materials: Several types of chips, paper towels, tracking form with headings of Size, Shape, Type, Flavor, Taste, Texture, and pencils

Opening

State the Objective

The objective of this lesson is to test potato chips' crispness based on size, shape, type, flavor, taste, and texture. Potato chips capture the student's attention, so learning becomes a good time for all.

Gain prior knowledge by asking students, "What do you know about _____?"

Potato chips are an example of a tasty mistake. The potato chip was invented in 1853 in Saratoga Springs, New York, by accident. George Crum was the chef who worked in a popular vacation spot for wealthy people. One day a customer sent back his plate of potatoes several times. He kept asking that the potatoes be cut thinner and fried longer. Crum had a bad temper, and decided to get even with the customer. He sliced the potatoes very thin, fried them until they were crisp, and salted them. He was sure the guest would hate them. Much to everyone's surprise, the customer was very happy and asked for more. The news spread fast about these crispy potatoes. Until the 1900's they were known as Saratoga chips, named after the town where they were introduced. Today, potato chips are America's number one snack food.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")	*Activity → Teachable Moment(s) *throughout*
1. Purchase or have students bring several different kinds of chips. Include chips with different shapes, textures, flavors and different types. Include corn, tortilla and puffed chips. Choose several different flavors of each. 2. Prepare a tracking form with headings on size, shape, type, flavor, taste and texture. Students will list each chip and rate chips according to the criteria. 3. Set the control for the test. The control will be a basic chip with no extras, such as flavor or ridges. 4. When finished with the activity, have the children conclude what aspects of the chip impacted the crispness, such as flavoring, size, shape and type.	Tip: Teachers, listen for questions that begin with "what" or "how." • Student: "Have you ever eaten sweet potato fries?" • Teacher: "What is different about sweet potato fries?"
Students Practice ("You Do")	
1. Conduct the test. Have each child taste the control chip. Note: To taste, does not mean to eat the whole chip. Then each child will taste the other chips and rate them on their Tracking Form. 2. Provide time for drinks of water after the test. Students will be thirsty.	

3. Share the findings as a class. Which chips were the most crispy?	

Closing
Review First we learned how potato chips were invented. Then we tasted the control chip. Next we tasted the other chips and marked on the paper if they were crisp or not. Finally, we decided which chips were the most crispy.
Debrief **Partner Debrief:** Turn to your partner. Alternate asking debriefing questions of each other. Ask, "What did you like best about this activity? What didn't you like about this activity? What would you like to add to this activity to make it better?"

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "This lesson can be enjoyed by all ages. A few students were more interested in tasting rather than gathering data. It is possible to tweak the lesson to fit your group. We did not include corn chips or puffed crisps, but you certainly could add them to the assortment."

Your Reflection:

Modification of lesson:

For younger students, create a simplified tracking form or have them use their white boards. Reduce the choices of chips to test.

For fun, tell kids about a potato who has decided to exercise. Draw the potato before he begins his exercise program. Then draw the potato after exercising. He now has become a potato chip! This can be a follow-up activity during clean-up.

Consult 4 Kids Lesson Plans

Component	Science
Grade Level:	K-5
Lesson Title:	Float Like a Boat
Focus:	The American Story

Materials:
Paper clips, dish detergent, clear glass pan or bowl, water, newspaper

Opening

State the Objective

Today we are going to observe what happens when we float a paper clip on "water skin" (surface tension).

Surface tension is caused by the attraction of water molecules to each other, just as a magnet is attracted to metal. A molecule is a single part of something that goes into making a completed whole. Think of a house being built brick by brick. Each brick (molecule) helps make a whole house. Water has its own skin (surface tension). This "skin" allows water to do many things. Surface tension (water skin) can be broken.

The American Story Theme continues with students engaged in hands-on activities. Students learn best by experimentation and working as a team to find solutions.

Gain prior knowledge by asking students, "What do you know about _____?"

1. Let's review. "What is "water skin" or surface tension? (The attraction of water molecules to each other.)
2. Name a few items that will float on water: ping pong balls, plastic, light pieces of wood, cork, wire mesh, aluminum foil and rubber bands.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Ask, "Will we be able to float a paper clip on top of water?"
2. Predict what will happen when we add a drop of dish detergent to the water."
3. 3. Demonstrate the activity for the whole group.

Students Practice ("You do")

1. Provide partner-pairs with materials. You will need clean hands, and a clean paper clip.
2. Cover the workspace with newspaper.
3. Place a pan of water on the newspaper.
4. Carefully bend the inside of the paper clip upward. Make a flat boat. Otherwise the uneven boat will break the water skin.
5. Hold your breath so you can hold the paper clip boat steady. Push the paper clip boat gently straight down on the water surface. You may need to adjust the paper

Activity → Teachable Moment(s) *throughout

Tip: Listen for questions that begin with "what" or "how."

Student: "What caused the paper clip boat to sink?"

Teacher: "Students, how can we find the answer?"

clip and try the activity a few times. 6. Dip one tiny part of another paper clip in the dish detergent. 7. At the other end of the pan, barely touch the paper clip with the dish detergent into the water. 8. Wait and watch. In a second, the paper clip boat will sink. When soap is added to the water, the paper clip falls into the hole on the surface "cut" by the detergent.	

Closing

Review

Say, "Let's review what we did today. First we bent a paper clip to make a flat bottom boat. Then we carefully placed the paper clip on top of the water. Next, we added a tiny amount of dish detergent to the water. Finally, the paper clip sank through the hole in the water skin."

Debrief

Three Step Debrief

Step 1: Describe: Students describe what they did during the activity.
Step 2: Interpret
a) What were you key learning's when you participated in the activity?
b) What skills did you need to utilize to participate in this activity?
c) How did you feel when participating in this activity?
Step 3: Generalize: How can you use the skills or your key learning's in your life?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "A few students still don't get the idea of dish detergent making a hole in the surface tension of water. I think we need another lesson about surface tension."

Reflection:

Modification of Lesson:

Younger students need help adjusting the paper clip so it will float.

Consult 4 Kids Lesson Plans

Component	Science
Grade Level:	K-5
Lesson Title:	Graham Cracker Earthquake
Focus:	The American Story

Materials:
One half of a graham cracker (one cracker with a perforated line down the middle) for each student.

Opening

State the Objective

This activity will show the forces that can create earthquakes. It also will show the tension that can build up before a quake and debris created along a fault.

Gain prior knowledge by asking students, "What do you know about _____?"

The Earth's top layer is like a giant jigsaw puzzle. It is formed of giant "plates" that are always moving. The plates move slowly, a little faster than your fingernails grow. Sometimes the plates get stuck. Pressure and tension build up. When plates move side by side, the rubbing together makes vibrations. These vibrations are earthquakes. In a big earthquake, the plates move violently past each other.

Earthquakes happen all over the world and in every state. The places where the plates meet and grind against each other are where there are the most earthquakes. These places are called faults, or fractures between rocks. Some faults are small; others continue for many miles. Engineers are working to help people in these areas be safe.

Earthquakes are a definite part of the American Story.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")	*Activity → Teachable Moment(s) *throughout*
1. Talk about earthquakes. Ask if students have felt an earthquake. 2. Discuss safety during and after an earthquake. 3. If the internet is available, access usgs.gov. Look for an interactive map that shows where earthquakes are happening now in your area. 4. Talk about the graham cracker representing the Earth's plates. 5. Discuss the difference between plates moving side by side and an uneven break at a fault line. Which break creates larger earthquakes? 6. What is the meaning of the word "debris?" (rubble, something broken up) 7. What kinds of debris would be left after an earthquake?	Tip: Teachers, listen for questions that begin with "what" or "how." • Student: "What is a tsunami?" • Teacher: "How do you know about tsunamis?"
Students Practice ("You Do") 1. Break the graham cracker along the perforation. 2. Place the two pieces back together so they touch.	

3. Move one piece away from you and one piece toward you keeping the edges touching. 4. Observe the tiny crumbs that form as they move side by side. These represent rocks breaking off the edges of two places along a fault. 5. Now break one of the halves into two pieces. Notice that the edge is not smooth like the first two pieces you made. 6. Put the broken edges back together like you did with the first break. 7. Move one piece away from you and one toward you with the broken edges touching. 8. Notice that the two do not move as easily this time. This is the tension that builds up along a fault before an earthquake. 9. Keep moving the halves until they move. Notice the large pieces that break off. This represents a very much larger destructive earthquake.	

Closing
Review First we talked about earthquakes. Then we did this cool activity with graham crackers. We learned what the word debris means. There was a lot of debris, or crumbs, after the activity. Finally we each got a graham cracker to eat.
Debrief **Partner Debrief** Turn to your partner. Alternate asking debriefing questions of each other. Ask, "What did you like best about this activity? What didn't you like about this activity? What would you like to add to this activity to make it better?"

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "Even though this activity was simple, the point really got across to the kids about the Earth's plates building up pressure and tension."

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level:	K-5
Lesson Title:	It's in the Mix
Focus:	The American Dream

Materials:
Materials needed for each group: 3 large (12-16 oz) clear plastic cups, ¾ full of water, 1 plastic teaspoon, salt, powdered milk, cup of sand, newspaper to cover the work area

Opening

State the Objective

Today we are going to explore the differences between mixtures, suspensions and solutions.

Gain prior knowledge by asking students, "What do you know about _____?"

Many substances we see are mixtures of different materials. I mixtures, you can physically see the different components. For example, sand in water. In solutions, the different components are completely dissolved, like salt water. In suspensions, solid particles are spread evenly but remain solid, like milk. Given enough time, the different components in a suspension will separate by gravity.

Scientists have a quest for knowledge. The average person seeks answers to questions as well. In this lesson common everyday substances are defined and explained. Increasing our knowledge about mixtures, suspensions and solutions helps us understand more about our world. Thus, we are living the American Dream.

1. Ask, "What is a mixture?" (A mixture is a substance made from two or more materials mixed together.) Give examples: cookie dough, cake mix, sand and water.
2. "What is a suspension?" Cornstarch and water
3. "What is a solution?" Salt and water. Can we separate the parts of the solution?" (Yes, by evaporation)

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Make predictions about what will happen when sand and water are mixed.
2. Make predictions about what will happen when powdered milk and water are mixed.
3. Make a prediction about what will happen when salt and water are mixed.
4. Demonstrate the activity for the whole group. See directions below. Use student helpers.

Students Practice ("You do")

1. Divide students into small groups. Review directions for the activity.
2. Stir a teaspoon of sand into a cup of water.
3. What happens as soon as the student stops stirring? (The sand separates.)

Activity → Teachable Moment(s) *throughout

Tip: Listen for questions that begin with "what" or "how."

Student: "What is powdered milk?"
Teacher: "Students, what do you think is in powdered milk?" (Milk solids with the water removed)

4. Stir a teaspoonful of powdered milk into a cup of water. What happens? (The little milk particles are floating.) 5. Ask a student to stir a teaspoonful of salt into the third cup of water. What happens? (The water is hazy at first, but will become clear.) 6. Label each cup with mixture, suspension and solution.	

Closing

Review

Say, "Let's review what we did today. First we mixed sand and water. Then we mixed powdered milk and water. Finally we mixed salt and water."

Debrief

The teacher will ask the following three questions. Students tell their partner-pair the answer.

1. What is a mixture? What is a solution?
2. What didn't you like about mixing the sand, powdered milk and salt?
3. How would you change the activity to make it better next time?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "I tweaked the lesson by using cornstarch, instead of powdered milk. It worked okay and formed a suspension."

Reflection:

Modification of Lesson

For younger students, have adult help to supervise each group.

Consult 4 Kids Lesson Plans

Component	Science
Grade Level:	K-5
Lesson Title:	Paper Airplanes
Focus:	The American Story

Materials: Tough lightweight paper (copy paper works well), "How to Fold a Paper Airplane" Directions. The simple dart-type airplane is a good place to begin.

Opening

State the Objective

The objectives are to learn to fold a paper airplane, fly the plane, and determine if the number of folds affect the distance a paper airplane will fly.

Gain prior knowledge by asking students, "What do you know about _____?"

For a hundred years, people have folded paper into a simple dart to make paper airplanes. Mankind has become more creative over the years, creating planes using origami paper-folding techniques. Thus, the American Story continues with kids and adults having fun with paper airplanes.

Why do we use paper? Paper makes a good wing because it is impermeable to air. In a single sheet of paper, multiple layers of interlocked fibers prevent it from flowing through. In contrast, a hole-filled screen from a back door would not make a very good wing.

After the initial throw, paper planes are gliders powered by gravity. As the plane falls, its wings deflect air backward and down, providing thrust and lift.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")	***Activity → Teachable Moment(s) *throughout***
1. Here are some tips for making paper airplanes: ▪ Crisp folds—Make a firm finger-press ▪ Symmetry--Be sure one side is exactly like the other ▪ Control the Surfaces--Double check ▪ Paper Choice--Tough, lightweight paper ▪ Make fresh planes--Old ones lose strength ▪ Practice, practice, practice 2. Demonstrate the folding for the whole class. When it is their turn, model each step with them as you go. It would be helpful to download illustrations of each step rather than relying on the written directions in this lesson, unless you are an expert paper airplane maker!	Tip: Teachers, listen for questions that begin with "what" or "how." • Student: "How would I make a paper helicopter?" • Teacher: "What shall we do to find out?"
Students Practice ("You Do") 1. Fold a sheet of paper in half lengthwise (Like a hot dog).	

2. Fold the top corners down to the center fold. 3. Fold the tip down. 4. Fold about one inch of the tip up: unfold 5. Fold the top corners down to the center fold so that the corners meet above the fold in the top. Note: The nose of the plane should be blunt. 6. Fold the tip up. 7. Fold the entire plane in half so that the tip is on the outside. 8. Fold the wings down. 9. Trim and fly. (Give a gentle toss forward. If the nose drops and the plane dives into the ground, bend up the back of the wings. A little bend goes a long way. If the nose rises first and then drops, the plane is stalling. Bend down the back of the wing. Keep your adjustments small.)	

Closing
Review First we talked about paper airplanes. Then we worked together to fold a paper airplane, one step at a time. Next we practiced flying our planes. We made other planes with just one, two, up to 6 folds and measured which planes flew the furthest. Finally, we talked about what we learned.
Debrief **Likes and Dislikes** Create a chart and list what students liked and what students didn't like about the activity. You might probe by asking, "What about this activity . . ."

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "It was difficult for kids to get the idea of making a crisp fold and keeping the folds symmetrical. They wanted to rush through the activity."

Your Reflection:

Modification of lesson:

For younger students, modify the lesson by preparing a few airplanes ahead of time, and/or ask them to fold only Steps 1-3. For older students, challenge them to create other types of paper airplanes. Directions can be downloaded from the internet. Measure the distance each plane flies with one, two, three, four, five, or 6 folds.

Consult 4 Kids Lesson Plans

Component:	Science
Grade Level:	K-5
Lesson Title:	Paper Plate Hovercraft
Focus:	The American Story

Materials: Paper or Styrofoam bowls or plates (CD's, or any plastic lids from a can or tub of a product can be used), balloons, pencil, pipe cleaners (maybe), and scissors.

Opening

State the Objective

The objective is to challenge students to create a vehicle of the future.

Gain prior knowledge by asking students, "What do you know about _____?"

The American Story Theme reflects our desire as a people to be creative. Learning to design your own hovercraft, from simple to more complex, is a way to pursue creativity and fun.

When air flows out of the balloon, it goes under the paper plate and creates a layer of air space that keeps the Hovercraft and the smooth, flat surface from rubbing against each other. Without rubbing, there is no friction, which causes an object to slow down when moving or to hold in place. Therefore, the air layer from the balloon creates a buffer, allowing your Hovercraft to glide across the surface, free from the friction that would have held it in place.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Ask students the meaning of the word "hover." (float, drift, soar, fly)
2. Talk about "a layer of air space." Students place their hands just above the table to create an air space.
3. Talk about friction. Ask students to rub their hands together to create friction and heat. How does friction slow down a water or land craft? Is there friction when a spacecraft travels through the atmosphere? (Yes)
4. Talk about the benefits and uses of hovercraft in real life: travels the same speed over land and sea, military uses, specialized transports, can transport people and equipment, faster than most boats, and cost effective.
5. Demonstrate how to make the hovercraft for the whole class. See below.

Students Practice ("You Do")

1. Students work in small groups or with a partner.
2. Provide materials to each group.
3. Decorate the plate with crayons or markers.
4. Stick a pencil through the center of the paper plate.
5. Use scissors to make the hole a little bigger.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- Student: "How do you get the paper plate to hover longer?"
- Teacher: "What do you think we should try?"

6. Stick the balloon through the hole with the opening on the underside. 7. Blow up the balloon. 8. Make sure the balloon is still the same size. 9. Release your grip on the balloon. Pass the hovercraft over the table. 10. Use pipe cleaners to help secure the balloon, if needed. 11. Your hovercraft is floating!	

Closing
Review First we stuck a pencil through the middle of the paper plate. Then we pushed the balloon through the hole. After that, we blew up the balloon. Finally, we released our grip on the hole of the balloon and pushed the hovercraft gently on the table. It didn't work the first time, so we kept trying. At the end, it worked!
Debrief **WHI?** Ask the following three questions: 1. What were some of the questions that came up in your group? 2. How did you go about including everyone? 3. If you were to try this again, what might you do differently?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "This activity taught me that it is important to keep trying until the hovercraft worked."

Your Reflection:

Modification of lesson:

You may extend the lesson by taping pennies to the plate to give balance, folding back the sides of the plate to give stability and direction, adding batteries with a fan to give lift, or making the hovercraft large enough to float a person (high school or young adult).

Consult 4 Kids Lesson Plans

Component	Science
Grade Level:	K-5
Lesson Title:	Red Cabbage Juice
Focus:	The American Story

Materials: Head of red cabbage, medium-sized bowl, grater, cold water, strainer, plastic container, clear plastic cups, plastic stirring spoons, baking soda, various liquids to test (lemon juice, vinegar, cola, milk, baking soda saturated solution, aspirin in distilled water, shampoo, other common liquids). Option: eyedroppers, waxed paper.

Opening

State the Objective

The purpose of this activity is to use red cabbage juice to find out if a liquid is an acid or a base.

Gain prior knowledge by asking students, "What do you know about _____?"

Most substances have what we call a pH. A pH meter measures whether the substance is an acid or a base. It is sensitive to the hydrogen ions which are present in the solution being tested. The pH scale has a range from 0 to 14. 7 is neutral. Pure water has a pH of 7. Water is neither an acid nor base. An acid is a substance that commonly tastes sour, such as vinegar. Acids can be corrosive. Strong acids are dangerous and will burn your skin. A base in a substance that commonly tastes bitter. It feels slippery. Ammonia is a base. Strong bases are dangerous and can burn your skin.

Acids and bases have the property of modifying color of certain substances. The juice or liquid of red cabbage is a blue-violet color, but when it comes in contact with acidic substances, it becomes red. When in contact with a base, it becomes green and even yellow.

This activity is an example of the American Story. American educators have developed such activities to promote awareness of acids and bases in a safe environment.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")	***Activity → Teachable Moment(s) *throughout***
1. Ahead of time, prepare the cabbage juice. 2. Grate some red cabbage into a medium-sized bowl. 3. Cover the cabbage with cold water and let sit for 45 minutes. 4. Strain the juice into a plastic container. 5. Introduce students to the two terms – acid and base. Ask if they have ever heard of either word. 6. Discuss that red cabbage juice will change color when it comes into contact with an acid (red) and a base (green or yellow). 7. Pour an equal amount of cabbage juice into each plastic cup (one cup for each partner-pair. 8. Add 1 teaspoon of baking soda to all but one of your cups. The baking soda (which is a base) will turn your cabbage juice blue. The cup without the baking soda is a	Tip: Teachers, listen for questions that begin with "what" or "how." • Student: "How do you know that cola is an acid?" • Teacher: "What happened when you added cola to the cabbage juice with

control cup. This is the color that you want to get all of your mixtures to match. 9. If it is too confusing by adding too many liquids to the cabbage juice and baking soda solution, use eye droppers and waxed paper to see the dramatic color change. See Modification of Lesson.	baking soda?"
Students Practice ("You Do") 1. Give each partner-pair a plastic cup of cabbage juice with 1 teaspoon of baking soda added. 2. The challenge is to add various liquids, one teaspoon at a time, to see if they can turn the blue juice back to its original color. It will take different amounts of different acids to turn the juice back to its original color. If the juice stays blue, the liquid is probably not an acid.	

Closing
Review First we mixed baking soda in cabbage juice. Then we watch the solution turn blue. Next we added other liquids to try to find acids to turn the solution back to blue-violet. It took a long time, but we kept adding a lot of cola and it turned back to violet. Finally we learned about acids and bases.
Debrief **Three Whats** Ask the following three "what" questions: 1. What did you enjoy most about this activity? 2. What was the biggest challenge with this activity? 3. What did you learn from the group?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "It is important to try this activity ahead of time. I realize now that first graders needed the eye droppers and waxed paper so they could see the color change better."
Your Reflection:

Modification of lesson:
For younger students, provide students with an eye-dropper and a square of waxed paper. Squeeze three drops of pure cabbage juice on the paper, a good distance from each other. To the first drop, add a baking soda liquid. The drop should change to a blue color. To the second drop, add a drop of lemon juice. The drop of substance should turn reddish. Ask students what they have seen. Tell them that they have seen a chemical change when we added baking soda or lemon juice.

Consult 4 Kids Lesson Plans

Component	Science
Grade Level:	K-5
Lesson Title:	Thumbs Up!
Focus:	The American Story

Materials: Students' hands, duct tape or masking tape, small objects to pick up, pencils and paper

Opening

State the Objective

The purpose of this lesson is to model how primates (humans, apes, and Old World Monkeys) use an opposable thumb for grasping objects.

Gain prior knowledge by asking students, "What do you know about _____?"

What exactly is an opposable thumb? If thumbs can touch all of the other fingers on the same hand, fingerprint to fingerprint, they are opposable. It is believed that the thumb evolved because it allowed humans to flourish in our environment. The human thumb gave humans the ability to use tools. Writing is another trait that would be nearly impossible without the thumb. Human thumbs are very important for gripping or grasping objects.

The American Story Theme prevails as creative surgeons work to replace a missing thumb so the patient will be able to grip. Replacement parts for a thumb can be another digit on the hand, silicone or plastic joints, or the Big Toe.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Talk about thumbs. Find out students' prior knowledge about thumbs.
2. Name animals that do not have an opposable thumb: mammals like cats, dogs, otters, and seals. How do they grip objects?
3. Ask students to observe their hands while moving their thumbs in a number of directions. Do the other fingers move?
4. Ask students to pick up a coin, turn a doorknob, lift a book, turn the pages, and write their name while paying attention to the involvement of their thumbs.
5. Record each task's level of difficulty: 1=very difficult, 2=difficult, 3=easy, 4=very easy.
6. Talk about the level of involvement of their thumbs: 1=thumb not needed, 2=thumb slightly used, 3=thumb used throughout the task, 4=extensive thumb usage.
7. Record this data on the classroom white board.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- Student: "What if you just had one thumb and no fingers?"
- Teacher: "How would you grip something?"

Students Practice ("You Do")

1. Provide students with masking or duct tape.
2. Work in partner-pairs.

3. Tape the thumb of your writing hand to your palm so that you cannot use it. The tape should allow your other fingers to move freely. 4. Repeat the tasks: pick up a coin, turn a doorknob, lift a book, turn the pages, and write their name. 5. Use the same rating scales as above for difficulty of the task and the level of involvement of the thumb. 6. Talk about the results. Were the tasks more difficult with or without an opposable thumb? (They were more difficult without an opposable thumb.)	

Closing
Review First we observed our thumbs and how they move. Then we did a few tasks using our thumbs. We rated ourselves on a scale for difficulty of the task. Next we taped our thumbs to our palms so they wouldn't move. We performed the same tasks again and rated ourselves. Finally, we talked about the importance of opposable thumbs.
Debrief **Three Whats** Ask the following three "what" questions: 1. What did you enjoy most about this activity? 2. What was the biggest challenge with this activity? 3. What did you learn from the group?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "The kids went wild with the masking tape. Next time, I will tear off a piece of tape for each student."

Your Reflection:

Modification of lesson: For younger students, do all of these activities as a group. Students may need help taping their thumbs.

Consult 4 Kids Lesson Plans

Component	Science
Grade Level:	K-5
Lesson Title:	Zapped by Static Electricity!
Focus:	The American Story

Materials: Several inflated balloons with strings attached, aluminum cans, your hair, Styrofoam packing pellets, puffed rice cereal, salt and pepper restaurant packets

Opening

State the Objective

The purpose of this activity is to find out about positively and negatively charged particles using a few basic items. Students will determine if they can control when objects are attracted or repelled from each other.

Gain prior knowledge by asking students, "What do you know about _____?"

Rubbing a balloon against your hair creates static electricity. This means that negatively charged particles (electrons) jump to positively charged objects. When you rub the balloon against your hair, the balloon becomes negatively charged. The balloon has taken some of the electrons from the hair leaving it with a positive charge. It is said that opposites attract. Your positively charged hair rises up to meet the negatively charged balloon. The same principle works with the aluminum can, packing pellets, puffed rice and salt and pepper.

American kids are always experimenting with things around the house. This activity is a safe way to see static electricity at its best!

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Talk about static electricity. What is the difference between static and current electricity? (Current electricity flows through wires and is controlled. Static electricity is not as controlled.)
2. Ask students to make predictions about what will happen when they bring various objects in contact with the negatively charged balloon.

Students Practice ("You Do")

1. Give each student a balloon.
2. Rub the balloon against their hair. With a partner, hold the balloons near each other to see if they move closer or repel. (They will repel since both are charged with negative electrons.
3. Rub one balloon back and forth on your hair then slowly pull it away. Ask your partner what is happening to your hair. Try this in front of a mirror.
4. Put the aluminum can on the side of a table.
5. After rubbing the balloon on your hair again, hold the balloon close to the can and

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- Student: "How can I get the Styrofoam pellets to fall off the balloon?"
- Teacher: "What needs to happen before they can fall off?" (Some of the electrons may drain off the balloon, and the particles will fall."

watch as the can rolls toward it. Slowly move the balloon away from the can. The can will follow. 6. Do other experiments with puffed cereal, salt and pepper in a plate, and Styrofoam packing pellets. 7. Ask students to try other common objects that can be easily charged.	

Closing

Review

First we each got a balloon. Then we rubbed the balloon against our hair. We did experiments to make our balloons go away from each other and made our hair stand out. We watched how a balloon with static electricity can make an aluminum can move. The best activity was to watch puffed cereal jump to the balloon. Finally we talked about static electricity.

Debrief

DIGA – Four Step Debrief

Step 1: Describe: Students describe what they did during the activity.
Step 2: Interpret: Students answer one or some of the following questions:
What were your key learnings when you participated in this activity?
What skills did you need to utilize to participate in this activity?
How did you feel when participating in this activity
Step 3: Generalize: How can you use the skills or your key learnings in your life?
Step 4: Apply: How can you use the skills or your key learnings in your work?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "My Aha moment was when I saw puffed cereal jump to the balloon. I didn't know static electricity had that much power!"

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science - Month 7
Grade Level	K-5
Lesson Title	Benjamin Franklin – Make a Thermometer
Focus	Inventors and Inventions

Materials: Tap water, rubbing alcohol (Don't taste or drink this), a clear, narrow-necked plastic bottle, food coloring, clear plastic straw, and modeling clay

Opening

State the Objective

The objective of this activity is to show that when the alcohol in the mixture heats up, it starts to expand and has nowhere to go but up inside the straw.

Gain prior knowledge by asking students, "What do you know about Benjamin Franklin?"

Our inventor for today is Benjamin Franklin. Ben was born in 1706 into a large family. He was 15th of seventeen children. He had only two years of formal education but taught himself foreign languages, grammar, science and math. As a young man, Ben ran away to Philadelphia, Pennsylvania. He started his own successful printing business, published a newspaper, started the first library in America, created the first volunteer fire department and built the first hospital in Pennsylvania. He created a postal system, and became the Postmaster. Along the way, he invented bifocal glasses, the lightning rod, and the Franklin stove. He proved that lightning and electricity are the same thing using a kite, string, and key in a thunderstorm. He helped write the Declaration of Independence and the Constitution of the United States of America. Benjamin Franklin has been an important role model for all of us. Because of him, our country is a much better place.

One of his inventions was the thermometer. A thermometer is a special instrument that is able to measure heat in the air. To be your own weatherperson, you're going to need a thermometer. So, let's make one!

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Model this activity for the whole class.
2. **CAUTION:** Warn students that even though rubbing alcohol looks like water, it can be harmful if swallowed.
3. **Follow the directions that you will give to the students—**have them predict what will happen. Ask them for their thinking on why this happens.

Students Practice ("You Do")

1. Divide students into groups. Provide materials.
2. Pour equal parts of tap water and rubbing alcohol into the bottle, filing it about 1/8 of the way up.
3. Add a few drops of food coloring to the mixture and stir or swirl the bottle to mix.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- Student: "Is there rubbing alcohol inside a thermometer that I put in my mouth?" (No)
- Teacher: "How does

4. Place a straw in the bottle, but don't let it touch the bottom of the bottle. 5. Seal the neck of the bottle with modeling clay so that the straw stands upright. 6. Hold your hands on the bottle, and watch what happens to the liquid inside the straw. 7. The mixture should go up the straw. If you hold the bottle long enough, it may come out the very top of the straw. This means that the alcohol has expanded more than the bottle and straw can handle, thus causing the overflow.	a digital thermometer work?" (They use the concept of electrical resistance)

Closing

Review

1. First we put water and alcohol in a bottle.
2. Then we placed a straw in the bottle without touching the bottom of the bottle.
3. Next we sealed the straw to the bottle opening with modeling clay.
4. Finally, we held our hands on the bottle and watch the liquid move up the straw.

Debrief

What's Important About That?

This strategy allows for the debriefing to take a single student's learning and thinking deeper. Begin by asking a student, "What was so important about making a thermometer?" The student might respond, "A thermometer is important so you can take your temperature." Teacher, "What's so important about taking your temperature?" Student, "Maybe I am sick." Teacher, "What's so important about being sick?" Teacher, "Then what I heard you say is that the importance of this activity that we just finished is _____ because , , , "

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "I think digital thermometers are safer than thermometers made with mercury or other toxic substances. Also, we tried pouring more water and alcohol in the bottle to see what would happen. It took longer to heat the liquid."

Your Reflection:

Modification of Lesson:

1. Although this experiment is fun, you should be careful. For younger children, have a volunteer pour the alcohol in the bottle.
2. Make sure you follow basic safety rules.

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Chicken Sounds From a Cup!
Focus	Inventors and Inventions

Materials: Plastic drinking cups, yarn or cotton string, paper clips, paper towels, a nail, scissors, and water.

Opening

State the Objective

The objective of this lesson is to learn how a sounding board works.

Gain prior knowledge by asking students, "What do you know about Alexander Graham Bell?"

The inventor of the day is Alexander Graham Bell (1847–1922). He invented the telephone with Thomas Watson in 1876, the wireless phone with Sumner Tainter, and new techniques for teaching the deaf to speak. Bell, Gardiner Hubbard and others founded the National Geographic Society in 1888.

In this experiment, the vibrations from the string would be almost silent without the cup, but when you add the cup, it spreads the vibrations and amplifies them (makes them louder.) Pianos and music boxes use wood to act as a sounding board to make the instrument louder.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")	***Activity → Teachable Moment(s) *throughout***
1. Model the lesson for students. 2. Cut a piece of yarn about 20 inches long. 3. Using the nail, pre-punch a hole in the bottom of each plastic cup. 4. Tie one end of the yarn to the middle of the paper clip. Push the other end of the yarn through the hole in the cup and pull it through the hole in the cup. 5. Get a piece of paper towel about the size of a dollar bill. Fold it once and get it damp in the water. 6. Now it's time to make some noise! Hold the cup firmly in one hand, and wrap the damp paper towel around the string near the cup. While you squeeze the string, pull down in short jerks so that the paper towel tightly slides along the string. If all goes well – you hear a chicken!	Tip: Teachers, listen for questions that begin with "what" or "how." • Student: "How would this experiment work with a paper cup?" • "Teacher: "What is your prediction about the paper cup?
Students Practice ("You Do")	
1. Divide students into partner-pairs. Provide materials. 2. Provide alternate materials – different types of string or yarn; different sizes of cups.	

3. Does the type of string or yarn make a difference in the volume of sound? 4. Does the size of the cup affect the volume of the sound? 5. Students create their own sounding boards. 6. Share with classmates.	

Closing
Review **Sample Review**: "We followed directions. There were a lot of chickens squawking in the room!" **Review:**
Debrief **Like Best, Next Time (LBNT):** 1. Have students share what they enjoyed most about the activity. 2. What else would they have liked to have done? 3. What would they have liked to have spent more time on?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "What does this experiment have to do with Alexander Graham Bell?"

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Ice Cream in a Bag
Focus	Inventors and Inventions

Materials: ¼ cup sugar, ½ teaspoon vanilla extract, 1 cup milk, 1 cup whipping cream or half & half, crushed ice (1 bag of ice will freeze 3 bags of ice cream), 1 cup rock salt (8 cups per 5 pounds), 1 quart and 1 gallon size Ziploc Freezer bags, duct tape, bath towel, cups, spoons. This recipe will serve 4 students. You will need 5 recipes to serve a class of 20 students.

Opening

State the Objective

The objective of this activity is to use bags to make a dairy treat.

Gain prior knowledge by asking students, "What do you know about ice cream?"

The invention of ice cream is basically unknown, but most historians give credit to the Chinese. From 960 – 1279 during the Age of Yingzong during the Song Dynasty, it is said that the Chinese poured a syrup over a mixture of ice treated with salt to create a frozen treat. The ice was hauled down from the mountains and stored in cool places. Then in the 18th Century, in England, the first recipe for ice cream was written on paper. This recipe was brought to America. Early colonists such as George Washington, Thomas Jefferson and Benjamin Franklin served "iced cream" or ice cream to their guests.

Ice cream freezes at -6 degrees C (21 degrees F). The freezing point of water is actually lowered by adding salt to the ice between the bag walls. Heat energy is transferred from the milk through the plastic bag to the salty ice water causing the ice to melt. As it does so, the water in the milk freezes, resulting in ice cream.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Model this activity for the whole class.
2. Put the milk, whipping cream, sugar and vanilla in a 1 quart freezer bag and seal. Fold a piece of duct tape over the seal.
3. Pace the bag with the ingredients inside a gallon freezer bag.
4. Pack the larger bag with crushed ice around the smaller bag. Pour ¾ to 1 cup of salt evenly over the ice.
5. Wrap in a bath towel and shake for 10 minutes. Open the outer bag and remove the inner bag with the ingredients. Wipe off the bag to be sure salt water doesn't get into the ice cream.
6. Cut the top off and spoon into cups.
7. Makes about 3 cups. (1 bag will serve 4 students)
8. Serve plain or top with coconut or fruit. Enjoy!

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- Student: "What is the point of using rock salt instead of table salt?"
- "Teacher: "Rock salt costs less than table salt."

Consult 4 Kids Lesson Plans

Students Practice ("You Do")	
1. Divide students into groups. Provide materials. 2. Students work together to add ingredients and make their on Ice Cream in a Bag. 3. Make sure students have clean hands and keep washing them as they proceed.	

Closing
Review **Sample Review**: "We followed all the directions. Everyone had fun!" **Review:**
Debrief **Three Whats** Ask the following three "what" questions: 1. What did you enjoy most about this activity? 2. What was the biggest challenge with this activity? 3. What did you learn from the group?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "Ice cream in a bag is good, but it doesn't taste like store-bought ice cream."

Your Reflection:

Modification of Lesson

Have adequate adult supervision during this activity. Since it might be a messy lesson, consider doing the activity outside on a grassy area.

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Learn About a Habitat
Focus	Animal Habitats (Homes and Ecosystems)

Materials: Habitat printouts, globe or world map, writing paper, drawing paper, butcher paper, markers, crayons

Opening

State the Objective

The objective of this lesson is to create awareness about habitats: physical description, location, and plants and animals live in the habitat.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "What is a healthy ecosystem? (The water, water temperature, plants, animals, air, light and soil all work together.) What is an unhealthy ecosystem? (natural disasters, human destruction, disease, loss of a healthy component)

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Talk about each of these habitats: Grasslands, Temperate Forest, Tropical Rain Forest, Desert, Arctic Polar Ice, Antarctica Polar Ice and Tide Pools.
2. Ask students what connections they have to one or more of the habitats. For example, "My family loves the temperate forest because we go camping there every summer."
3. Brainstorm other habitats not on the list: swamp, freshwater marsh, city, tundra, and pond.

Students Practice ("You Do")

1. Divide students into small groups.
2. Provide each group with large pieces of butcher paper, markers, and crayons.
3. Students choose a habitat.
4. Provide each group with printout information on their habitat.
5. Students draw pictures and write information to show the Physical Description, Location, and Plants and Animals of their habitat.
6. Outline all drawings in black so they are visible from a distance...
7. Students should answer the Connection Question at the end of the information.
8. Share butcher paper "murals" with classmates.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "What website can I use to learn more about ecosystems? "
- **Leader:** "Just Google "ecosystems" or" habitats."

Closing
Review **Sample Review**: "We learned about a habitat, which is also called an ecosystem." **Review:**
Debrief **Three Questions** Ask the following three questions: 1. How would you explain where animals in the Temperate Forest get their food? (Berries, fish, other animals, plants) 2. Which one of the habitats would you like to visit? 3. How can you use what you learned in your real life?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "I would tweak this lesson to review synonyms for the word habitat. (System, environment, home, surroundings, bionetwork, and ecosystem)

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Leonardo da Vinci (1452 – 1519) Parachutes
Focus	Inventors and Inventions

Materials: A plastic bag or light material (handkerchief), scissors, string or fishing line, a small object to act as the weight-cork, bottle cap, small action figure.

Opening

State the Objective

Today we are going to make a parachute and see how air collects inside the chute and causes it to float.

Gain prior knowledge by asking students, "What do you know about Leonardo da Vinci?"

Our inventor for today is Leonardo da Vinci (1452-1519). Leonardo wrote about the parachute. However, it was Louis-Sebastien Lenormand in 1783 of France who tried the theory and jumped from a tall tree carrying two umbrellas. A few years later, some people jumped from hot-air balloons using designs of early parachutes. The first person to jump from a flying airplane and survive the fall was Captain Albert Berry, who jumped from a U.S. Army plane in 1912. Parachutes were first used in war towards the end of World War I.

A parachute is a device for slowing down one's descent while falling to the ground. Parachutes are used to skydive from airplanes, jump from high places, and to help slow down the descent of spacecraft. They are also used to slow down some race cars. Modern day parachutes are made of nylon fabric.

Air resistance happens when you open up the parachute and a large area of material uses air resistance to show it down. The larger the surface area, the more air resistance and the slower the parachute will drop.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Model this activity for the whole class.
2. Cut a large square from your plastic bag or material.
3. Trim the edges so it looks like an octagon (8 equal sides).
4. Cut a small hole near the edge of each side (8).
5. Cut 8 equal pieces of string or fish line. Tie the string to each of the holes.
6. Attach 8 pieces of string or fish line to the object you are using as a weight.
7. With supervision, use a chair or find a high spot to drop your parachute.
8. Test how well it worked. Remember you want it to drop as slowly as possible.
9. Cutting a small hole in the middle of the parachute will allow air to slowly pass through it rather than spilling out over one side. This should help the parachute fall straighter.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- Student: "Our parachute is crashing to the floor! What is wrong with it?"
- Teacher: "Have you cut a hole in the middle?"

Consult 4 Kids Lesson Plans

Students Practice ("You Do")	
1. Divide students into groups. Provide materials. 2. Students work together to design a parachute that falls slowly to the ground. 3. Students share their parachutes with classmates.	

Closing
Review Sample Review: We made our parachute just like the leader showed us. It fell too quickly to the floor, so we cut a small hole in the center. Then it descended more slowly. When I get home I am going to make a parachute. We have an extra plastic bag in the garage."
Debrief **Three Whats** Ask the following three "what" questions: 1. What did you enjoy most about this activity? 2. What was the biggest challenge with this activity? 3. What did you learn from the group?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "This activity was fun. Our first plastic bag ripped when we tied the string through the holes. We had cut the holes too close to the edge. The second bag worked better.

Your Reflection:

Modification of Lesson:
Use adult supervision if students stand on a chair. Never stand on a folding chair.

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Light
Focus	Inventors and Inventions

Materials: Different kinds of paper (writing, tissue, wax, grocery bags), different kinds of fabric, (sheer, woven, knit), colored cellophane, aluminum foil, window screen, other transparent or translucent objects.

Opening

State the Objective

The objective of this lesson is to learn that light is all around us.

Gain prior knowledge by asking students, "What do you know about Thomas Edison?"

The inventor of the day is Thomas Alva Edison (1847-1931). He was an American inventor whose many inventions changed the world. His work includes the electric light bulb, the phonograph, and the motion picture projector.

Edison experimented with thousand of different light bulb filaments to find just the right materials to glow well, be long-lasting, and inexpensive. He finally discovered that a carbon filament in an oxygen-free bulb glowed but did not burn up for quite a while. We are forever grateful to Thomas Edison.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Talk about some natural sources of light (sun, firefly, spark, fire).
2. Now think of some manmade sources of light (TV, light bulb, flashlight, and candle.)
3. Ask students, "Can you see in the dark? What animals can see in the dark? (Nocturnal animals – owls and cats. They have large eyes which glow in the dark.)
4. How do you think light helps us see? (Light lets more images into our eyes.)

Students Practice ("You Do")

1. Divide students into partner-pairs. Provide materials.
2. Have students make predictions about what things light can go through.
3. Students experiment with the paper, fabric, and other materials to determine if light can go through them.
4. Share with classmates.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- Student: "What does the word transparent mean?"
- Teacher: "Transparent means that a lot of light goes through an object. Glass is transparent."

Consult 4 Kids Lesson Plans

Closing
Review **Sample Review**: "We learned that light can go through some things and not through others." **Review:**
Debrief **WHI?** Ask the following three questions: 1. What were some of the questions that came up in your group? 2. How did you go about including everyone? 3. If you were to try this again, what might you do differently?

Reflection (Confirm, Tweak, Aha!) **Sample Reflection**: "We should have talked about the words transparent and translucent at the beginning of the lesson." **Your Reflection**:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Sir Isaac Newton – Opposite Colors
Focus	Inventors and Inventions

Materials: Plastic cups, white paper, crayons, paper, water, a sunny day.

Opening

State the Objective

In this activity, students will discover the close relationship between color and light. They will learn that colors have opposites.

All colors can be found in light. We know this for sure when we see a rainbow in the sky after a rainfall. There are seven colors in the rainbow: red, orange, yellow, green, blue, indigo, and violet. Black and white are both colors but do not appear in a rainbow.

Gain prior knowledge by asking students, "What do you know about _____?"

The law relating to the refraction of light was discovered by a Dutchman, Willibrord Snellius in 1621. The law is now called Snell's law. Rainbows form in the sky when sunlight refracts (bends) as it passes through raindrops. It will act the same way when it passes through a cup of water. Rainbows can form in other situations.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Some colors are warm: red, yellow and orange. Some colors are cool: blue, green and purple.
2. Why do you think those colors were designated as either warm or cool?
3. What are some things that you know about that are warm colors? Do you feel warm when you are around those colors?
4. What are some things that you know about cool colors? Do you feel cool when you are around those colors?
5. Together we are going to draw a sunburst flower. I will demonstrate and then you will have your turn.
6. Draw a sunburst flower using red, yellow and orange; or blue, green and purple. Make a black dot in the center of the paper. Then using strokes like the rays of the sun make lines coming out from the center of the flower. Use multiple layers of color until you have reached the edge of the paper.

Students Practice ("You Do")

First Activity. Do the activity with the whole group:

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- Student: "How do you use secondary colors in real life?"
- Teacher: "In what jobs would you use secondary colors?" (Painters, artists, fashion designers, product design)

1. Provide students with a blank color wheel. 2. Fill in the primary colors. Red at 12:00, yellow at 4:00, and blue at 8:00. 3. Fill in the secondary colors. Orange at 2:00, green at 6:00, and violet at 10:00. 4. Find the opposite of red (green). Draw a straight line to connect. Find the opposite of yellow (violet), blue (orange). Connect the opposites. **Second Activity:** 1. Using a blank sheet of white paper, place a red colored dot on the paper. Stare at the dot for 30 seconds. Now stare at the white paper. You should see the complimentary or opposite color (green) on the white paper next to the red dot. 2. Continue to find the opposite of blue and red.	

Closing
Review **Sample Review**: "First we filled in the primary colors on the color wheel. Next we filled in the secondary colors. Then we drew lines to connect the opposite colors. Finally we stared at a red dot for 30 seconds, looked at the white paper and saw a green dot. We did the same thing with the blue dot, and saw an orange dot." **Review:**
Debrief **What's Important About That?** This strategy allows for the debriefing to take a single student's learning and thinking deeper. First, ask a question of the whole class, "What's important about . . . (relating to the activity)" When one student responds, "It's important to . . ." Listen for what the student says is important about the activity. Building on that statement, the question again is, "What is important about that?" (Whatever was stated by the student). Go with the process up to five times, each time taking the child's understanding of what is important to a deeper level. When finished state, "Then what I heard you say is that the importance of this activity is . . . "

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "I think I would find out about people who are color blind. Will they still see green after staring at a red dot?."

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Two Paper Clip Experiments
Focus	Inventors and Inventions

Materials:

Magical Paper Clip - String, magnet, scissors, paper clip, scotch tape, glue (optional), clean glass jar with a metal lid.
Magnetic Paper Clip Experiment – Magnets, paper clips

Opening

State the Objective

Magical Paper Clip: The objective of this activity is to show that the string is preventing the paper clip from being pulled flat to the magnet. It appears that the paper clip is suspended in the air.

Magnetic Paper Clip Experiment: See how many paper clips you can pick up with just one magnet.

Gain prior knowledge by asking students, "What do you know about paper clips?"

The paper clip was invented in 1899 or 1890 by a Norwegian patent clerk called Johann Vaaler. His original paper clip was a thin spring-steel wire with triangular or square ends and two "tongues." The modern shaped paper clip was patented in 1899 by William Middlebrook of Waterbury, Connecticut.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Magical Paper Clip: Model this activity for the whole class.
2. Cut the string about the length of the jar from top to bottom.
3. Tie the paper clip to one end of the string.
4. Tape the other end of the string to the bottom (inside of the jar).
5. Show students the jar with the paper clip lying at the bottom of the jar.
6. Pace the lid on the jar. Turn it upside down so the paper clip hands from the string.
7. Carefully turn the jar right side up so that the paper clip is being pulled by the magnet.

Students Practice ("You Do")

1. Divide students into groups. Provide materials.
2. Hang one paper clip from a magnet.
3. Use the hanging clip to pick up other paper clips.
4. See how many paper clips you can pick up using only one magnet.
5. Try this with plastic coated paper clips and different sized paper clips.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- Student: "How will this experiment work with a plastic jar?"
- "Teacher: "Let's try it and see."

Consult 4 Kids Lesson Plans

Closing
Review **Sample Review**: "We watched the leader do the magic trip with the glass jar. We worked together to see how many paper clips would hang from one magnet." **Review:**
Debrief **Like Best, Next Time (LBNT):** 1. Have students share what they enjoyed most about the activity. 2. What else would they have liked to have done? 3. What would they have liked to have spent more time on?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "I wanted to do the glass jar experiment in our group. We liked making a chain of paper clips."

Your Reflection:

Modification of Lesson

Have adult supervision when using a glass jar.

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Willibrord Snellius - Make Your Own Rainbow
Focus	Inventors and Inventions

Materials: Plastic cups, white paper, crayons, paper, water, a sunny day.

Opening

State the Objective

The objective of this lesson is to learn that light can appear to bend in a cup of water.

Gain prior knowledge by asking students, "What do you know about rainbows?"

The law relating to the refraction of light was discovered by a Dutchman, Willibrord Snellius in 1621. The law is now called Snell's law. Rainbows form in the sky when sunlight refracts (bends) as it passes through raindrops. It will act the same way when it passes through a cup of water. Rainbows can form in other situations.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Say, "Let's learn a silly poem."

<u>Roy G. Biv</u>
Roy G. Biv is an odd name for a fellow
But what his name means is
Red – Orange – Yellow
The G is for Green which as you may know,
Comes right in the middle of every rainbow.
Next, Blue and Indigo, more pale than dark.
Then V for Violet – And that completes the arc!

2. Using crayons and paper draw a rainbow arc using the colors in order, beginning with red at the top.

Students Practice ("You Do")

1. Review directions for the activity.
2. Provide students with supplies to conduct the experiment in partner-pairs.
3. Fill a plastic cup ¾ full of water.
4. Take the cup and white paper to a sunny window or outside.
5. Hold the cup of water above the paper. Watch the sunlight pass through the water.
6. The sunlight refracts (bends) and forms a rainbow of colors on the white paper.
7. Try holding the cup of water at different heights and angles to see the effect.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- Student: "How do the colors of the rainbow know to be in that order?"
- Teacher: "I don't know the answer to that question. How can we find out?"

Consult 4 Kids Lesson Plans

Closing
Review **Sample Review**: "First we put water in a plastic cup. Then we found a sunny location. Next we held the cup above the white paper. Finally we watched sunlight pass through the water to form a rainbow on the paper." **Review:**
Debrief **WHI?** Ask the following three questions: 1. What were some of the questions that came up in your group? 2. How did you go about including everyone? 3. If you were to try this again, what might you do differently?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "Whenever I see water and light, I am going to look for a rainbow."

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Courageous Journey in a Graham Cracker Car
Focus	Courageous Journeys and Quests

Materials: Plenty of graham crackers, peanut butter, plastic knives, paper plates, straws (axles), assorted wheel-shaped candies or cookies, gum drops (headlights), pretzels (road),

Opening

State the Objective

In this activity, students will learn how to make a graham cracker car using various sizes of wheels.

Gain prior knowledge by asking students, "What do you know about _____?"

The wheel is a device that allows heavy objects to be moved easily through rotating on an axle through its center. The wheel was invented around 3500-3350 BC, possibly in Europe. Knowledge of the device spread across Asia, China and eventually to the Western Hemisphere.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Ask students, "What parts should we build on our cars?" (Body, wheels, axle, headlights, windshield wipers, antenna, and license plate.) Show them how the axle and wheel work.
2. Talk about using peanut butter as glue to keep the car together. Experiment with thin, medium or thick layers of peanut butter. Which holds the crackers best?
3. Prepare the surface where students will be working.

Students Practice ("You Do")

1. Divide students into groups. Provide students with group materials on paper plates.
2. Construct the cars. Construct the axle and wheels. Set the car onto the axle and wheels.
3. Decorate the car with headlights, and other parts.
4. Share the cars. Take photos. Review how wheels work.
5. If desired, eat the cars.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- Student: "How will I get the wheel to roll?"
- Leader: "Experiment with different candies, cookies and axles."

Consult 4 Kids Lesson Plans

Closing
Review **Sample Review**: "We built the cars using our own imagination." **Review:**
Debrief **Three Questions** Ask the following three questions: 1. What was your key learning from this activity? 2. Were there any problems with the activity? 3. If you were to try this activity again, what might you do differently?
Reflection (Confirm, Tweak, Aha!) **Sample Reflection**: "The peanut butter didn't hold as well as hard white icing (Royal Icing). However, the cars lasted long enough for us to take photos." **Your Reflection**:
Modification of Lesson: Teach students how to clean up after a messy lesson.

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Journey to the Moon
Focus	Courageous Journeys and Quests

Materials: Aluminum foil baking pan (10x13), flour, cocoa powder, sifter, magnet, steel marbles or ball bearings, BB's. pellets, and photo of a crater on the moon.

Opening

State the Objective

In this activity, students will learn about man's journey to the moon. Students will learn how craters are formed and how some of the characteristic features of a crater are produced.

Gain prior knowledge by asking students, "What do you know about _____?"

In 1969, over forty years ago, three astronauts blasted into space aboard the Apollo 11 spacecraft. Their goal was to land on the moon. They were successful! Neil Armstrong said these famous words as he set foot on the moon. "One small step for man. One giant leap for mankind." Hundreds of thousands of people all over the world watched the event. With man able to land on the moon the dawning of a new age began. It took the planning and coordination of a workforce totaling 350,00 workers to accomplish this amazing task!

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Talk about the moon with the students. What do they see when they look at the moon in the night sky? Can you see the moon in daylight?
2. Discuss gravity on the moon. Gravity is only 1/6 as strong on the moon as it is on Earth. Ask these questions:
   - Weightlifting – If you can lift a 10 pound weight on Earth. How many pounds can you lift on the moon? (60 pounds)
   - Diving – Would you be able to dive into a pool of water on the moon? (No. There is no atmosphere or air pressure. Water would quickly boil away into space.)
   - Golf – If you hit the ball 25 yards on Earth, how many yards would the ball go on the moon? (125 yards)
   - Parachuting - Would a parachute work on the moon? (No. There is no air resistance. You would freefall slowly to the moon's surface.)
3. Demonstrate Making a Crater. Ask for student helpers. Compare the flour craters with the actual moon crater photo.

Students Practice ("You Do")

1. Take the aluminum pan. Fill it with flour to a depth of about an inch. Gently shake

*Activity → Teachable Moment(s) *throughout*

Tip: Teachers, listen for questions that begin with "what" or "how."

- Student: "How can you tell if the crater is old?"
- Leader: "The crater's rim is not as sharp. He is worn down."

or tap the pan until the flour is smooth. 2. Using the sifter, gently sprinkle cocoa on top until the flour is barely covered. 3. Drop the large steel ball (1/4 in. diameter) in the middle of the pan. Carefully remove the ball with a magnet. 4. Now, take a few of the small objects (BB's, pellets), and drop them into the box from straight overhead. Drop each one from a different height. 5. Take a few of the small objects and throw them very carefully into the box at an angle. 6. Have students identify the features of a large crater (sharp rim; rays are visible), small crater (sharp rim; few rays), the rim, the rays of the crater, center peak.	

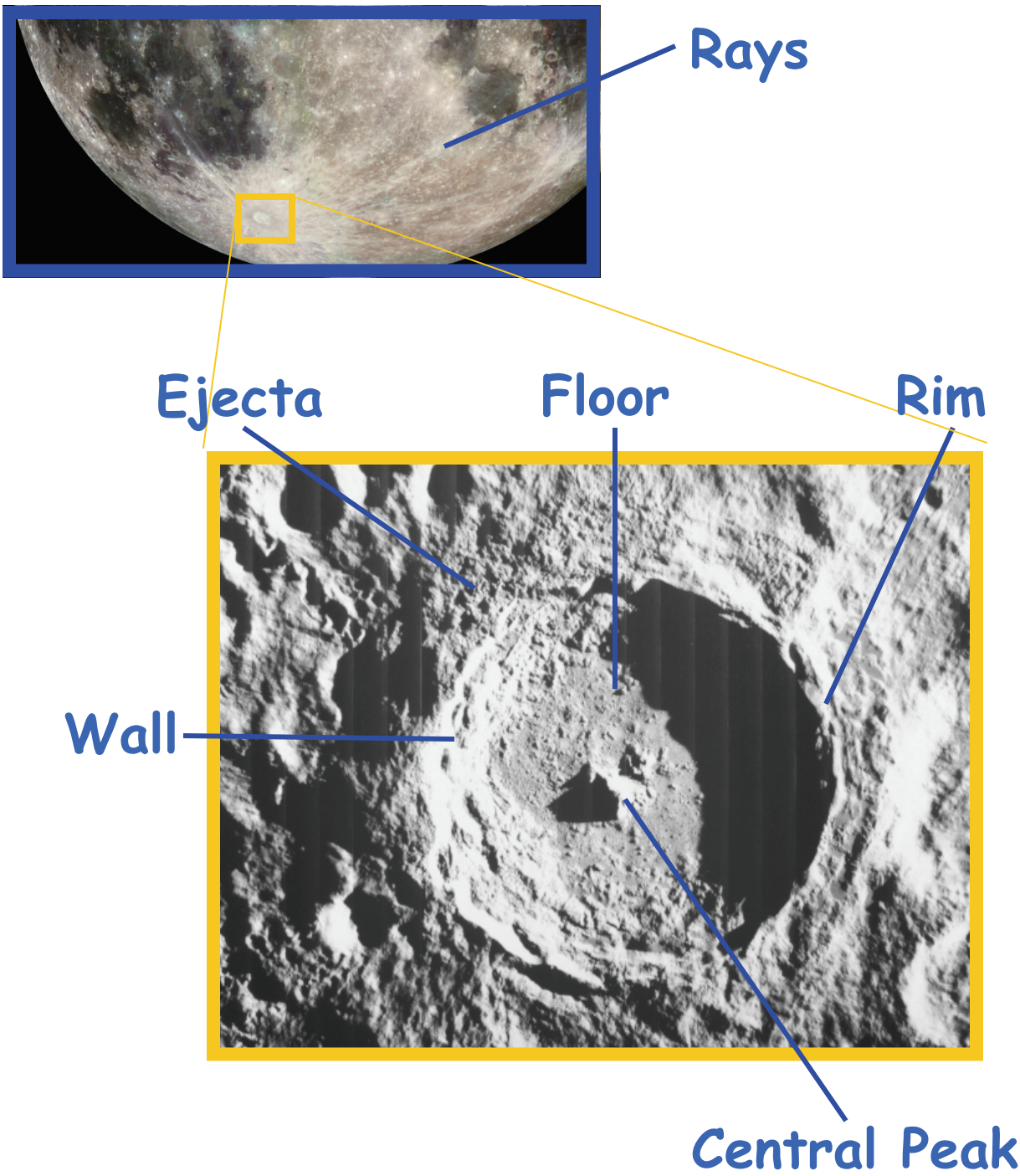
Closing
Review Sample Review: "We dropped round objects into the pan with flour. The larger objects made larger craters." Review:
Debrief WHI? Ask the following three questions: 1. What did you like best about this activity? 2. How did you include everyone in the activity? 3. If you were to try this activity again, what might you do differently?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "A few students really got the idea of moon craters. Other students didn't make the connection."

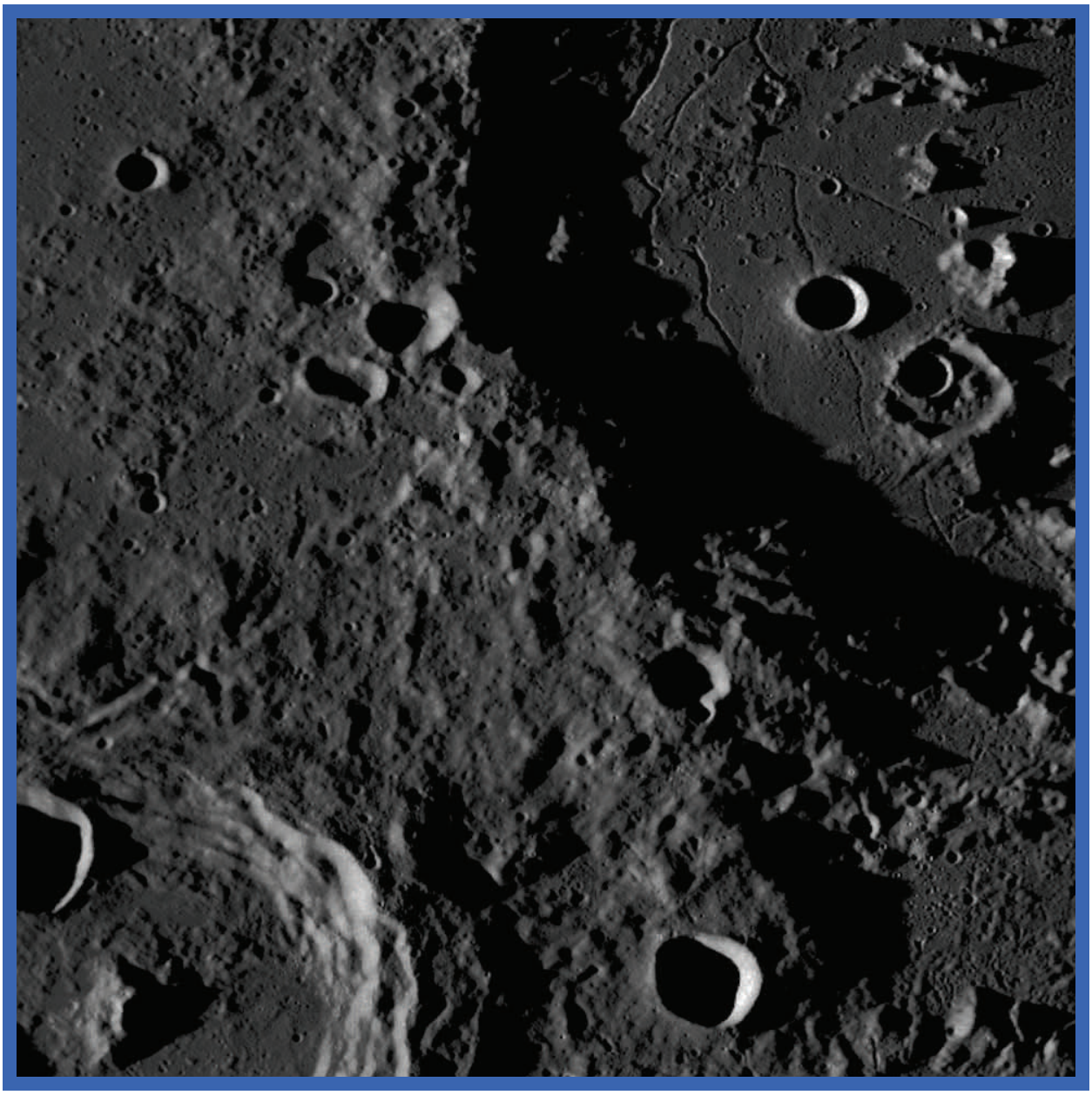
Your Reflection:

Modification of Lesson: Pour the flour into the pan before students come into the room. Flour dust can be inhaled.



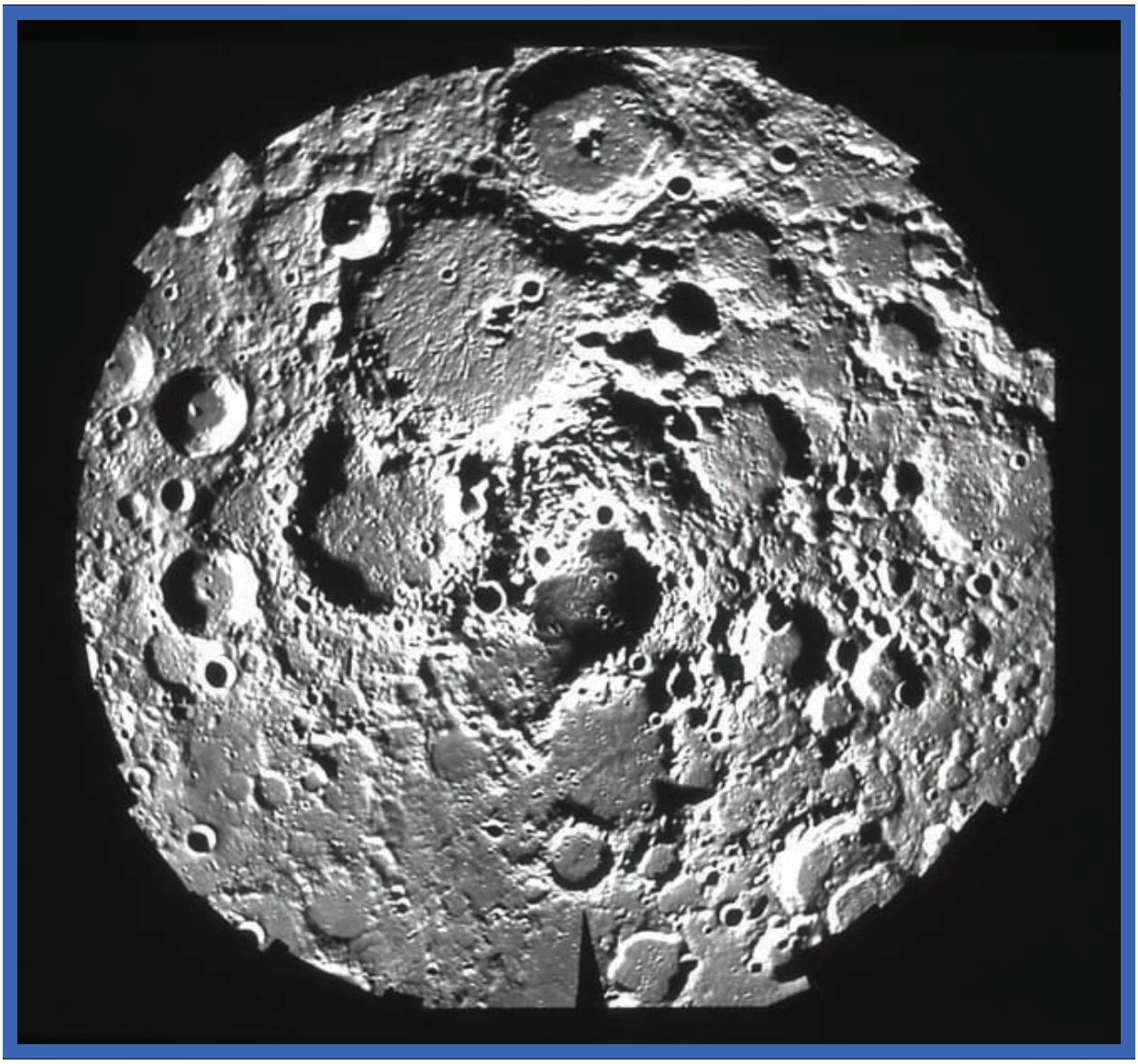
1. Craters Have Distinct Features

Credits: NASA



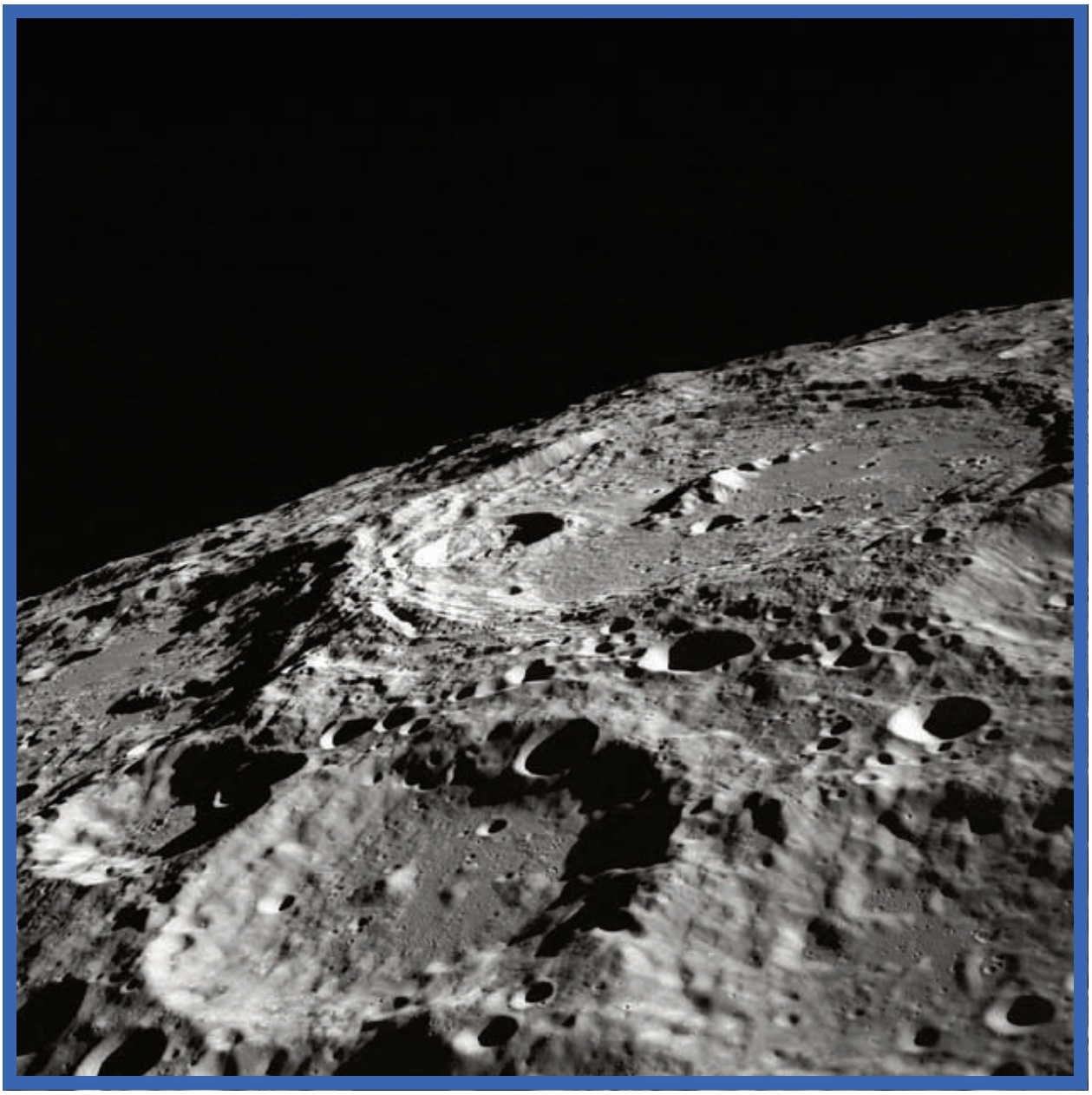
2. Large and Small

Credit: NASA/GSFC/Arizona State University



3. Circular Craters Cover the Surface of Moon's North Pole

Credit: Lunar and Planetary Institute

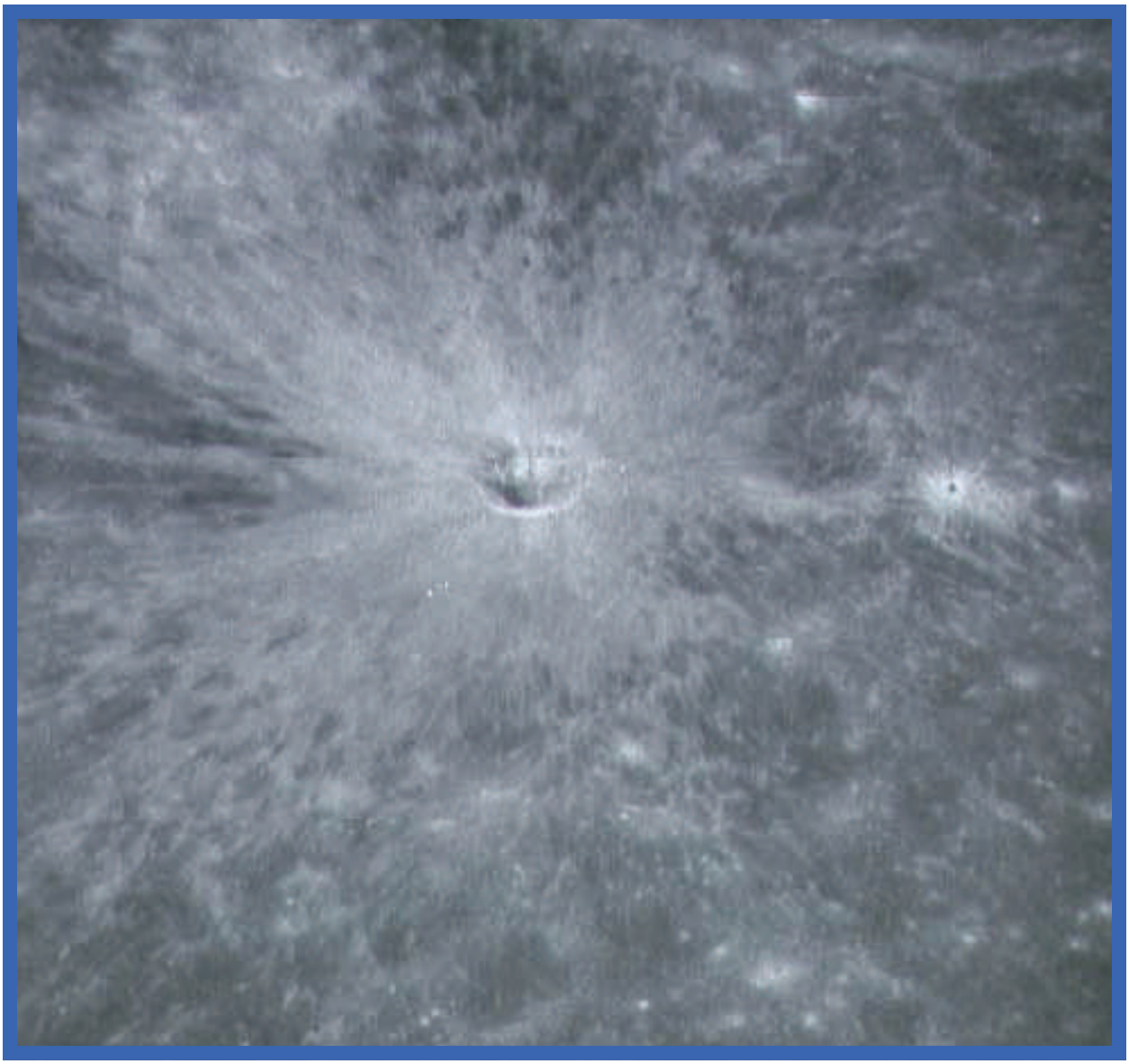


4. Light and Shadow

Credit: NASA

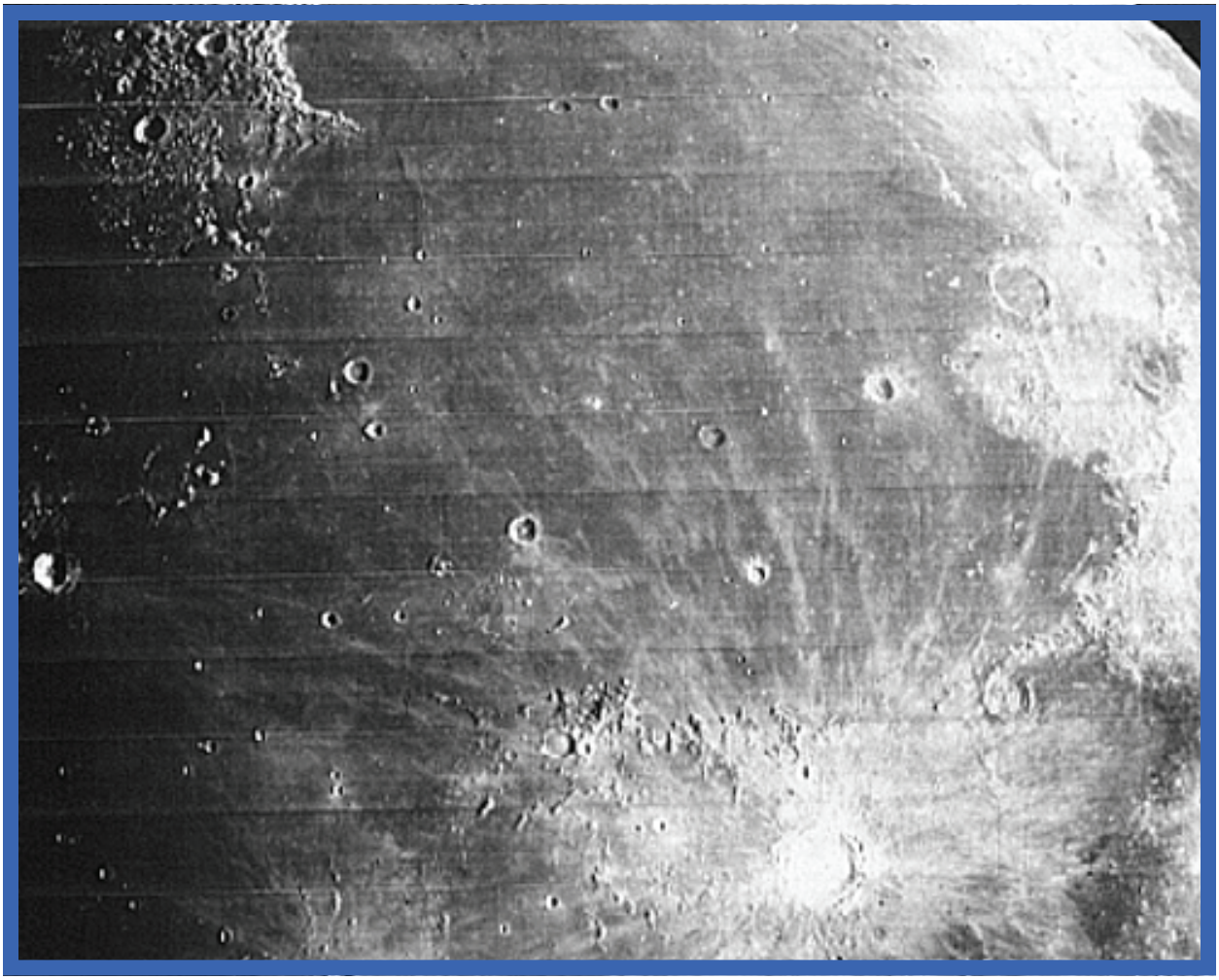
5. Fresh and Ancient Craters

Credit: NASA



6. Bright Rays on Dark Mare

Credit: NASA



7. Ejecta Splashed Across Moon

Credit: NASA

8. Astronaut on Crater Rim

Credit: NASA

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Mountain Climbing
Focus	Courageous Journeys and Quests

Materials: Photo of Mt. Everest, YouTube video – Mt. Everest Summit Video – Everest Peace Expedition

Opening

State the Objective

In this activity, students will learn some of the many challenges mountain climbers experience when climbing a tall mountain.

Gain prior knowledge by asking students, "What do you know about _____?"

The tallest mountain in the world is Mt. Everest. It is 29,029 feet tall, growing at approximately 5 inches per year. In 1953, the first two men to reach the top of Mt. Everest were Edmund Hillary and his Sherpa guide, Tenzing Norgay. Hillary was a beekeeper but wanted to take the challenge of the climb. Mt. Everest lies in the Himalaya Mountains on the border of China and Nepal. This was an amazing quest for both men. They set the bar for others to follow.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Ask students, "What does it mean to be brave? Have you ever been exhausted? How is being exhausted different than being tired? Would a mountain climber be uncomfortable?"
2. What are some decisions a mountain climber must make? (Which route to take, spending two years of his life training and preparing for the trip, forming a team, buying equipment, making arrangements with the government of Nepal)

Students Practice ("You Do")

1. Divide students into groups.
2. Ask students to brainstorm obstacles a mountain climber might face. (Extreme cold, carrying a heavy load, low oxygen, crevasse fields, avalanches, steep slopes, their bodies breaking down, losing fingers, toes, and the tip of your nose to frostbite
3. Use whiteboards to draw pictures of mountain gear climbers need to carry on their backs. (Backpack, clothing, tent, food, oxygen tank, rope, ladders, medicine, camera)
4. Act Out climbers using science on the mountain: thermometers, communication devices, experiments, creams, dried food, heat sources).

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- Student: "How much money does it take to go on this journey?"
- Leader: "Make a prediction and we'll talk about it."

Closing
Review **Sample Review**: "Students brainstormed ideas about mountain climbing. They acted out how you would use science on the mountain." **Review:**
Debrief **Three Whats** Ask the following three "what" questions: 1. What did you enjoy most about this activity? 2. What was the biggest challenge with this activity? 3. What did you learn from the group?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "It would have been helpful to show a video of climbers actually on their way to the top of Mt. Everest."

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Pilgrim Journey to America
Focus	Courageous Journeys and Quests

Materials:
Butter - Glass baby food jars with lids, heavy cream, salt, crackers, plastic knives, paper plates
Matching Items from the Past with Items from Today - White boards, markers, erasing cloth.

Opening

State the Objective

In this activity, students will experience life and food as they would have during Pilgrim days.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "What does the word "pilgrim" means? (Someone who goes on a special journey.) "What do you know about pilgrims in America?"

The Pilgrim's journey to America began in 1608. They were forced to leave England and went to Holland looking for religious freedom. After a time they returned to England and prepared to depart for America. Finally, after many problems including a leaky boat, 102 passengers set sail for America. After a journey of 66 days, they landed in America more than 600 miles off their course. Ask students, "What does it mean to have courage and be courageous?"

Just the Facts! Heavy cream is an emulsion. The fat is spread throughout the cream in very tiny drops. The protein in the fat keeps the fat droplets suspended. When you shake the cream, you force the fat droplets to come together. If they come together with enough force, they'll stick to each other and form bigger and bigger globs of butter.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Write this list of *Items from the Past* on the white board: outside game, girl's coif/ boy's hat, hornbook, made own candles, made own, leather mug, wooden trencher, and shells.
2. Divide students into two teams. Ask students to work with a partner. Say an *Item from Today*. Ask students to match the *Item from Today* with the *Item from the Past.* Have them draw a picture of the *Item from Today* on their white boards. Give points to the winning team.
3. *Items from Today*: spoon, electronic game, plate, baseball cap, glass cup, story book, soap, and light bulb or small lamp.
4. Answers: spoon (shells), plate (wooden trencher), glass cup (leather mug), soap (made own), light bulb/small lamp (made own candles), story book (hornbook), baseball cap (girls coif/boys hat), and electronic game (outdoor game)
5. Demonstrate how to make Pilgrim Butter.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- Student: "Why isn't the butter yellow?"
- Teacher: "Butter is yellow if cows are fed bright-green hay."

Students Practice ("You Do") 1. Give each student a baby food jar with lid. 2. Fill each jar half full of heavy or whipping cream. 3. Screw lid on tightly. 4. Students shake jar for 5-10 minutes or until a ball of butter forms. 5. Pour off buttermilk. 6. Add a little salt. 7. Spread butter on crackers to taste.	

Closing

Review

Sample Review: "We shook and shook until the cream thickened and became buttery. Everyone liked the taste of Pilgrim butter rather than store-bought butter."

Review:

Debrief

WHI?

Ask the following three questions:

1. What did you like best about this activity?
2. How did you include everyone in the activity?
3. If you were to try this activity again, what might you do differently?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "This lesson was very meaningful for kids."

Your Reflection:

Modification of Lesson: For younger students, use one pint jar. Unlike plastic, talk about glass being a breakable object. Remind students of safety during the project. Pass the jar around the room so each child gets a chance to shake the jar. You may have to go around the room more than once.

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Rafting the Grand Canyon
Focus	Courageous Journeys and Quests

Materials:
Making a Fossil Print – 2 cups flour, ¾ cup warm water, ½ cup salt, measuring cup, mixing bowl, waxed paper, objects for fossil prints (leaves, shells, plastic dinosaurs)
Canyon Carver – 1.9-L milk carton, 2.0-L water bottle, source of sediment (sand or potting soil), ruler, scissors, source of water, garden trowel.

Opening

State the Objective

In Making a Fossil Print, students will learn how fossils were made many years ago. In Canyon Carver, students will learn basics of the erosion process and how they form the landscape of the Grand Canyon.

Gain prior knowledge by asking students, "What do you know about _____?"

The Grand Canyon, located in the state of Arizona, is a steep-sided canyon formed by the Colorado River. It was established as a National Park many years ago. Its powerful immense size (277 miles long and 1 mile deep) and natural beauty inspires tourists from around the world. At the bottom of the canyon runs the muddy Colorado River which continues to erode and form the canyon even to the present day. Fossils may be found in Grand Canyon National Park. White water rafting and hiking are two of the many attractions to the Park. It has been said that the Grand Canyon is one of the Seven Wonders of the Modern World.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

Canyon Carver:

1. Use scissors to cut out the side panel of the carton under the spout, leaving the spout intact.
2. Lay the carton on its side with the cut out panel facing up. Fill the container about half full with the sediment. Smooth the surface.
3. Set one end of the carton approximately 1 cm. higher than the other end, using something to prop it up. Be sure that the lower end of the carton is the one with the spout.
4. Place the mouth of the water bottle on the higher end and slowly pour the water out. The water should flow steadily down and out the spout end.
5. Have a bucket ready to catch the water.

Students Practice ("You Do")

1. Mix the flour, salt and water to make dough, or a thick, stick mixture. Roll dough on a clean countertop until it is smooth.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- Student: "How long does it take for the river to carve the canyon?"
- Leader: "Do you think the hardness of the canyon wall would make a difference?"

2. Pull off a small piece of dough and form a ball. Place the dough ball on a piece of waxed paper. 3. Flatten the dough ball. It should be slightly bigger than the object you want to use to make a fossil print. 4. Press the object into the dough for about five seconds. Carefully remove the object from the dough. 5. Let your fossil print dry for 24-48 hours.	

Closing

Review

Sample Review: "First we watched as the 'Colorado River' eroded the canyon walls. Then we imagined seeing a fossil print exposed on the canyon wall. Finally, we made our own fossil prints."

Review:

Debrief

Three Questions

Ask the following three questions:

1. What was your key learning from this activity?
2. Were there any problems with the activity?
3. If you were to try this activity again, what might you do differently?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "I think we should have added dry coffee grounds to the dough so it would look more like dirt."

Your Reflection:

Modification of Lesson:

Canyon Carver: For younger students, cut the milk carton ahead of time. You may want to do this activity outside.

Consult 4 Kids Lesson Plans

Component	**Science**
Grade Level	**K-5**
Lesson Title	**Shrink a Potato**
Focus	**Courageous Journeys and Quests**

Materials: One potato for each group of 3 or 4 students, two saucers or plastic bowls, salt, water.

Opening

State the Objective

The purpose of this lesson is to make a potato shrink and shrivel,

Gain prior knowledge by asking students, "What do you know about _____?"

Potatoes are known as a root vegetable. This means that they grow from the roots of the plants under the ground. The salt water draws the water out of the potato, causing it to shrivel and become dehydrated. Dehydrated means when the water is removed. This often happens to humans when they sweat a lot and don't drink enough water. Your body can be like the potato is you don't drink enough water to replace what you sweat out!

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Fill both of the saucers with water.
2. Mix some salt into one saucer. Leave the other one with just plain water.
3. Mark the one with salt water so you remember which one it is.
4. Place one half of the potato into each saucer, with the flat side facing down.
5. Leave for about half an hour.
6. What has happened after this time?

Students Practice ("You Do")

1. Divide students into groups.
2. Students follow directions above.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "What other vegetables grow under the ground?"
- **Leader:** "Which of these is a root vegetable: carrot, turnip or radish?" Answer: All of the above.

Closing
Review **Sample Review**: "First we added salt to one of the saucers of water. Then we placed one cut potato in each saucer. After one hour we looked at our experiment." **Review:**
Debrief **WHI?** Ask the following three questions: 1. What were some of the questions that came up in your group? 2. How did you go about including everyone? 3. If you were to try this again, what might you do differently?
Reflection (Confirm, Tweak, Aha!) **Sample Reflection**: "This activity taught the students that it is important to drink more water after exercising!" **Your Reflection**:

Modification of Lesson:

Using a knife, the leader should cut the potatoes in half.

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Sunspots – View Images of the Sun Safely
Focus	Courageous Journeys and Quests

Materials:
For each student you will need one 4 x 6 index card, a piece of white card stock, cut in half, and a sharp pencil.

Opening

State the Objective

The purpose of this lesson is to safely view dark sun spots on the white card stock.

Gain prior knowledge by asking students, "What do you know about _____?"

The sun is a small star. It is made of intensely hot gases. We could not live without the Sun. The sun provides sunlight to sustain life on Earth. Explosions known as flares and magnetic storms happen without warning on the sun's surface. These storms usually occur when sunspots are forming. Sunspots or dark spots come and go. These sunspots are dark because they are much cooler than the gas around them. Astronomers have been curious about sunspots for a very long time.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

WARNING! Never stare directly at the Sun as it will cause damage to your eyes.

1. Teach students to never stare directly at the sun. In this lesson, the sun will be behind the students.
2. Have students make a small hole with the sharp pencil in the index card.

Students Practice ("You Do")

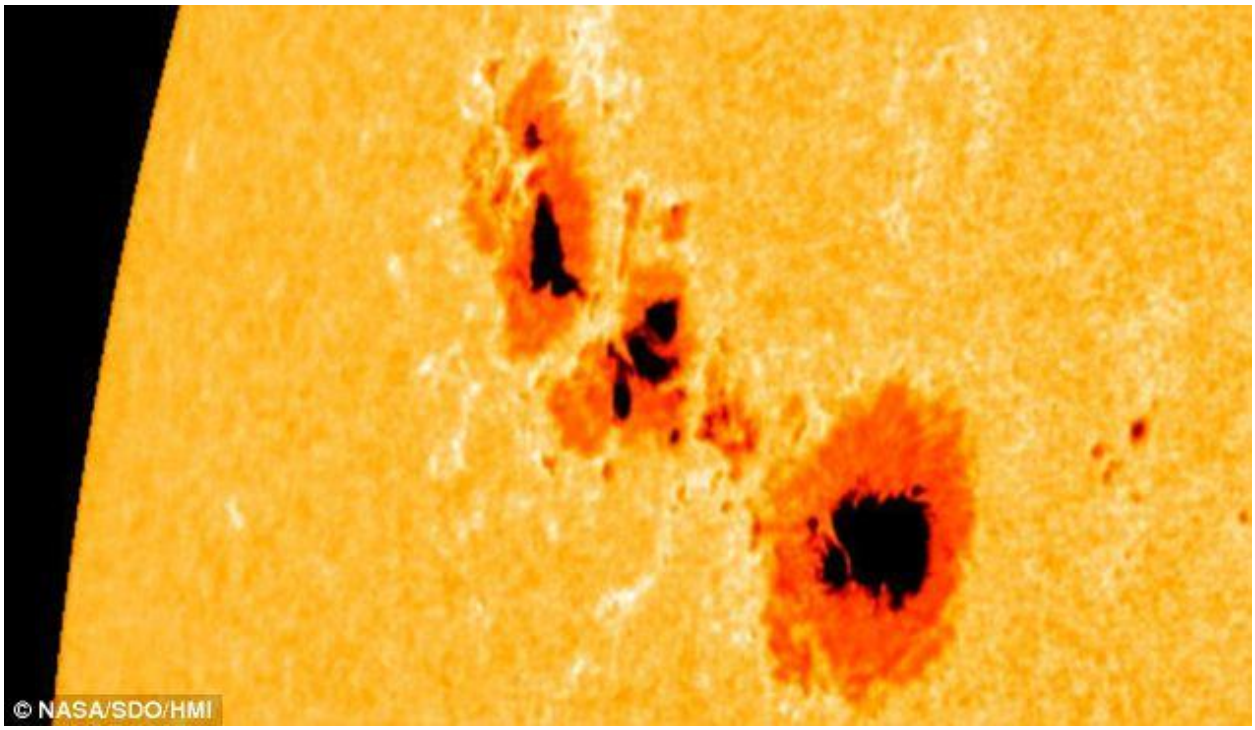
1. Students take their two pieces of paper outside.
2. Stand with your back to the Sun.
3. Hold the index card with the hole in it up to the Sun.
4. Hold the piece of cardstock about 8 inches below the index card.
5. Observe what is happening.
6. Move the two papers further apart.
7. Observe what is happening.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- Student: "What can we use to see an eclipse?"
- Leader: "Use these cards to view an eclipse."

Closing
Review **Sample Review**: First we punched a small hole in the index card. Then we sent outside, put our backs to the sun, watched the sunlight go through the hole and project onto the white cardstock. We could see the sun. **Review:**
Debrief **Three Questions** Ask the following three "what" questions: 1. What did you enjoy most about this activity? 2. What was the biggest challenge with this activity? 3. What did you learn from the group?
Reflection (Confirm, Tweak, Aha!) **Sample Reflection**: We don't think there were sunspots on the sun today. We'll try again tomorrow. **Your Reflection**:
Modification of Lesson: Remind students that sun glasses WILL NOT protect their eyes if they look directly at the sun!



Sunspot Images
September 2011

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Underwater Adventure
Focus	Courageous Journeys and Quests

Materials: 8 coins, tape, modeling clay, 2 wide rubber bands, water, large clear bowl, scissors, 12 oz. clear plastic water bottle, flexi drinking straw, and a permanent marker.

Opening

State the Objective

In this activity, students will learn how to make an underwater vessel or submarine.

Gain prior knowledge by asking students, "What do you know about _____?"

Jacques Yves Cousteau (1910-1997) was a French filmmaker and undersea explorer. He invented the Aqua Ling, a mechanism that allows divers to swim underwater while breathing compressed air. He traveled the world's oceans in his boat, the Calypso. Jacques Cousteau made underwater adventures popular world-wide.

In 1620, a Dutchman named Cornelius van Drebbel, was the first to build a submarine in which he remained submerged under the ocean.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")	***Activity → Teachable Moment(s) *throughout***
1. Talk about the ocean. What is under the ocean? Are there mountain ranges under the sea? (Yes) What can you learn by being in a submarine? 2. 2. Sing the song, "Yellow Submarine."	Tip: Teachers, listen for questions that begin with "what" or "how."
Students Practice ("You Do") 1. Take the aluminum pan. Fill it with flour to a depth of about an inch. Gently shake or tap the pan until the flour is smooth. 2. Using the sifter, gently sprinkle cocoa on top until the flour is barely covered. 3. Drop the large steel ball (1/4 in. diameter) in the middle of the pan. Carefully remove the ball with a magnet. 4. Now, take a few of the small objects (BB's, pellets), and drop them into the box from straight overhead. Drop each one from a different height. 5. Take a few of the small objects and throw them very carefully into the box at an angle. 6. Have students identify the features of a large crater (sharp rim; rays are visible), small crater (sharp rim; few rays), the rim, the rays of the crater, center peak.	• Student: "How can you tell if the crater is old?" • Leader: "The crater's rim is not as sharp. He is worn down."

Closing
Review **Sample Review**: "We dropped round objects into the pan with flour. The larger objects made larger craters." **Review:**
Debrief **WHI?** Ask the following three questions: 1. What did you like best about this activity? 2. How did you include everyone in the activity? 3. If you were to try this activity again, what might you do differently?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "A few students really got the idea of moon craters. Other students didn't make the connection."

Your Reflection:

Modification of Lesson: Pour the flour into the pan before students come into the room. Flour dust can be inhaled.

Yellow Submarine by the Beatles

In the town where I was born,
Lived a man who sailed to sea,
And he told us of his life,
In the land of submarines.

So we sailed on to the sun,
Till we found the sea green,
And we lived beneath the waves,
In our yellow submarine.

We all live in a yellow submarine,
Yellow submarine, yellow submarine.
We all live in a yellow submarine,
Yellow submarine, yellow submarine.

And our friends are all aboard,
Many more of them live next door,
And the band begins to play.

We all live in a yellow submarine,
Yellow submarine, yellow submarine.
We all live in a yellow submarine,
Yellow submarine, yellow submarine.

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Amazing Gravity
Focus	Incredible Stories (Fact is Stranger Than Fiction)

Materials: Newspaper, two oranges, grape, empty water bottles, several ketchup packets, cup of water

Opening

State the Objective

The study of Science offers incredible stories. The objective of this activity is to experiment with weight and the force of gravity.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "Does the weight of an object affect how fast gravity pulls the object to Earth?" (No matter how much an object weighs, gravity pulls it downward at the same speed.)

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Place newspaper on the floor.
2. Hold one orange in each hand. Extend your arms. Each orange must be at the same height.
3. Let the oranges go at the same time. Observe which one lands first.
4. Repeat the activity but this time hold an orange in one hand and a grape in the other.
5. Observe which one lands first.
6. What are the variables in this activity? What could cause either one to land before the other?

Students Practice ("You Do")
"Anti-Gravity Ketchup Trick"

1. Materials: bottle of water, ketchup packet (Found at fast-food stores), glass of water.
2. Take the label off the bottle. Find a packet of ketchup that is not too full. To be sure you're using one that will float, test out a few packets using a glass of water.
3. Fold the ketchup packet in half and push it into the bottle. It should float. Screw the cap back onto the bottle.
4. Pick up the bottle and hold it at the bottom with your right hand. If you lightly squeeze the bottle, the packet will fall to the bottom. If you release the pressure, it

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "What will happen if we drop a feather and the lead sinker from the same height at the same time?"
- **Leader:** "How will the atmosphere affect the feather?"

will float back to the top! The trick is to squeeze the bottle while pretending to control the movements with a wave of your other hand.	

Closing
Review **Sample Review**: "We watched two oranges fall to the floor, and then we watched an orange and grape fall to the floor. The best part was when we performed the Anti-Gravity Magic Trick with a water bottle." **Review:**
Debrief **WHI?** Ask the following three questions: 1. What happened after the orange and grape fell to the newspaper? 2. How would you explain the Anti-Gravity Magic Trick? 3. Which one of these activities will you use in your real life?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "I'm not sure how squeezing the water bottle makes the catsup raise and lower in the water bottle."

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Balance and Gravity Test
Focus	Incredible Stories (Fact is Stranger Than Fiction)

Materials: Large index card, pattern of a clown, pencil, scissors, markers, paper clips, string, several large balloons, water, string

Opening

State the Objective

The study of Science offers incredible stories. The objective of the first activity is to see how symmetry can work with gravity to create balance. The second activity attempts to show to actual shape of the Earth.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "Can you make an upside-down clown balance on the eraser of a pencil? If it is possible then, what will gravity have to do with the activity?"

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Talk about symmetry. (An object that is exactly the same on both sides.) Look for symmetrical objects around the room.
2. Use the clown pattern provided.
3. Fold the index card in half. Draw half of the clown. The fold line in the middle of the card is the middle of the clown.
4. Cut out the clown, and unfold the paper. Decorate.
5. Attach a paper clip to each arm for weight.
6. Try balancing the clown on the eraser top of a pencil.
7. Try balancing the clown with just one paper clip on one arm, and see if there is a different effect.

Students Practice ("You Do")
"The Shape of the Earth"

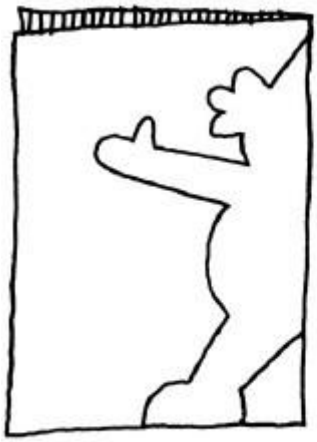
1. Do this activity outside.
2. Provide partner-pairs with a large balloon, source of water, and a piece of string.
3. Fill the balloon with water. Tie the end with string.
4. The shape students have just made is an oblate sphere. Imagine a flattened sphere or ball. Earth also has this shape, although not quite as extreme as the shape of the balloons.

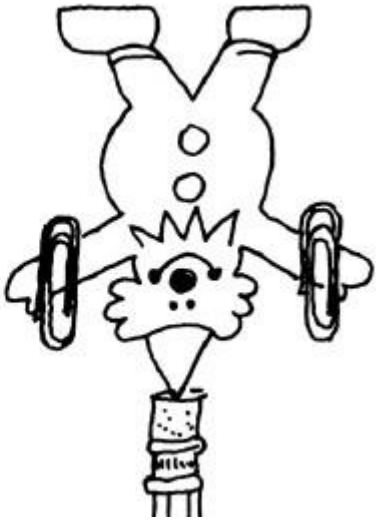
Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "What caused the clown to fall with just one paper clip?"
- **Leader:** "How is the clown balanced with a paper clip on one side?"

Closing
Review **Sample Review**: "We balanced a paper clown on the end of a pencil eraser. Then we filled balloons with water." **Review:**
Debrief **Liked Best, Next Time (LBNT)** In this simple debrief, students talk about the activity or the day and share what they enjoyed most. Have them share what else they would have liked to have done, or what they would have liked to have spent more time on. LBNT allows students to express an opinion about the day.
Reflection (Confirm, Tweak, Aha!) **Sample Reflection**: "It is difficult for me to imagine that the Earth is shaped like a pear." **Your Reflection**:





Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Gravity Free Water
Focus	Incredible Stories (Fact is Stranger Than Fiction)

Materials: A glass filled right to the top with water, a piece of cardboard, several balloons, flexible straws

Opening

State the Objective

The study of Science offers incredible stories. Students will learn that water in a glass, held upside down, can defy gravity. Students will learn that you can suspend balloons in mid-air.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "Is it possible for water to stay in a glass while being held upside down?" (Yes, with the help of a piece of cardboard and air pressure.) "Would this experiment work with other liquids?"

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Put the cardboard over the mouth of the glass. Make sure that no air bubbles enter the glass as you hold onto the cardboard.
2. Over a sink, or outside, turn the glass upside down.
3. Take your hand away holding the cardboard.
4. You may need to try this activity several times until you get it mastered.

Students Practice ("You Do")
"Suspending Balloons in Mid-Air"

1. Blow up your first balloon. Place the longest end of the straw in your mouth and the bent up end of the straw pointing toward the sky.
2. Hold your balloon just above the bent end of the straw.
3. Blow through the straw and see if you can suspend the balloon in mid-air.
4. If you are feeling confident, blow up the second balloon making sure that it is slightly bigger than the first balloon that you blew up.
5. Place the second balloon just above your first balloon to see if you can get both balloons to stay afloat, one on top of the other.
6. If you have managed this, go for your third balloon making sure that it is slightly bigger than the second balloon that you blew up.
7. Place your third balloon just above the second balloon to see if you can suspend it in air.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "What does air pressure have to do with the water staying in the glass?" (With no air in the glass, the air pressure from outside the glass is greater than the pressure of the water inside the glass. The extra air pressure manages to hold the cardboard in place, keeping you dry.)

Closing
Review **Sample Review**: "We kept water in a glass without it spilling to the ground. We also suspended two balloons in mid-air. **Review:**
Debrief **Four Step Debrief (DIGA)** **Step 1:** Describe: Students describe what they did during the activity. **Step 2**: Interpret: Students answer one, some or all of the following questions a. What were your key learning's when you participated in this activity? b. What skills did you need to utilize to participate in this activity? c. How did you feel participating in this activity? **Step 3:** Generalize: How can you use the skills of your key learning's in your life? **Step 4**: Apply: How can you use the skills in your work as an adult?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "We all got out of breath trying to keep the balloons in the air by blowing through the straw."

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Gravity Pulls
Focus	Incredible Stories (Fact is Stranger Than Fiction)

Materials: Lead sinker (fishing line weight), ball, pitcher, books, small cans or plastic cups, string

Opening

State the Objective

The study of Science offers incredible stories. The objective of this activity is to explore the force of gravity.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "What would happen if there was no gravity? If gravity did not exist, what would happen to you, tables, chairs, food and everything? Where would all of the people and things go? (Floating around in space) Could you drink out of a cup? (No) Could you drink out of a straw? (You would need air pressure.)

Gravity keeps the planets and stars of the Milky Way in their place. Gravity acts the same way on objects of differing size and weight.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Prop a table up by placing some books under one end of it, about 2 in.
2. Observe the speed of the ball as it rolls down the table.
3. Throw a ball into the air and observe its path.
4. At a sink, over a bucket, or outside, pour water from the pitcher and again observe its path.
5. The paths of these objects are called parabolic. (A curve formed by the intersection of a cone with a plane parallel to its side. Think of a basketball court. The "key" under the net is outlined in a parabola; also, the arch in the McDonald's Sign)
6. Now drop the lead sinker and the ball. Observe the difference.

Students Practice ("You Do")
"Whirl the Water Can"

1. Attach a piece of string to a small can or plastic cup.
2. Half fill the can (cup) with water.
3. Do not put the lid back on the can (cup).
4. In an outside area swing the can around your head very quickly.
5. What will happen?

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "What will happen if water spilled in a 'no gravity zone?' Could you collect the water and put it back in the cup?"
- **Leader:** "What is the name of the man who discovered many things about gravity?" (Sir Isaac Newton)

6. Does the water stay in the cup? What keeps the water in the cup? When you stop swinging the cup, why does the water fall out? 7. Think about a ride at the County Fair or Amusement Park, sometimes called a "Gravitron." You stand at the edge of a circular device. As it begins to spin faster and faster, you are pinned to the wall around the edges of the ride. What is this force? (centrifugal force) Is this the same thing as gravity? (This ride is used to create artificial gravity.) 8. Can you think of other examples of centrifugal force? (Banked curves when driving)	

Closing

Review

Sample Review: "We watched a ball roll, a ball being thrown up in the air and water being poured. Next we watched a cup half full of water being swung around by a string."

Review:

Debrief

Three Questions

Ask the following three questions:

1. What was the most important thing you learned from this activity?
2. How can you use what you have learned in your real life?
3. How would you show this activity to another person?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "This activity taught the students that gravity will hold water in a cup when it is twirled around your head."

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Seasons and Tides
Focus	Incredible Stories (Fact is Stranger Than Fiction)

Materials: Balloon with a line drawn around the middle (Earth and its equator), bowl (to rest Earth on), flashlight (the Sun), books to rest flashlight on; bucket, plastic ball or balloon, water

Opening

State the Objective

The study of Science offers incredible stories. Students will learn how the Earth experiences different seasons, and how the ocean has high and low tides.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "Does the light from the Sun fall evenly on the Earth? Where is the hottest part of the planet?"

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Blow up the balloon. Tie off the end.
2. Draw a black line around the center of the balloon (equator).
3. Slowly spin Earth around.
4. Sit Earth onto the bowl so the line of the equator is slightly sloping toward the flashlight.
5. Rest the flashlight onto the books so it is shining just above the equator.
6. Where the Sun's light is brightest, the countries will be experiencing summer. Where the Sun's light is furthest away, the countries will be experiencing winter.
7. Talk about where winter, autumn and spring would be?
8. Discuss which colors of clothing you should wear in summer. (Light colors reflect the light and heat to keep you cooler) Which colors should you wear in winter? (Dark colors absorb the light and heat to keep you warm)
9. Would it be possible to live where there is summer all year long? (Yes, just follow the equator from one end to the other.)
10. Does this make sense to do in real life?

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "How can the equator be the hottest part of the planet?"
- **Leader**: "What part of the Earth is closest to the Sun?" (The equator)

Students Practice ("You Do")
"The Tides"

1. Half fill the bucket of water.
2. Place the ball in the bucket so it is floating.
3. Place both hands onto the ball and push down very slowly.
4. Let the ball come up again.
5. Watch the change in water level.

6. How can you tell if the tide is coming in or out? (Every twelve hours the tides rise and fall. As the Earth and Moon spin, gravity pulls them together and the Moon pulls at the ocean water directly beneath it causing it to rise and fall. When it is high tide on one side of Earth, it will be low tide on the other side.) 7. When is the best time to go fishing? High tide or low tide? (The best time to go fishing is one hour before high or low tide, and one hour after high or low tide. There is less water movement at that time. Expert fishermen say that in the early hours before sunrise and after sunset are the best times for fishing.)	

Closing

Review

Sample Review: "We learned all about the seasons. We learned how the moon pulls the water on Earth to make high tide."

Review:

Debrief

What's So Important About That?
This strategy takes a single student's learning and thinking deeper. Students are reminded of what they just participated in. The first question asking students generically, what is important about (whatever they just finished). When one student responds, listen for what the student says is important about the activity that was just completed. Building on that statement, the question is again, "What's so important about that?" This process can take up to five times. At the end, the leader says, "So what I'm hearing you say is that it is important to . . . "

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "I liked learning about the seasons. When it is winter here, I think I will go to Australia for summer."

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	The Moving Sun and Sunset in a Box
Focus	Incredible Stories (Fact is Stranger Than Fiction)

Materials: Chalk, 2 friends, pen, paper, watch; several clear plastic boxes, water, milk, several flashlights, several plastic teaspoons

Opening

State the Objective

The study of Science offers incredible stories. Students will learn how the Sun moves through the day, and why the sky changes color at sunset.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "Does the Sun move through the sky or does the Earth move through the sky?"
Ask students, "Are there dust particles in the atmosphere? (Yes) How do you know this is true? (They are visible when the wind is blowing. You can see them on a car or in the house on the furniture.) These tiny dust particles scatter the Sun's light. The yellow and red light of the Sun is harder to scatter, so that is why we see those colors during a sunset.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

WARNNG: Never stare directly at the Sun as it may cause eye damage!

1. Choose three times of the day to go outside and measure shadows. The best times are mid-morning, noon, and mid-afternoon.
2. Before you go outside, record the three times you will be outside in a table.
3. With your partners, go outside with your chalk and your recording table.
4. Take turns to draw each other's shadows on the concrete.
5. Draw what your shadow looks like in your recording table. Draw a line through the middle of your shadow.
6. Go out for your second observation and stand in exactly the same place as you did earlier. Trace around your shadow and draw a line down the middle of it. Record this on your table.
7. Do this for your third observation.
8. Compare the lines down the middle of each shadow. What do you notice?

Students Practice ("You Do")
"Sunset in a Box"

1. Divide students into small groups.
2. Fill your clear plastic box with water.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "What if we can only go outside two times and draw our shadows?"
- **Leader**: "Can we still get information about the path of the Earth from two shadows?"

3. Add a teaspoon of milk to the water. 4. Shine a flashlight straight down to see what the Sun looks like at midday. 5. Shine the flashlight sideways to see what the Sun looks like as it sets. 6. Do you see red and yellow colors?	

Closing

Review

Sample Review: "We learned that our shadows change size during the day. We also learned that dust moves the Sun's light around."

Review:

Debrief

Three What's

Ask the following three "what" questions:

1. What did you enjoy most about this activity?
2. What happened after we finished drawing the shadows?
3. What did you learn from the group?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "I learned that nothing is ever the same, even our shadows."

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	The Sun, Earth and Moon
Focus	Incredible Stories (Fact is Stranger Than Fiction)

Materials: Several large balloons, modeling clay, straw, several pieces of elastic, cut in various lengths

Opening

State the Objective

The study of Science offers incredible stories. The objective of this activity is to see the relationship between the Sun, Earth and the Moon, and how incredible it would be if the Sun was not a part of the solar system.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "Does anyone have a sweater big enough to fit a small planet? Would we be able to live on Earth if someone turned the Sun off?"

Without the Sun there would be no life on Earth. The Sun provides light, warmth, and energy. The Sun is much bigger than any of the planets in our solar system. Compared to Earth, the Sun is 100 times bigger in diameter, 330,000 times heavier and a million times bigger in volume.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Blow up a large balloon as big as possible and tie the balloon closed.
2. Make two round balls with the modeling clay. One about the size of a ping-pong ball (Earth) and the other a little smaller in size than a small marble (Moon).
3. Slide the straw through the middle of the larger ball and the through the middle of the smaller ball.
4. Position the balloon about three feet from the Earth and Moon.
5. Ask students to comment on what they see.

Students Practice ("You Do")
"Whirl the Ball"

1. Experience the pull of gravity.
2. Talk about safety during the lesson. Students should find a safe place to whirl the balloon.
3. Whirl a balloon on the end of a piece of elastic.
4. The stretch of the elastic represents the gravitational pull of the Sun.
5. The planets are kept in place by the pull of gravity.
6. The further the planet is from the Sun the longer it takes to orbit (travel) around the

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "Does the Sun rotate around the Earth and Moon?" (No)
- **Leader:** "How many days does it take for the Earth to rotate around the Sun?" (365 days)

Sun. Have students make a list of all the planets. (Mercury, Venus, Earth, Mars, Jupiter, Uranus and Neptune) Have students decide which piece of elastic represents each planet. Note: Pluto at one time was considered a planet. With the advances of space telescopes, it is now **not** considered a planet.	

Closing

Review

Sample Review: "First we made a model of the Sun, Earth and Moon. Then we attached a piece of elastic to a balloon and whirled it around."

Review:

Debrief

WHI?

Ask the following three questions:

1. What were some of the questions that came up in your group?
2. How did you go about including everyone?
3. If you were to try this again, what might you do differently?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "This activity taught the students that the Sun is absolutely essential to life on Earth."

Your Reflection:

Modification of Lesson:

The leader may need to model the pull of gravity activity before students work in small groups.

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Your Weight on the Moon and Gazing at Stars
Focus	Incredible Stories (Fact is Stranger Than Fiction)

Materials: Bathroom scales, calculators; balloons, waterproof markers

Opening

State the Objective

The study of Science offers incredible stories. Students will learn what their weight will be on the Moon. They will also see how galaxies are moving away from each other.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "Is the Moon larger or smaller than the Earth? If the Moon is smaller than the Earth, will it have as much gravity as Earth? (No) Will you weigh the same on the Moon as you do on the Earth?" (No)

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Have students weigh themselves on the bathroom scales.
2. Record their weight.
3. Divide their weight by six because the pull of gravity on the Moon is about one-sixth of that on Earth. So if the student weighs 90 pounds on Earth, he or she will weigh 15 pounds on the Moon.
4. Ask students to discuss weighing only one-sixth of what they weigh now. What would they be able to do that they can't do now? (Jump 6 times higher)
5. Have students find a partner and talk about this new experience. Draw a picture of their new life on the Moon.

Students Practice ("You Do")
"Gazing at Stars"

1. Divide students into small groups.
2. Talk about galaxies.
3. What is a galaxy? (A group of billions of stars and their planets, gas, and dust that extends many thousands of light-years and forms a unit within the universe. Galaxies are held together by gravitational forces. Most of the galaxies are shaped like spirals and ellipses.)
4. Blow up your balloon to half its capacity, but do not tie it.
5. With your marker, draw small specks all over the balloon.
6. Blow more air into the balloon.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "How much does the Earth weigh?"
- **Leader**: "Actually, the Earth weighs 380,000 trillion tons! Awesome!"

7. Look at the position of the specks. 8. Keep blowing and watch the specks. What do you notice? (Scientists think that the universe is growing in size just like the balloon did. This means that the galaxies are moving away from each other.)	

Closing
Review **Sample Review**: "We learned how much we would weigh on the moon, and then found out about galaxies." **Review:**
Debrief **WHI?** Ask the following three questions: 1. What were some of the questions that came up in your group? 2. How did you figure out that the galaxies are moving apart? 3. If you were to choose the best activity, which one would it be?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "We learned that the universe is getting larger, not staying the same."

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Bouncing Around
Focus	Introducing a Very Talented You

Materials: Basketball, tennis ball, large outdoor area; carpeted floor area, hard floor area; 3 tennis balls, tape measure, masking tape

Opening

State the Objective

The objective of the first activity is to investigate how energy is transferred by bouncing balls of different sizes. The second activity will investigate bouncing energy. The objective of the third activity is to learn how different surfaces affect the bounce of balls.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students what objects bounce? (Silly putty, balls, toys, people) "What have you observed about objects that bounce? What is inside different kinds of balls? (Air, wound-up string in baseballs and golf balls) Ask students to make a prediction whether the basketball or tennis ball will bounce higher.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

First Activity:

1. Go to an outside area. Bounce the basketball and notice how high it bounces.
2. Bounce the tennis ball from the same height as the basketball. Notice how high it bounces.
3. Now hold the tennis ball on top of the basketball. What do you think will happen when you drop them? Which one will bounce the highest?
4. Note: The tennis ball bounces much higher than the basketball. This is because energy from the basketball is transferred to the tennis ball.

Second Activity:

1. Go to the hard floor area. Bounce the basketball and then bounce the tennis ball. What do you notice?
2. Go to a carpeted area. Bounce the basketball and the tennis ball. What happens? Why do you think the balls bounced differently in the different places?
3. Note: When a ball hits a soft surface like carpet, the ball's energy is absorbed into the carpet because it is spongier.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "How do bouncing balls get their energy?"
- **Leader:** "Bouncing balls get some of their energy from gravity?"

Students Practice ("You Do")

Third Activity:

1. Divide students into small groups.
2. Use the tape measure to measure 16 in., 32 in., and 48 in. on a wall. Mark these

with masking tape. 3. Drop the tennis ball from the 16 in. height. Ask the group what happened? How high did the ball bounce? Do this two more times. Record how high it bounces each time. 4. Do the same using the height of 32 in. 5. Repeat the experiment at the 49 in. height. Why do you think the ball bounces at different heights? 6. Note: When a ball is bounced it conserves its energy. That is why it bounces up close to the height from which it was dropped.	

Closing
Review **Sample Review**: "In the first activity we watched a tennis ball fall on top of a basketball. In the second activity, we bounced the balls on a hard surface and on the carpet. In the third activity, we measured how high the tennis ball could bounce." **Review:**
Debrief **Likes and Dislikes** Create a chart. List what students liked and what students didn't like about the activity. Next time, how would they change things to make them better?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "I wonder which ball would bounce the highest – a room temperature ball or a frozen ball."

Your Reflection:

Modification of Lesson:

Try bouncing two tennis balls – a room temperature ball and a frozen ball. (The room temperature ball will bounce higher.)

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Float or Sink? and Thirsty Rocks
Focus	Introducing a Very Talented You

Materials: pumice stone, small piece of sandstone, small piece of granite, small brick or small piece of cement, clear plastic container, enough water to just fill the plastic container, pen, paper; 3 large clear plastic containers (cups), measuring cup, piece of granite, piece of sandstone, piece of limestone.

Opening

State the Objective

The objective of this activity is to predict which rock will float or sink, and then to decide which rocks are most porous.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "Do all rocks have the same hardness? Which rock is the hardest? (diamond) Which rock is the second hardest? (granite) Why are we not using diamond for this experiment? (Diamonds are rare and expensive. Granite is easily found and is free or inexpensive.)

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Take your pen and paper and predict which rocks will float and which rocks will sink. Write down your predictions.
2. Fill the plastic container with water.
3. Drop all the rocks into the container.
4. Which rocks sunk? Which rocks floated?
5. Were your predictions correct?
6. How many predictions did you get right? How many did your friends get?

Students Practice ("You Do")
"Thirsty Rocks"

1. Make predictions about which rock will absorb the most water. Write your predictions on paper.
1. Measure and pour the same amount of water into the three containers.
2. Make a note of how much water was poured into each container.
3. Put one rock in the middle of each water-filled container.
4. Make sure there is enough water to cover each rock completely.
5. Leave the rocks in the water for at least 30 minutes. Can you see anything happening to the water level?
6. Carefully remove the rocks from their containers. Drain all of the excess water back into the container.
7. Pour the water back into the measuring container. Subtract to find out how much water was soaked up by each rock.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "In real life, what is the use of a floating rock?"
- **Leader:** "In real life, what are the uses of rocks that sink?" (Breakwater in a harbor, foundations for bridges mixed with concrete and steel, aquariums, anything requiring drainage).

Closing
Review **Sample Review**: "In the first activity we predicted which rock would float or sink. In the second activity, we found out which rock soaked up the most water." **Review:**
Debrief **Likes and Dislikes** Create a chart. List what students liked and what students didn't like about the activity. Talk about what would change to make the activity better next time.

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "The students learned not to build a house out of sandstone or limestone."

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Make Quicksand and Continental Eggs
Focus	Introducing a Very Talented You

Materials: Cornmeal, water, bowl, various stores; boiled eggs, enough for one for each student (Purchase eggs that are close to their expiration date. Older eggs will peel easier.)

Opening

State the Objective

The objective of the activity is to find out how quicksand works, and how the Earth's tectonic plates work.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "What do you know about quicksand? (Quicksand is a mixture of sand and water usually liquefied by an underground water source.) Is there quicksand near where you live? Where would you most likely find quicksand? (beaches, marshes and ponds) How would you escape from quicksand?" (Relax and float on your back. The more you struggle, the faster you will sink. Beware of quicksand because the surface of it looks solid. Carry a long stick with you to probe into suspicious surfaces to see if it is a mushy mixture.)

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Fill the bowl about halfway with cornmeal.
2. Add water to it and stir thoroughly until it makes a thick paste. This is your "quicksand."
3. With two fingers, pretend to "walk" across the quicksand. Walk quickly first. Did you make it across the quicksand?
4. Now try to walk across the quicksand slowly. Can you make it across this time?
5. Put a stone on your "quicksand." See how quickly it sinks.

Students Practice ("You Do")
"Continental Eggs"

1. Make predictions about will happen when you crack the egg shell.
2. Take a boiled egg and crack it on its side. (What you want are two or three large pieces of eggshell, not a lot of little pieces.)
3. Leave the shells on the egg.
4. Take your egg and try to move the pieces of the shell horizontally around the egg so that the pieces move against each other.
5. Do the pieces of shell move over each other? Do they buckle or move upward?
6. Students have made something similar to the surface of the Earth, with the shells being the tectonic plates.
7. Actually, Earth's plates move about 11/4 in-2 in. in a year.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "Is quicksand like you see in the movies?"
- **Leader:** "In real life, quicksand is usually only about a few feet deep. Always go in these areas with a buddy."

8. What is a sudden movement of the tectonic plates called? (Earthquakes)	

Closing
Review **Sample Review**: "In the first activity we made fake quicksand. In the second activity we used an egg to make a model of tectonic plates on the Earth. **Review:**
Debrief **Liked Best, Next Time (LBNT)** In this simple debrief, students talk about the activity or the day. They share what they enjoyed most and what they would have liked to have spent more time on.

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "The students learned to avoid areas where there might be quicksand."

Your Reflection:

Modification of Lesson:

Leader: Crack a boiled egg ahead of time to see if the shell will peel easily.

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Making Craters and Spinning Fun
Focus	Introducing a Very Talented You

Materials: Large bowl, flour, large marble, small marble, tennis ball; normal weight paper, thin paper, thick cardstock, ruler and scissors

Opening

State the Objective

The objective of the first activity is to investigate why craters are not always the same size. The objective of the second activity is to see how different objects can move through the air.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "Do all objects fly through the air in the same way? (No) Does the design of the object make a difference in how they fly through the air?" (Yes)

"What is a crater? (A crater is a large hole in the ground caused by an explosion.) Does a volcano have a crater at its top? (Yes) Are all craters the same size?" (No)

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Fill the bowl with flour. Pat it down gently. Make it smooth on top. Note: Be careful not to disturb the flour as it will make dust.
2. From a height, drop a large marble into the middle of the flour. What do you notice?
3. Now, smooth the flour again and repeat Step 2 with a smaller marble. What do you notice?
4. Now smooth the flour again and repeat Step 2 with a tennis ball. What do you notice?
5. Note: The larger the object, the greater the force with which it hits Earth and the larger the crater.

Students Practice ("You Do")
"Spinning Fun"

1. Ask students to take normal weight paper and make a strip of paper 8 in. long and ¾ in. wide. Cut out the strip.
2. Measure 5/8 in. from each end and make a cut halfway across the strip. The cuts should be on opposite sides of the strip.
3. Turn the paper strip and use the cuts near the ends to make a closed circular shape. The shape should hold together and not undo.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "How did the craters get on the Moon?"
- **Leader:** "Since the Moon has no atmosphere to slow down space rocks, asteroids and other space rocks crashed into the Moon."

4. Hold the flying machine over your head and drop it. Watch how it spins quickly as it falls. 5. Make another fun spinner with the thin paper and watch what happens. 6. Make another fun spinner from the thick card stock. What happens? 7. Do all of the fun spinners fly through the air the same way?	

Closing
Review **Sample Review**: "In the first activity we dropped different round-shaped objects into a bowl of flour. In the second activity, we made three fun spinners." **Review:**
Debrief **Three What's** Ask students to answer these three "what" questions: 1. What did you enjoy most about this activity? 2. What was the biggest challenge with this activity? 3. What did you learn from the group?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "I wonder what other things you can make out of spinners?"

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Pangaea: The Ancient Continent
Focus	Introducing a Very Talented You

Materials: Photocopies of a map of the world, large sheets of butcher paper the same size as your map. scissors, glue

Opening

State the Objective

The objective of this activity is to investigate the shape of the continents and learn some of the history of Earth.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "Has anyone ever heard of Pangaea, the Ancient Continent?" Pangaea (pan-jee-a) was an ancient continent made up of the current major continents on Earth, where they were once combined into one continent.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Show a large map of the Earth's continents.
2. Ask students, "What three continents touch the Arctic Ocean?" (North America, Europe, and Asia)
3. "What is the wettest region on Earth?" (The places closest to the Equator – Hawaii and Florida)
4. "What caused Pangaea to split?" (Currents in the Earth's mantle, the part of the Earth that lies between the crust and the core, caused by the mantel turning hot).
5. Act out the splitting of Pangaea: Ask seven students to come to the front of the class. Have them close together in the order they appear in the Pangaea Map. (The map of Pangaea is loosely shaped like a capital "C." Beginning at the top of the letter, Asia, Europe, North America, Africa, South America, India, Antarctica, and Australia.)
6. Slowly have them drift to their respective places on the globe. (See the Continent Map)

Students Practice ("You Do")
"Let's Make Pangaea"

1. Provide each partner pair with a map of the seven continents of the world, a large sheet of butcher paper, scissors and glue.
2. Cut out the seven continents of the World.
3. Spread the butcher paper on a table.
4. Take the continents you have cut out and place them on the paper.
5. Play around with them to see how you can get them to fit together.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "How many continents did Pangaea split into?" (At first, 3 continents)
- **Leader:** "How many years old is the Earth?" (Some scientists think it is 4.5 billion years old.)

6. When you have found the pieces that match, glue them next to each other on your butcher paper. Glue the extra pieces around the edge of the paper. 7. Now you have the super-continent Pangaea!	

Closing
Review **Sample Review**: "First we acted like we were Pangaea. Then we cut out the continents from a World Map and glued them to the butcher paper." **Review:**
Debrief **Three What's?** Ask the following three "what" questions: 1. What did you enjoy most about this activity? 2. What was the biggest challenge with this activity? 3. What did you learn from working with your group?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "This activity taught the students that the Earth has changed over time."

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Ruler Vibrations and Musical Bottles
Focus	Introducing a Very Talented You

Materials: Plastic or metal rulers, one for each child, table edge; identical glass bottles (5-8), water, metal spoon

Opening

State the Objective

The objective of the first activity is to listen to the sounds a ruler can make. The objective of the second activity is to find out how differently pitched sounds are made.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "How are musical sounds made?" (When an object vibrates through the air, particles bang into each other and sound is produced.) What is musical pitch? (How high or how low a sound is) What are some instruments with a high sound? (flute, piccolo, violin, piano, trumpet, clarinet, bugle) What are some instruments with low sounds? (bass drum, timpani, bass guitar, cello) Can everyday objects make musical sounds? (Yes. Brooms, steel drums, metal against metal)

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Be sure the glass bottles are identical.
2. Put the bottles in a line.
3. Add water to the bottles. Fill the first bottle with a little water; the next one with a little more than the first, until you have filled all the bottles with different but increasing amounts of water.
4. Take a metal spoon and strike the bottles one after the other.
5. Strike the bottles in any order.
6. Can you plan a tune on the bottles? You may need to add or take away water to make a musical scale. Place the bottle with the greatest amount of water in order first. It will produce the lowest sound.
7. Note: The more water in a bottle, the lower the pitch will be; the less water, the higher the pitch will be.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "How do musical instruments produce sound?"
- **Leader:** "Something is vibrating: strings, metal, or plastic."

Students Practice ("You Do")
"Ruler Vibrations"

1. Take a ruler and place it so that it is half on the table and half off the table.
2. Firmly hold the part of the ruler that is on the table.
3. Use your other hand to pull up on the part of the ruler that is off the table.
4. Let go and listen to the sound. Keep repeating this action.

5. Can you make the sounds go higher and lower by moving the ruler? **Note:** When the ruler vibrates at a slower speed, the sound is at a lower pitch. When it vibrates at a higher speed, the sound is at a lower pitch.	

Closing
Review **Sample Review**: "In the first activity we played the tune, "Three Blind Mice." In the second activity we had fun flipping our rulers." **Review:**
Debrief **Three Questions** Ask students to answer these three questions: 1. Name three musical instruments. 2. How did you get the ruler to make different sounds? 3. If you used bottles that were not identical, would you be able to produce musical sounds?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "The students kept flipping their rulers. They didn't want to stop."

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Thirsty Rocks
Focus	Introducing a Very Talented You

Materials: Large plastic container, measuring cup (must have level markings), brick, water; clear plastic cups, several pieces of chalk, vinegar, water

Opening

State the Objective

The objective of this activity is to investigate whether rocks can absorb water, and to observe a chemical reaction.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "Do rocks get wet? (Yes) Do they soak up water? (Yes) Do all rocks soak up the same amount of water? (No)"

Ask students, "What does the word "absorbent" mean? (capable of soaking up liquid) What are some things that are absorbent? (cloth, carpet, wood, food, skin) What are some things that are not absorbent? (plastic, metal)

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Make a prediction about what will happen when we place the brick in the water.
2. Pour a measured amount of water into the container. Make sure you pour enough water so that it completely covers the brick.
3. Put the brick in the middle of the water-filled container. Can you see anything happening to the water level?
4. Leave the brick in the container for 45 minutes.
5. Remove the brick from the container. Make sure you allow the excess water to drain off before completely removing the brick.
6. Pour the remaining water in the container back into the measuring container.
7. Subtract the remaining volume from the original volume. Your answer will be the amount of water absorbed by the brick.
8.

Students Practice ("You Do")
"Bubbling Rocks"

1. Place a piece of chalk, which is made of calcium carbonate, in a clear cup of water.
2. Set one piece of chalk in a cup of vinegar and one in water.
3. The chalk will immediately start reacting with the vinegar (an acid), making quite a show!
4. What are other acids you could use? (lemon juice or Coke)

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "What are some absorbent rocks?" (chalk, pumice, limestone).
- **Leader:** "What are bricks made of?" (The basic component.)

5. Pour off the liquid after about an hour. 6. Compare the chalk that was in the water to the chalk in the vinegar. 7. Is there sediment in the water cup? 8. The sediment that you see is calcium acetate, a chemical made when the acid and carbonates react. 9. What does this activity tell us about thirsty rocks?	

Closing
Review **Sample Review**: "In the first activity we put a brick in a pan of water, and then we measured how much water the brick soaked up. In the second activity, we put a piece of chalk in a cup of water and in a cup of vinegar." **Review:**
Debrief **WHI?** Ask the following three questions: 1. What did the brick show the students? 2. How did the brick soak up the water? 3. If you choose to do this activity again, would you use a brick or another rock?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "This activity taught the students that many rocks can soak up water."

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Turning Inside a Balloon and Unusual Pendulum
Focus	Introducing a Very Talented You

Materials: Clear balloons, dimes; string, modeling clay, sunglasses

Opening

State the Objective

The objective of the first activity is find out how an object turns within a confined space. The objective of the second activity is to see how a pendulum moves.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "What makes a top spin? Why does the top stay upright?" (A spinning top stays upright because of the forces of energy that keep it there. The same thing will happen with the coin inside the balloon.)

"What is a pendulum? (A pendulum is a weight hung from a fixed point so that it can swing freely back and forth under the influence of gravity.) Where would you find a pendulum? (Grandfather clock, playground swings, metronome for music timing, and a seismograph to measure earthquake waves)"

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Provide student pairs with clear balloons and a dime.
2. Place the coin inside the balloon and blow the balloon up. Be careful not to over blow the balloon and make it too stretched. Tie the end of the balloon.
3. Start to turn the balloon around quickly in a circle.
4. Once you feel the coin starting to move around in a circular path, hold the balloon still and let the coin keep moving.
5. Why do you think this is happening?
6. Why does the coin have this kind of path?

Students Practice ("You Do")
"Weird Pendulum"

1. Ask students, with parent's permission, to bring an old pair of sunglasses to class
2. Discuss the meaning of clockwise and counter-clockwise. Ask students to form a line and move clockwise; then counter-clockwise.
3. Provide students with a string, and a large blob of modeling clay.
4. Attach the string to the modeling clay.
5. Hold the string in your hand and let the pendulum swing.
6. Ask a partner to hold the sunglasses over their right eye. Ask them to tell you what

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: ""What is Newton's First Law of Motion?"
- **Leader:** "The Law is the tendency of a body in motion to stay in motion unless acted upon by an outside force."

is happening. (The pendulum appears to be moving in a counter-clockwise direction.) 7. Now ask your partner to hold the sunglasses over their left eye. What is happening? (The pendulum appears to be moving in a clockwise direction.) 8. Can anyone explain this phenomenon? (It is an illusion.)	

Closing
Review **Sample Review**: "In the first activity we watched a dime continue to turn after we stopped rolling the balloon. In the second activity, we looked at a pendulum through sun glasses." **Review:**
Debrief **Three Questions** Ask students to answer these three questions: 1. What is the meaning of the word "circular?" 2. Which activity will you teach to someone else? 3. What is an example of a pendulum?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "I didn't know that a playground swing is a pendulum!"

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Learn About a Habitat
Focus	Animal Habitats (Homes and Ecosystems)

Materials: Habitat printouts, globe or world map, writing paper, drawing paper, butcher paper, markers, crayons

Opening

State the Objective

The objective of this lesson is to create awareness about habitats: physical description, location, and plants and animals live in the habitat.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "What is a healthy ecosystem? (The water, water temperature, plants, animals, air, light and soil all work together.) What is an unhealthy ecosystem? (natural disasters, human destruction, disease, loss of a healthy component)

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Talk about each of these habitats: Grasslands, Temperate Forest, Tropical Rain Forest, Desert, Arctic Polar Ice, Antarctica Polar Ice and Tide Pools.
2. Ask students what connections they have to one or more of the habitats. For example, "My family loves the temperate forest because we go camping there every summer."
3. Brainstorm other habitats not on the list: swamp, freshwater marsh, city, tundra, and pond.

Students Practice ("You Do")

1. Divide students into small groups.
2. Provide each group with large pieces of butcher paper, markers, and crayons.
3. Students choose a habitat.
4. Provide each group with printout information on their habitat.
5. Students draw pictures and write information to show the Physical Description, Location, and Plants and Animals of their habitat.
6. Outline all drawings in black so they are visible from a distance...
7. Students should answer the Connection Question at the end of the information.
8. Share butcher paper "murals" with classmates.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "What website can I use to learn more about ecosystems? "
- **Leader:** "Just Google "ecosystems" or" habitats."

Closing

Review

Sample Review: "We learned about a habitat, which is also called an ecosystem."

Review:

Debrief

Three Questions

Ask the following three questions:

1. How would you explain where animals in the Temperate Forest get their food? (Berries, fish, other animals, plants)
2. Which one of the habitats would you like to visit?
3. How can you use what you learned in your real life?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "I would tweak this lesson to review synonyms for the word habitat. (System, environment, home, surroundings, bionetwork, and ecosystem)

Your Reflection:

Grasslands

Physical Description: Grasslands are basically flat with rolling hills. There are few bushes, scrubs and trees. The soil is too thin and dry maintain the root system of trees. Grasslands get a moderate amount of rain, but sometimes lack enough rainfall to sustain life and the grass begins to dry. Severe thunderstorms, tornados, dust storms, heat, wind and fire sometimes cause problems in the region.

Location: In the United States, the Great Plains stretch from south Texas to Canada. This includes Oklahoma, Nebraska, Kansas, Colorado, Montana, New Mexico Wyoming, North Dakota and South Dakota. Much of central and south Africa is grassland. Australia has large areas of grassland.

Plants and Animals: Grasslands are full of life. Deer, mice, rabbits and birds of prey (raptors) are plentiful. Foxes, coyotes, weasels, and snakes live in grasslands. Smaller creatures such as ants, lady bugs, dragonflies, grasshoppers, insects and earthworms live most everywhere. In Africa, cheetahs roam the grasslands.

Connection Question: What sport would cheetahs excel in?

Temperate Forest

Physical Description: Temperate forests have four seasons – winter, spring, summer and fall. Most of the climates are mild. Many forests are covered with snow in winter. Water comes from rain and snow. In summer, food is plentiful. Temperate forests are home to many plants and animals. There are many trees in the forest – maple, chestnut, elms, pines, firs and cedars are just a few. Clean air and clean water are plentiful in forests.

Location: There are temperate forests in Australia, Europe, Russia, Canada, the United States and Russia. Many of our forests are within National Parks. Some of the forests have been cut down to be used as farmland.

Plants and Animals: In Australia, koalas, possums, wallabies, wombats, and kookaburras live in forests. In European forests you will find boars, badgers, squirrels and songbirds. In Canada and the United States we have deer, bears, mountain lions, foxes, marmots, bobcats, rabbits and woodpeckers. In China, you will find the giant pandas and red pandas. Many animals camouflage themselves to blend in with the trees and foliage, so they are difficult to see.

Connection Question: What sport would giant pandas excel in?

Tropical Rain Forest

Physical Description: Tropical Rain Forests are warm and wet with tall trees, warm climate and a lot of rain. There are several layers in the forest:

- Emergent: Giant trees much higher than the average canopy. Many birds and insects live here.
- Canopy: Upper part of the trees. Full of life – insects, birds, reptiles and mammals
- Understory: Dark cool environment under the leaves, but over the ground
- Forest Floor: Home to many insects. Largest animals of the rain forest usually live here.

Location: Many rain forests are located in South America, Africa, and Southeast Asia. They form a green belt near the Equator.

Plants and Animals: Over 170,000 of the world's known 200,000 plants are found in the rain forests. There are many species of plants and animals found in no other region on Earth. Why? Tropical Rain Forests receive a lot of sunshine. The sunshine produces energy. Energy is stored in plants. The plants are eaten by animals.
The Temperate Rain Forest ecosystem is very important to all of us. They . . .

- help stabilize the Earth's climate
- are home to thousands of plants and animals
- help maintain the water cycle
- are a source of medicines and foods
- support tribal people

Connection Question: Many rain forests are in danger because they are needed for products we use. What is your plan for saving rain forests?

Desert

Physical Description: Deserts are a harsh environment. They get very little rainfall. Some deserts have extreme temperatures. They are very hot in the day and cold at night. Some deserts are always cold such as the Gobi Desert in Asia and Antarctica.

Location: Here are a few of the larger deserts: Sahara desert in North Africa, Mojave and Sonoran deserts in the southwestern U.S., Atacama Desert in northern Chile, South America, Lut Desert in eastern Iran, Arabian Desert in the Arabian Peninsula, Gobi Desert in China, Mongolia

Plants and Animals: Plants and animals have adapted to the lack of water, extreme temperatures, and shortage of food. Many animals are nocturnal. They sleep during the day and come out at night. Some burrow beneath the surface; others hide in the shade of rocks. Here are a few animals: rattlesnakes, coyotes, desert tortoise, jack rabbits, lizards, hawks, tarantulas, antelopes and bighorn sheep.

Connection Question: Humans have adapted to living in the desert. What adaptations have they made?

Arctic Polar Ice

Physical Description: This is a cold, windy region near the North Pole. It is frozen ice with no land underneath. Land within the Arctic Circle is called tundra. There are long periods of darkness in winder and long periods of light in summer.

Location: The Arctic region is located on or near the North Pole.

Plants and Animals: Despite the cold extreme temperature there are many kinds of animals that call this region their home: arctic fox, ermine, arctic terns, beluga whales, harp seals, moose, reindeer, snowy owls, wolves and snow geese.

Connection Question: How is it possible that animals can survive on ice instead of land? What would happen to this ecosystem should the ice melt?

Antarctic Polar Ice

Physical Description: Antarctica is the coldest, windiest place on Earth. It is a frozen continent, with land underneath the ice. It gets very little rainfall. Therefore, Antarctica is considered a desert! An amazing fact is that it contains 70% of the world's fresh water, frozen solid.

Location: Antarctica is located at and near the South Pole.

Plants and Animals: Antarctica doesn't support many life forms. Those life forms that do exist have adapted to the harsh environment. Animals have short compact bodies, thick skin and a layer of fat to help keep them warm. Birds have a layer

Guess the Habitat

1. In this habitat you will find animals that can fun at great speeds when they try to escape from their enemies. What is the habitat? *Grasslands*

2. In this habitat, there are animals that live on different levels: canopy, understory, and floor. What is the habitat? *Tropical Rain Forest*

3. In this habitat, you are near a rocky pond by the ocean. You might see a starfish on a rock. What is the habitat? *Tide pool*

4. This habitat is very hot in the summer. You might find snakes, tortoises, and cactus here. What is my habitat? *Desert*

5. In this habitat, there are many animals: bears, deer, and birds. What is the habitat? *Temperate Forest*

6. In this habitat, you will need very warm clothing. You might take a photo of someone fishing through the ice. A whale might pop up to catch a breath of air. What is the habitat? *Polar Ice*

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Animal Habitats Around the World
Focus	Animal Habitats (Homes and Ecosystems)

Materials: Guess the Habitat printout, white boards, markers, erasing cloth (socks)

Opening

State the Objective

The objective of this lesson is to learn that animals live everywhere on earth – in every kind of land and every kind of climate. Students will become aware of different habitats and some of the animals that live there.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "What are some habitats for animals? What does it mean to migrate (to move from one habitat to another in response to seasonal changes or variations in food supply) from one habitat to another?"

Ask, "How do scientists know where and when the animals migrate?" (GPS sensors, observation)

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Write these habitats on the white board: Grasslands, tropical rain forest, tide pool, desert, temperate forest (Temperate forests have four seasons and are found in the Northern and Southern Hemispheres), and polar ice.
2. Ask students to name animals that live in these habitats:
   Grasslands - zebra, African elephant, Asian elephant, lion, hippo, yak
   Tropical rain forest - sloth, python, leopard, macaw, orangutan
   Tide pool – starfish, mussels, sea urchins, green algae, crabs, abalone
   Desert - rattlesnake, scorpion, Gila monster, tortoise, trap-door spider
   Temperate forest – black bear, lynx, koala, giant panda, great horned owl
   Polar ice – caribou, polar bear, penguin
3. <u>Guess the Habitat</u>
   See attached sheet. Have a student read the question. Classmates guess the habitat.

Students Practice ("You Do")

1. Students discuss various animals.
2. With their partner, make a prediction of where the animal migrates to and from.

Western Monarch Butterfly	North America to Mexico

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "How far can an animal migrate?"
- **Leader:** "The arctic tern (a bird the size of a robin), migrates from the North Pole to the South Pole, about 20,000 miles round trip!"

Humpback Whale — Alaska to Hawaii Salmon — Fresh water streams to ocean Sea Turtle — Ocean to the coast Arctic Tern — Arctic to Antarctica 3. If possible, use the internet to research these animals. 4. Using their white boards, draw pictures of one or more of these animals migrating.	

Closing
Review **Sample Review**: "We learned that some animals migrate." **Review:**
Debrief **Three What's** Ask the following three "what" questions: 1. What did you enjoy most about this activity? 2. What was the biggest challenge with this activity? 3. What did you learn from the group?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "My Aha! moment was when I learned the Arctic tern travels 20,000 miles round trip when migrating"

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Basic Needs of Animals and Humans
Focus	Animal Habitats (Homes and Ecosystems)

Materials: Large pieces of butcher paper (one sheet for every 3 students), markers, and/or crayons; white boards, erasing cloths

Opening

State the Objective

The objective of this lesson is to learn that all animals and humans have basic needs: food, water and shelter.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "What are three basic needs that humans and animals need in order to survive? (food, water and shelter) What are secondary needs? (Clothing, tools, education, recreation, hobbies, etc.)"

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

First Activity:

1. On the white board, the leader will write the title, BASIC NEEDS. Under the title, make three columns: Food, Water and Shelter. Ask students to give examples of these three headings.
2. For example, Food - fruit, vegetables, meat and milk; Water - ice, rivers, lakes, ocean; Shelter - tent, hut, cabin, cave, house, trailer, apartment, car.

Second Activity:

1. Ahead of time, write one of the titles on each sheet of butcher paper: Food, Water or Shelter.
2. Provide students with butcher paper, markers and crayons. Ask them to make large drawings of many items that tell about their subject.
3. Ask them to outline all drawings in black. Write the names of the drawings underneath them.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "How is clothing a secondary need?"
- **Leader:** "We can live without clothing, but clothing makes life much more comfortable!"

Students Practice ("You Do")

Third Activity:

1. Divide students into small groups.
2. Ask students to think of a pet or an animal they know.
3. Ask students to use white boards to show how the basic needs of their animal or pet are met: food, water and shelter.
4. Ask, "If the water is turned off at a school site, why do they send students home for the day?" (Water is a basic need. Kids need it to survive!)

Closing
Review **Sample Review**: "We learned about basic and secondary needs for humans and animals." **Review:**
Debrief **Four Step Debrief (DIGA)** Step 1: Describe what they did during the activity. Step 2: Interpret: Students answer one, some or all of the following questions: ▪ What were your key learning's when you participated in this activity? ▪ What skills did you need to participate in this activity? ▪ How did you feel when participating in this activity? Step 3: Generalize: How can you use the skills or your key learning in your life? Step 4: Apply: How can you use the skills when you become an adult?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "How do people survive without having all their basic needs each day?"

Your Reflection:

of down under their feathers to help insulate their bodies. Here are a few common animals: Emperor penguins, blue whales, fur seals, squid, octopus, dolphins, porpoises, crabs, shrimp, and krill.

Connection Question: Do you think polar ice caps are melting? What effect might melting ice caps have on the rest of the world?

Tide Pool

Physical Description: Tide pools can be small shallow puddles found high on the shore or huge deep holes nearer to the sea. Tide pools form when the ocean covers the beach two times each day. The ocean brings fresh oxygen and food. Between the tides, some small pools begin to dry up. Many creatures hide under cool damp rocks and moist seaweed so their bodies do not dry out.

Location: Tide pools are found in the intertidal zone where the ocean meets the land. These are rocky areas by the ocean filled with sea water.

Plants and Animals: Plants and animals in tide pools are able to survive in both wet and dry conditions. Algae are the most abundant plant found in tide pools. It can make its own food and is food to many sea animals. Other animals are crabs, sea urchins, star fish, sea anemones, and limpets.

Connection Question: Can you touch sea life you find in a tide pool? A tide pool animal might be in danger from . . . ?

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Herbivores, Carnivores and Omnivores
Focus	Animal Habitats (Homes and Ecosystems)

Materials: Habitat Race Questions

Opening

State the Objective

The objective of this lesson is to create awareness about animals that are herbivores (plant eaters), carnivores (meat eaters) and omnivores (both plant and meat eaters), and how they are part of the ecosystem of their environments.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "What is a synonym for "cover?" (shelter) What are covers for animals in the temperate forest? (underground burrows, under bushes, caves, under rocks, hollow trees)"

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Ask students to make a list of things that herbivores eat. (Nuts, berries, leaves, and twigs.
2. Ask students to name animals that eat other animals. (Bobcats, hawks, owls, lions, cats, snakes)
3. Play the Habitat Race Game. Divide students into two teams. Have a scorekeeper. When a question is asked, if anyone on Team 1 can answer it correctly, the team gets a point. If they miss the answer, the question goes to Team 2.

Students Practice ("You Do")

1. Students discuss various animals.
2. With their partner, make a prediction of where the animal migrates to and from.

Western Monarch Butterfly	North America to Mexico
Humpback Whale	Alaska to Hawaii
Salmon	Fresh water streams to ocean
Sea Turtle	Ocean to the coast
Arctic Tern	Arctic to Antarctica

3. If possible, use the internet to research these animals.
4. Using their white boards, draw pictures of one or more of these animals migrating.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "What are people called that are herbivores?"
- **Leader:** "People that each just plants are called vegetarians."

Closing
Review **Sample Review**: "We learned that some animals migrate." **Review:**
Debrief **Three What's** Ask the following three "what" questions: 1. What did you enjoy most about this activity? 2. What was the biggest challenge with this activity? 3. What did you learn from the group?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "My Aha! moment was when I learned the Arctic tern travels 20,000 miles round trip when migrating"

Your Reflection:

Habitat Race Questions

Note: Accept all reasonable answers.

1. Name one thing that is essential for all wildlife to survive. (Food, water, a safe home or cover)
2. Name a plat that herbivores eat. (Nuts, berries, leaves and twigs)
3. Some animals need to roam and wander. Name an animal that may wander several miles in search of food. (Black bear, cats, wolves)
4. Water is essential for survival. Name a source of water for animals. (Puddles, sprigs, streams, dew, rivers, garden hose and ponds)
5. Name an animal that eats both plants and animals. (Raccoons, possums)
6. Name an animal that eats other animals. (Bobcats, hawks, and owls)
7. Name an animal that builds nests I hollow trees and eats nuts. (Squirrel)
8. Name the habitat of muskrats and many kinds of ducks. (Marsh)
9. Name a shelter for a rabbit. (Under bushes, underground burrows, hutch)
10. Fields, meadows, lakes, ponds, streams and rivers are all called _____ . (Habitats)
11. Name an animal that eats only plants. (Deer and rabbits)
12. An omnivore eats both plants and animals. True or False? (True)
13. People are omnivores. True or False? (True)
14. There are animals that get all their water from food. True or False? (True)

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Icebergs
Focus	Animal Habitats (Homes and Ecosystems)

Materials: Iceberg Shapes Handout, drawing paper, crayons

Opening

State the Objective

The objective of this lesson is to observe the different shapes of icebergs.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "Why is it difficult to see icebergs when they are so large? (Most of the iceberg in under the water.) "Can you pull an iceberg out of the way?" (Yes, tug boats can secure a tow line around a berg. This is commonplace in the Arctic when bergs drift near oil rigs.)

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do

1. Form student groups to brainstorm factors that would cause icebergs to melt. (More of their surface in contact with water; higher water levels; higher temperatures; movement of the sea; iceberg turns over)
2. Provide students with the Shapes of Iceberg Handout.
3. Match the photo with the definition.
4. Using white boards, students draw each type of iceberg.
5. Discuss the Weird-Shaped Iceberg.

Students Practice ("You Do")

Iceberg Maze Activity

1. Have students create an Iceberg Maze on drawing paper.
2. Draw the ship and many icebergs in the water.
3. Partner-pairs try to find the safest pathway around the icebergs.

Colorful Bergs Activity

1. Provide students with drawing paper and crayons.
2. Ask students to draw icebergs from the following information:
    a. Icebergs can be blue, green, brown or black.
    b. In blue icebergs, crevasses have filled up with water. The water refreezes so fast that no bubbles form. Blue stripes appear.
    c. In green icebergs, there is algae growing on the ice. When you see a green

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "What makes icebergs white?"
- **Leader:** "Icebergs look white because they are full of tiny bubbles."

iceberg, you are actually seeing the underwater side of the iceberg. It has rolled over. d. Brown or black icebergs are just dirty. Dust, rocks, and dirt accumulate in the glacier. When an iceberg breaks off the glacier, it can have dirt layers deep within the ice.	

Closing
Review **Sample Review**: "First we learned about the different iceberg shapes. Then we created an Iceberg Maze. Finally we drew pictures of different colored icebergs." **Review:**
Debrief **Three Questions** Ask the following three questions: 1. What was a key learning from these activities? 2. What would you have liked to have spent more time on? 3. How can we make these activities better next time?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "I confirm that icebergs come in all sizes and shapes."

Your Reflection:

Iceberg Shapes

Following from the upper-left corner, here are various iceberg shape categories:

1. Tabular: Steep sides with a flat top like a huge table. These are very solid and often break away from ice sheets or ice shelves.
2. Dome: Rounded at the top, sort of.
3. Blocky: Flat-topped, block-shaped icebergs with steep vertical sides.
4. Wedge: Shaped like a wedge. The top narrows to a pyramid-like point.
5. Dry dock: An iceberg which is eroded to form a little U-shaped harbor-like enclosure.
6. Pinnacle: An iceberg with one or more spires.

Weird-Shaped Iceberg

Some icebergs are highly unstable. With uneven melting, icebergs may roll over in seconds without warning.
They also make noises: creaking, groaning, banging sounds as the sun heats up the surface.
What iceberg shape is this weird-shaped iceberg? Does its shape remind you of anything?

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Melting Polar Ice Caps
Focus	Animal Habitats (Homes and Ecosystems)

Materials: One ice cube, a piece of fishing line with a weight (the heavier the better) tied to each end, a clear plastic container, some kind of tray to keep things from getting wet; 3 or 4 trays of ice cubes, large clear plastic cups (milkshake cup is perfect), enough water to fill the cup

Opening

State the Objective

The objective of this lesson is to answer the question, "If the polar ice caps melted, would the sea level rise?"

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "What do you know about the polar ice caps? Which of the ice caps has no land underneath the ice? (Arctic) Which of the ice caps is a continental land mass covered with ice? (Antarctica) Which polar ice cap contains 70% of the Earth's fresh water? (Antarctica)

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Turn the container upside down and put it on the tray.
2. Place the ice cube on top of the upside down container.
3. Rest the fishing line over the ice cube so that the weights are left dangling over the sides of the container.
4. Watch it for around 5 minutes.
5. Ask students, "How is the fishing line similar to ice skating?" (The blades of a skater melt the ice directly underneath, allowing the skater to move smoothly on a thin layer of water.)

Students Practice ("You Do")

1. The ice in this experiment represents the polar ice caps.
2. Divide students into small groups.
3. Provide each group with a large clear plastic cup, ice cubes and water.
4. Fill the cup halfway with ice cubes.
5. Carefully fill the cup with water. Try to get the water level as close to the rim of the cup as possible without overfilling it. The water in this activity represents the oceans of the world.
6. Now, wait for the polar ice caps (the ice) to melt.
7. Ask students to predict what will happen.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "What caused the string to cut through the ice?"
- **Leader:** "The pressure from the two weights pulled the string through the ice cube by melting the ice directly under the fishing line."

8. Do they think the water will rise and overflow, stay the same, or decrease?	

Closing
Review **Sample Review**: "We cut an ice cube in half with fishing line and watched ice cubes melt in a cup filled with water. Now answer the question, "If the polar ice caps melted, would the sea level rise?" **Review:**
Debrief **Liked Best, Next Time (LBNT)** In this simple debrief, students talk about the activity. They share what they enjoyed most and/or what else they would have liked to have done. They share what they would have liked to have spent more time on.

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "Somewhere I learned that snow melting from mountain areas such as the Himalayas would contribute to the rising of the sea level."

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Observing An Iceberg
Focus	Animal Habitats (Homes and Ecosystems)

Materials: 1 clear pitcher (or other container) that is at least twice as tall as the amount of ice, water to fill ¾ of the container, ice, non-permanent marker, paper towels

Opening

State the Objective

The objective of this lesson is to observe how ice floats above and below the water.

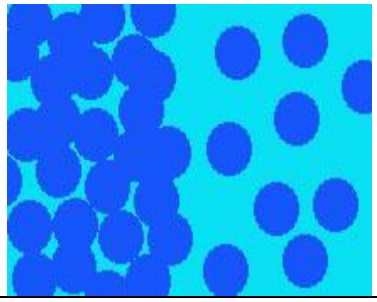
Gain prior knowledge by asking students, "What do you know about _____ ?"

Ask students, "What are glaciers? (A moving river of ice formed over thousands of years, from falling snow)

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Fill the container nearly to the top with crushed ice.
2. Use the thermometer to measure the temperature of the crushed ice.
3. Record the current temperature for comparison later.
4. Add 5 spoons of salt and mix well.
5. Check and record the temperature of the ice mixture one time each minute. Use the stop watch.
6. Chart the results with a graph.
7. Have students draw a picture of the ice molecules and water molecules.
8. The molecules on the left are ice; those on the right are water.



Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "In real life, when would you put salt on ice?"
- **Leader:** "You put ice on roads if you want the ice to melt because salt lowers the freezing point of water."

Students Practice ("You Do")

1. Ahead of time, fill clean milk cartons with water and allow them to freeze overnight into solid blocks of ice.
2. Ask students to remove the carton from the ice.

3. Stand ice upright in a plastic container. 4. Let students sprinkle rock salt on top of the ice. 5. Let students choose different colors to squeeze onto the tops of their blocks of ice with the eye droppers. 6. The food coloring will run through the cracks that the salt makes in the ice. 7. Students will have created beautiful ice sculptures. 8. Take photos of their sculptures before they melt away.	

Closing
Review **Sample Review**: "First we measured the temperature of crushed ice. Then we measured the temperature again after we added salt to the mixture. In the second activity, we made colorful ice sculptures by adding rock salt to a block of ice and dripped colors onto the ice." **Review:**
Debrief **Three What's** Ask the following three "what" questions: 1. What did you enjoy most about these activities? 2. What was the biggest challenge with these activities? 3. What did you learn that you can use in real life?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "Are the polar ice caps made of salt water or fresh water?" (Fresh water)

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Tip of the Iceberg
Focus	Animal Habitats (Homes and Ecosystems)

Materials: Drawing paper, clear large plastic cups, water to fill ¾ of the container, ice, non-permanent marker, paper towels

Opening

State the Objective

The objective of this lesson is to observe how ice floats above and below the water.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "What are glaciers? (Moving rivers of ice formed over thousands of years, from falling snow) What are icebergs? (Large blocks of ice break away from glaciers in the Arctic and Antarctic to form icebergs.)

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do

1. Ask students how much ice they see below the water of this iceberg.
2. Have students draw an iceberg. Include some or all of these animals in their pictures: ice worms, snow fleas, mites, sea nematodes, spiders, birds (Arctic terns), seals, polar bears (Arctic), and penguins (Antarctica).

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "What is the word to show an iceberg breaks from a glacier?
- **Leader:** The word is calving. For example, "Look! The glacier is calving!"

Students Practice ("You Do")

1. Provide students with containers of water and paper towels.
2. Have students mark the water level on their container.
3. Give students cups of ice.

4. Carefully place their ice in their containers. 5. What happened to the water level? What happens to the water level when students push down on the ice so that the top of the ice is just under the water level? 6. Is the whole ice cube above the water? About how much of the ice is above the water line? (About 10% will be above the water line; 90% will be below the water line.) 7. Have students tell their partner what they have just learned about icebergs and ice cubes in water.	

Closing
Review **Sample Review**: "First we drew a picture of an iceberg ecosystem. Then we made an iceberg out of an ice cube in a cup of water." **Review:**
Debrief **Three Questions** Ask the following three questions: 1. What makes an iceberg melt? 2. How would you describe the animals that live on an iceberg? 3. Where are icebergs found?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "Are the polar ice caps made of salt water or fresh water?" (Fresh water)

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Building and Taking Apart
Focus	Imagineering

Materials: Building blocks or LEGOS; Several bags of small marshmallows, several boxes of toothpicks

Opening

State the Objective

The objective of this lesson is to create objects and then take them apart.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "What is the best part of building? Building or taking it apart? Share your earliest memory of building something." (LEGOS, building blocks)

"What projects do adults build?" (Buildings, bridges, roads, homes, cars, planes, boats, rockets, space ships, and robots)

"When you become an adult, which project would you like to help build?"

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Have students brainstorm the different jobs involved in building something, for example building a road. (Engineers, purchasing agent, human resources, construction supervisors, construction workers, and others)
2. Have students assign themselves to various jobs.
3. What jobs would be needed to take apart a road? Are the jobs the same?
4. Why do kids like to build things?
5. Provide students with building blocks or LEGOS.
6. Have them develop a plan and create something with everyone in the group having a part in the process.
7. Set a time limit.
8. Share with classmates.

Students Practice ("You Do")

1. Divide the class into groups.
2. Discuss safety when using toothpicks.
3. Provide each group with plenty of miniature marshmallows and toothpicks.
4. Teach students to make 2-dimensional shapes; triangles, squares, and pentagons.
5. Next, introduce 3-dimensional shapes. What happens when you put three triangles

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "Is engineering part of science?"
- **Leader:** "Yes. Engineering is taking materials and using science to create something."

together; four, six, or more triangles? 6. Make as many 3-dimensional shapes as possible. 7. Have groups create individual projects or one project. 8. Share projects. 9. Now, take apart the project. 10. If desired, provide a marshmallow treat when finished.	

Closing
Review **Sample Review**: "As a team, we built a LEGO project. In our groups, we made geometric shapes with marshmallows and toothpicks." **Review:**
Debrief **Three Questions** 1. What is the most important thing about working in a group? 2. How did you go about including everyone? 3. If you were to try this again, what might you do differently?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "Next time, before I begin the marshmallow project, I will model with students how to make a triangle, square and pentagon. We also learned that the triangle shape is stronger than a square."

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Creativity
Focus	Imagineering

Materials: Drawing paper, crayons

Opening

State the Objective

The objective of this lesson is to put creativity in action.

Gain prior knowledge by asking students, "What do you know about _____?"

"Creativity is inventing, experimenting, growing, taking risks, breaking rules, making mistakes and having fun." Mary Lou Clark.

"Every act of creation is first of all an act of destruction." Pablo Picasso

Ask students, "Tell about a time when you created something. Did it work out for you? How did you use what you created?"

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Close your eyes and think about something you like.
2. Imagine exotic fish, roller coasters, the origin of the universe, historical events, heroes, or scary things. Now choose one.
3. Let's say that you choose "exotic fish."
4. Always add "Magic." In your imagination there are no rules. Fish can talk.
5. What would happen if your fish made a friend with a car, plane, or camera?
6. With your partner, think of all sorts of adventures your exotic fish could have.
7. Create a skit with the fish and his new friend. "Once upon a time there was this fish." Tell about a problem the fish has, and how he solved the problem.
8. Share your skits with classmates.

Students Practice ("You Do")

First Activity:

1. Listen to your "head chatter."
2. Sit quietly. Listen to all the sounds in your environment. (Buzz of an overhead light, air conditioner, your own breath, someone laughing, footsteps)
3. The more you focus on listening, the less "head chatter" you will hear.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "What happens if you can't think of anything creative"
- **Leader:** "Goof around and the ideas will come to you."

4. Listen for your thoughts, ideas and what others have to say. **Second Activity:** 1. Provide students with paper and crayons. 2. Ask students to draw the feeling of creativity 3. Draw what can spark their curiosity. (Words, music, people, challenges) 4. Turn the paper over. 5. Choose a theme park. List all the rides in that theme park. 6. Make a combination of two rides. (Indiana Jones and Peter Pan). 7. Make a connection between the two rides. What do they have in common? Why are they so popular? Why would they never get along? 8. Share ideas with classmates.	

Closing
Review **Sample Review**: "We practiced opening our minds so ideas would come in. We also made a list of theme park rides, and made a connection between the two rides." **Review:**
Debrief **WHI?** Ask the following three questions: 1. What is something you learned about being curious? 2. What is something that sparks your curiosity? 3. How can we make these activities better next time?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "Kids really got into the theme-park ride activity."

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Curiosity
Focus	Imagineering

Materials: Students white boards, markers, erasing cloths, paper clips

Opening

State the Objective

The objective of this lesson is to put curiosity in action.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "What is Imagineering? (People who dream an idea, work with creative challenges, and find a practical way to bring the idea to life.) What are examples of Imagineering in real life? (Theme park rides, animators, artists, musicians, video game creators, toy makers, authors)"

"What does it mean to be curious? (the desire to know something; asking questions) What are key words to use when asking questions? (Who, what, where, when, why and how)"

"Life must be lived and curiosity kept alive." Eleanor Roosevelt

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

1. Have students write the word IMPOSSIBLE on their white boards.
2. Erase the IM.
3. What word is left? POSSIBLE.
4. Talent is about the "possible." A curious mind is always working.
5. Let's begin finding all the possibilities in our minds!

1. Get started.
2. Think of something that interests you.
3. Start with a question. Who, what, where, when, why or how.
4. Imagine how many different ways someone can jump fifty feet into the air.
5. Brainstorm building a device that will allow you to jump fifty feet.
6. Have students work together. Ask, "How?" "Why?" and "What Other Way?"
7. Share different ideas.

Students Practice ("You Do")

1. Divide students into small groups.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "What if our jumping machine can only jump 10 feet?"
- **Leader:** "Ask more questions. What other way can we design the machine to make it jump higher?"

2. Provide students with paper clips. 3. Create a competition. 4. Ask students to design as many uses as possible for paper clips. 5. Share inventions. 6. Determine a competition winner!	

Closing
Review **Sample Review**: "We tried to invent a jumping device that would let you jump 50 feet in the air. We also made all sorts of objects out of paper clips." **Review:**
Debrief **WHI?** Ask the following three questions: 1. What were some of the questions that came up in your group? 2. How did you go about including everyone? 3. If you were to try this again, what might you do differently?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "Kids really had fun trying to create uses for paper clips."

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Divergent Thinking
Focus	Imagineering

Materials: White boards, markers, erasing cloths, books, various random objects

Opening

State the Objective

Divergent thinking is a thought process to generate creative ideas by exploring many possible solutions. The objective for this lesson is to teach students to think of many solutions to problems.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "Can you think of something you do that has rules? (Games, sports, recipes) What would happen if you changed the rules in a game? Would the game be as fun? Would it be more fun?" Divergent thinking happens when you shift your point of view (tweak the rules).

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

First Activity: Ant's Point of View

1. Ask students, "What is a point of view?" (an opinion)
2. Have students give examples of the point of view of an ant. (Human legs look like tall trees. This grain of sand is **so** heavy!)
3. Ask students to draw the world from the point of view of an ant.

Second Activity: Wrong Feet

1. Talk about when a habit has a point of view. (Every day I brush my teeth at the same time. What would happen if I brushed at a different time? How many different times could I brush my teeth?)
2. "Do we wear our shoes on the same feet out of habit?"
3. Ask students to take off their shoes and put them on the wrong feet. Take a few steps.
4. "Do you feel something different? Could you wear your shoes on the wrong feet for an hour? How many different ways could you think of to wear your shoes?"

Third Activity: Upside Down

1. Turn something upside down. Check it out.
2. Have students talk with their partners about what they see underneath the object.
3. Make a list of all the things you see underneath the object.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "How does divergent thinking help us when we do a Science experiment?"
- **Leader:** "Think of how many ways you can get the same result from the experiment. There is not just one right answer."

Students Practice ("You Do")

Fourth Activity: Right to Left 1. Students work in partner-pairs. 2. Provide students with a book. 3. Practice reading left to right instead of right to left. **Fifth Activity: Transforming Objects** 1. Divide students into small groups. 2. Provide random objects on a table such as a can opener, box of tissues and a sock. 3. Each student chooses an object. They have 15 seconds to think about changing the object into an unrelated thing. For example, the student chooses the can opener. You could remove the turning key and rotating wheel. With the two grippers you now have a pair of pliers or chopsticks! 4. Share ideas with classmates.	

Closing
Review **Sample Review**: "We did four activities. Tomorrow we'll schedule Reading Right to Left because we ran out of time." **Review:**
Debrief **Three Questions** 1. What is divergent thinking? 2. What skills did you use when you walked with your shoes on the wrong feet? 3. How can you use what you learned in real life?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "This was the craziest science lesson yet. The kids are getting the idea of divergent thinking when they transformed objects into unrelated objects. It was fun to watch them trying to figure it out."

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Dream and Go
Focus	Imagineering

Materials: One large dice, drawing paper, crayons

Opening

State the Objective

The objective of this lesson is to let our minds wander, create dreams, and act on the dreams.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "What do you dream about?" Have students fill in the blank . . . Someday I want to _____. The leader should fill in the blank also. What are synonyms to the word "dream?" (Wish, goal, hope, ambition, desire, think, and fantasize) "Have any of your dreams come true?"

"I dream of painting and then I paint my dream." Vincent Van Gogh
Ask students, "What connection do you have with Vincent Van Gogh and dreaming?"

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

Brain Blast

1. Have students play Brain Blast.
2. Have students generate topics in which they are interested. Some theme topics might be clothing, nutrition, seasonal activities, feelings, fitness, authors, sports, astronomy and countries.
3. You need a large die and a list of topics.
4. Divide the group into two teams and roll the die.
5. The number that is rolled will be the number of words that a team has to come up with for a particular topic.
6. Teams get a point for each word appropriate to the topic.
7. Students generate ideas in rapid fire, ready for the next roll of the die.

Famous People That Had a Dream

1. Ask students to think of great dreamers. (Walt Disney taught the rest of us to dream; Martin Luther King said that all races will become equal; Jim Henson, a puppeteer, created The Muppets; Albert Einstein said that imagination is more important than knowledge.)
2. Provide them with drawing paper. Have students draw the famous person and their dream.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "What does dreaming an idea have to do with science?"
- **Leader:** "Robert Goddard, the Father of Modern Rocketry said, "It is difficult to say what is impossible, for the dream of yesterday is the hope of today and the reality of tomorrow."

Students Practice ("You Do")

1. Divide the class into groups.
2. This is a problem solving game that encourages students to think and work together as a group.
3. Students pick a problem out of a paper bag.
4. Think of as many solutions to the problem as possible.
5. Here are a few problems:
   - All plastic bags have been banned. Think of ways for people to carry their purchases to their homes.
   - There are no more cell phones. How can people communicate with each other?
   - Books are a thing of the past. How can teachers teach students how to read?
   - School is now open for 300 days a year, instead of 180 days. What new subjects should children learn?

Closing

Review

Sample Review: "We played two games - Brain Blast and a Problem Solving Game."

Review:

Debrief

Three Questions

1. What was your key learning from this activity?
2. How can you use this learning in your real life?
3. What would you change about this activity to make it better?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "In the Problem Solving Activity, students wanted to think of their own problems. Next time I will give them time to do this."

Your Reflection:

Modification of Lesson: Introduce strategy games such as Chess and Checkers to your students. These games are fun brain exercises.

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Inspiring New Approaches
Focus	Imagineering

Materials: Various objects found in the classroom, magnifying glasses if available

Opening

State the Objective

The objective of this lesson is to find new approaches to the ordinary.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "What are words that build energy and make things possible? (Will, can, like, love, do, make, be, happen, and build.) What are words that contribute nothing to a brainstorming session?" (Try, maybe, might, should, could, sort of, kind of, not sure, and but)

"Shoot for the moon. Even if you miss, you'll land among the stars." Les Brown
Ask students to explain the meaning of the quote. Have someone draw a picture of the quote on the white board.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

First Activity: Imaginary Baseball

1. Divide the group into two teams, assign positions, determine the batting lineup, and start the game.
2. Assign an umpire.
3. The bat and ball are imaginary.
4. The pitcher throws, the batter swings, and everybody knows if he made a strike or hit a line drive.
5. When the shortstop throws to first base, is the runner out?
6. Continue play.
7. For variety, choose a game appropriate to the age-level of students.
8. Ask students, "How is this game a new approach to the ordinary?'

Second Activity: Gibberish Talk

1. Divide students into partner-pairs.
2. The first player tells his or her partner about all the terrible things that happened that day in gibberish (nonsense language).
3. Ask students to sound upset, use hand and body motions to tell how bad it was.
4. When finished, the partner retells the story in English.

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "Do people talk in gibberish in real life?"
- **Leader:** "In some movies you see aliens or other characters talking in unknown languages that are nonsense to us. Are you able to make sense of what they are saying?"

Students Practice ("You Do") Third Activity: 100 Details 1. Students work in small groups. 2. Provide students with an everyday object – apple, scissors, marker, hand sanitizer bottle, or a box of crayons. 3. Students look closely at the object. 4. While group members brainstorm, one student in the group writes down as many details as possible that the group sees. 5. When students hit a roadblock, ask them to look more closely. Provide magnifying glasses. 6. Remind students of words that will help them complete the project: will, can, like, love, do, make, be, happen, and build. The idea is to inspire students to find new approaches to just looking at the object.	

Closing
Review **Sample Review**: "We played Imaginary Baseball, talked using gibberish, and looked closely at an object." **Review:**
Debrief **Likes and Dislikes** Create a chart. List what students liked and what students didn't like about the activity. Ask what they would do to make the activity better next time.

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "Kids gave up after a bit when they were looking for details in the classroom object. Next time I will set a time limit or choose a student to be the coach to encourage them to keep looking."

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Keep the Door Open
Focus	Imagineering

Materials: Find random items in the classroom, in the desk drawer, in the car, in a junk drawer; drawing paper and crayons or white boards and markers

Opening

State the Objective

The objective of this lesson is to help students, when stuck on a science project, to get back on track and become problem solvers again.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students, "What kinds of problems make you frustrated? What have you tried to do to solve the problem?"

The best ideas come to you when they have had time to hang around in your head for awhile. Talk to other people about your challenges. Then the light comes on. You are on your way to solving your challenge.

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

First Activity: Arrange Objects to Form Something

1. Have students choose five random objects from around the room.
2. Demonstrate for students. Ask what can be made from these objects.
3. Can they be assembled to make a dog, a car, or something else?
4. How many ways can they be arranged?
5. Now, divide the class into groups.
6. Provide each group with five random objects.
7. Students brainstorm how they can be arranged to form something.
8. How many ways can they be arranged?
9. Have students share what they have created.

Second Activity: Who Does Science?

1. Provide students with drawing paper and crayons or white boards and markers.
2. Ask students, "Who does Science?"
3. Have students draw a picture of a typical scientist.
4. Ask, "Who is missing from your drawings of a scientist?" (Students, elderly people, family members people with disabilities)
5. Talk about career pathways in Science: mathematician, chemist, engineer, astronaut, pilot, marine biologist, and inventor.

*Activity → Teachable Moment(s) *throughout*

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "All this thinking is making me tired. I'm not used to it."
- **Leader:** "Congratulations! You are your way to becoming a creative thinker. Who knows? We may read about you in our Science book in fifteen years."

Students Practice ("You Do")	
Third Activity: Double Doodle 1. This activity will help students focus on left and right awareness. 2. Ask students, "What is a doodle?" (Drawing, sketch, picture, squiggle) 3. Provide students with white boards and markers and/or use the classroom white board. 4. Using their dominant hand, have students practice making doodles. 5. Have students doodle in the air with their dominant hand. 6. Encourage innovation and experimentation. 7. Now, ask students to use both hands and draw a doodle at the same time. 8. Begin with actual shapes: circles, triangles, stars, hearts, trees, or faces. 9. Double Doodle with "in," "out," "up," and "down."	

Closing

Review

Sample Review: "First we arranged objects to form something. Then we drew a picture of a typical scientist. Finally we learned how to Double Doodle.

Review:

Debrief

Three Questions

1. What is the most important thing about double doodling?
2. How do these activities help Keep the Door Open to ideas in Science?
3. If you had more time, what would you have liked to have spent more time on?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "It was not easy for kids to arrange random objects into something. I know we should do more activities like this to exercise their brains!"

Your Reflection:

Consult 4 Kids Lesson Plans

Component	Science
Grade Level	K-5
Lesson Title	Unrelated Images
Focus	Imagineering

Materials: Drawing paper, pencils, crayons

Opening

State the Objective

The objective of this lesson is to let absolutely ridiculous ideas spark invention.

Gain prior knowledge by asking students, "What do you know about _____?"

Ask students to share a time when they had a dream in which there were a lot of parts that had nothing in common. Do they remember the book, "Cloudy with a Chance of Meatballs," by Judi Barrett. In this story the weather comes three times a day, at breakfast, lunch and dinner. The rain is juice and soup. Snow is ice cream, and the wind brings hamburgers. What items in the story have nothing in common? (rain/juice and soup)

Content (the "Meat")

Instruction / Demonstration ("I do" – "We do")

First Activity – Weird Combinations

1. Have students work in partner-pairs.
2. Say a few everyday items.
3. Students must attach something that has nothing to do with the object. For example, the word is "boat." The weird object is Zumba.
4. Here are a few objects: grizzly bear, oak tree, and gravy.
5. Students combine these words and create something ridiculous.

Second Activity – Different Point of View

1. Fold the paper in half.
2. On one half of the paper, sign your name with your normal hand.
3. On the other half, sign you name with your other hand.
4. Pay attention how easily you can write the first signature and what effort it took to use you other hand. How is this learning like creating?

Activity → Teachable Moment(s) *throughout

Tip: Teachers, listen for questions that begin with "what" or "how."

- **Student**: "What does all of this have to do with Science?"
- **Leader:** "In Science we use curiosity, creativity and weird combinations to come up with science experiments."

Students Practice ("You Do")

Third Activity: What if?

1. Divide the students into partner-pairs.
2. To help inspire students, give them a picture book.

3. Ask their own, "What if?" questions. What will make the most magic happen? 4. Write down the "What if" questions. For example, "What if we drew the Mona Lisa and dressed her in a chimpanzee suit? 5. Think of positive answers to each question. "I think Mona Lisa in a chimpanzee suit will get laughs especially if she is eating a banana!" 6. Continue with questions and answers. Let the ideas flow.	

Closing
Review **Sample Review**: "We had fun with weird combinations. We practiced writing with our left hands. At the end, we asked "What if" questions." **Review:**
Debrief **Likes and Dislikes** Create a chart. List what students liked and what students didn't like about the activity. How would they change the activity to make it better?

Reflection (Confirm, Tweak, Aha!)

Sample Reflection: "I think we need more practice creating weird combinations. I would extend the activity by having students tell stories using their weird combinations."

Your Reflection: