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.
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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.