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.