

**Magic in the Rockies 2008  
Youth Magician Lecture**

**SCIENCE  
MAGIC**

**Presented by**

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## Magic Arcs Optical Illusion

Amaze your friends as the arcs magically appear to shrink and grow before your very eyes! Hold one arc above the other and ask the question, "Which arc is bigger?" The bottom arc will always look bigger than the top one, yet they are actually the same size! Reverse the arcs to make the other one look bigger. You just can't trust your senses. Keep reading and we'll let you in on some presentation ideas and stunts that will really amaze and fool your friends.

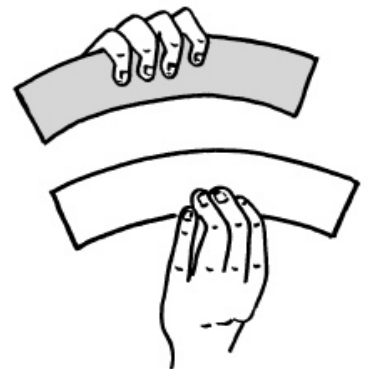
### Preparation

1. Cut out two identical arcs
2. Color them... because the same color isn't that amazing!
3. Hold one arc directly above the other and ask your friends, "Which arc is bigger?" The bottom arc will always look bigger than the top one. Now, reverse the arcs to make the other one look bigger. It always works! It appears as if you caused the arcs to magically stretch... but your eyes played a trick on your brain.

### Presentation Ideas

Part of the fun of doing a science demonstration is making your audience ask, "How did you do that?" Here are a few ideas to consider when you're developing your own ARctical Illusion presentation.

1. Start by showing that the arcs are exactly the same length. Explain that these arcs are made out of a special material that can be made to "stretch" or "shrink." Now, pretend to s-t-r-e-t-c-h the red arc. Prove that it worked by holding the yellow arc above the red arc. "See...the red arc is bigger!"
2. After showing that one arc is bigger than the other, "shrink" the bigger arc by pretending to squeeze the sides toward the middle.
3. The Convincer! Hold the arcs so that the yellow one is on the bottom and the red is on top. Of course, the yellow arc looks bigger. When someone says, "I know that trick...they're the same size," quickly place the red arc on top of the yellow one, but secretly allow the yellow arc to overlap the red one by about one inch.

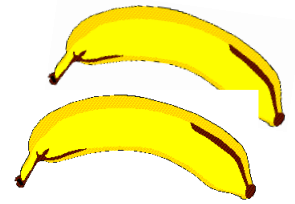


## How Does It Work?

This is an illusion of comparison. The psychology textbooks tell us that a segment of a circle seems much longer if it is placed under an identical segment in such a way that the ends are even at one end. The secret is that the longer outside edge of the bottom arc is being compared against the shorter inside edge of the top arc. When the inside curve of the top arc is placed next to the outside curve of the bottom arc, the bottom arc always appears to be bigger. The illusion is even convincing when the top arc is centered over the bottom arc.

## Stretching Bananas

Bob Friedhoffer is a world famous magician and science writer who offered this clever little piece of optical foolery. Instead of using the arcs, you'll need two bananas that are identical in size. Hold one banana above the other just as you did with the arcs. Which banana is bigger? The bottom one...of course! Bob suggests that you pretend to stretch the smaller banana to make it equal the size of the bigger banana! It's the great stretching banana trick.



So, the next time you're at the grocery store, hold a few bananas up pretending to compare their sizes. When someone asks what you're doing, tell them that you're trying to find two bananas that are the same size. "The bottom one looks bigger than the top banana, doesn't it?" Out of frustration, pretend to "stretch" the top banana. After the stretch is complete, place the bananas on top of each other to show that they are now equal in size. You'll know that you've fooled someone when you see them trying to "stretch" bananas on their own!

# BOUNCE -NO- BOUNCE BALLS



Two rubber balls that look, feel, and squeeze the same ...but try bouncing them! One rebounds in a most lively manner while the other...well...it's about as bounceless as a piece of clay. Highly visual sizes available, perfect for palming or sleeving, and great for any size audience.

## Ball Sleights

The vanishes and switches described below are helpful in developing your own routines using the Bounce No Bounce Balls. It is well worth learning all of these sleights because it will increase the flexibility of your performance style.



Most of these sleight-of-hand moves are designed to take advantage of the greater visibility of the large size Bounce No Bounce Balls, but most of them will also work with the smaller balls. Even though most of the routines involve switching the balls, several of these sleights can be used to produce a ball, as well. Be sure to adjust your handling as necessary when using balls of different sizes. •

### Classic Fake Take Vanish

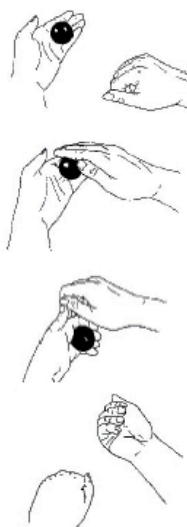
The Classic Fake Take appears in *Greater Magic*, if you would like more detail than provided here.

The ball is in the palm up fingers of the left hand. The palm down right hand covers the ball, with the right fingers touching the outer edge of the left index finger.

The left hand rotates inward, retaining the ball in Finger Palm, as the right hand moves forward, closing its fingers around the (nonexistent) ball.

The right hand, followed by the eyes, moves more to the right, as the left fingers push the ball into Classic Palm.

The left fingers can now open a little. From here, the ball (apparently in the right hand) can be put in a pocket, vanished by bouncing it on the table, or crumbled away over a spectator's hand.



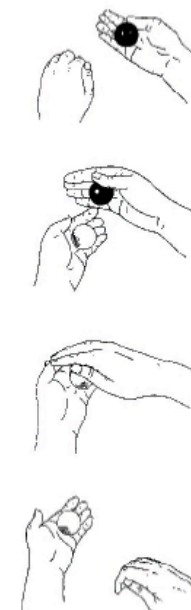
### Shuttle Pass Switch

The visible, examined light ball is held in the fingers of either hand, while the second, dark, ball is concealed in the palm down fingers of the other hand.

The hand with the light colored ball begins to rotate palm down as the other hand rotates palm up.

Apparently "drop" the light ball as you actually retain it with the fingers. The other hand opens to show its ball.

Remember that to the audience, you are merely moving a single ball from hand to hand so that your hand is free to use the wand. •



### Fake Take Switch

This follows the same actions of the Fake Take Vanish, except that the right hand secretly holds a ball in the slightly curled fingers.

The balls are brought into brief contact with each other as the left hand rotates inward and the right hand turns palm up to show the ball it has apparently just taken from the left fingers. •



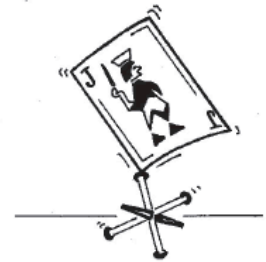
## Heavy Suggestion by Bob LaRue

Talk about suggestibility as you do a pendulum effect with the spectator to show how the mind can control a small object. Talk about trying it with larger objects... say, a ball and a hand. With the right hand, bring out the Bounce Ball and bounce it. At the same time, the left hand brings out the concealed No Bounce Ball. Ask to examine their hand for a moment as you apparently place the ball in your left hand. Actually do a Placement Switch. Pick up the pendulum with the right fingers and drop it into the right pocket, releasing the concealed ball as well. Look at their hand and do a little cold reading. Have them stretch their arm out straight. Place the No Bounce Ball in their upturned palm and have them close their eyes. Direct them to concentrate on making the ball feel heavier and heavier. Go for a few seconds... making sure that their arm has started to tire and droop a little. Tell them to hold their arm right where it is and to open their eyes. They will see that their arm has dropped... now tell them to bounce the ball and catch it. It will thud... "See! The ball did get cause your hand to droop because it got heavier!" (For those of you with a scientific inclination... we do know that "weight" is not the critical factor in determining bounce... it just sounds cute for this routine!) •



## Magician's Jacks by Curtis Kam

Here's a fun way to introduce four of a kind (the four Jacks) for use in the much heavier magic to come. "People ask me how magicians train. Well, a lot of the time we have little games, or drills that we use to improve our skills. For instance, have you ever played jacks? Remember as a kid, you'd bounce a ball and then you'd see how many of the little metal things you could pick up before the ball hit the table again. Well, magicians play a form of jacks, too. Here, you hold the ball. I'll take the deck. I'll bet I can run through this deck and find the four Jacks before you can bounce that ball once, and catch it. Ready? Go." The handling is obvious. Casually toss out the Jacks as the spectators discover the situation. •



## Healing the Bounce by Keven Williams

When I do hospital visits I tell the children I came to the hospital because my ball is sick. It just won't bounce, but just like them, the doctor is going to make both of them all better. I either have a nurse, a doctor, or my assistant with a stethoscope, examine the ball and diagnose the problem. Of course I've switched balls by this point. Have the child and the doctor work together to "treat" it... lo and behold it is cured! I've found that this routine helps ease the fears of scared patients. It is guaranteed to get big smiles from parents, staff and kids. As a matter of fact, I have taught this routine to doctor and nurse friends, and they say it's a winner for shy, sick children. •



## The Mysterious White Powder – Slush Powder

I first learned about this strange powder while attending a national magician's convention in Colon, Michigan, *the magic capital of the world!* A small group of magicians gathered around one of the exhibitor's tables where magic tricks and novelty items were displayed for sale. I watched as the magician filled a Styrofoam cup with water. He then picked up a sharpened pencil and proceeded to puncture one side of the cup with the pencil, explaining that he could magically keep the water from running out. The pencil went all the way through the cup and exited on the other side. This, of course was no great feat of prestidigitation...the water was simply held in by the pencil. To my amazement, however, he completely removed the pencil, and the water somehow stayed in the cup. To add insult to injury, a kitchen knife was pushed up through the bottom of the cup several times, and still no water came rushing out. My trained eye did not see any sleight-of-hand or misdirection. To the best of my knowledge the water had either vanished or somehow been trapped inside the Styrofoam cup...but how?



Then, as the magicians drew closer to the table, the secret was unveiled. The cup was tipped over and a glob of something fell out, a gel-like substance that the magicians called *slush*. The secret was a white powder called a superabsorbent polymer, but here on out it was known amongst the magicians as “slush”. No one really cared how the superabsorbent polymer worked. All that mattered was that it absorbed water instantly. Once again the chemists had made a magician's dream come true. The exhibitor passed out small bottles of the polymer as fast as he could collect ten dollar bills.

I also learned at that convention in 1986 that water was not the only liquid that was *slushable*. Waitresses at the local restaurants soon learned that coffee gelled quite nicely, and many were tricked into thinking that the packets of sugar on the table caused the coffee to turn to slush. Orange juice, soda pop, milk, and various types of soup were all targets of opportunity for the hundred of magicians in town for the weekend. Colon, Michigan was hit with one healthy dose of the superabsorbent polymer.

At the time, I knew very little about superabsorbent polymers. Someone said that the powder was the same substance used to absorb moisture in baby diapers, but the name of the actual chemical was never disclosed in any of the product literature.

## Don't Get Wet!

Secretly place 1/2 teaspoon of Water Gel in a Styrofoam cup. Invite a friend to hold the cup as you fill it with 4 ounces of water, being careful not to let them see inside the cup! Now, hold the cup above their head and slowly poke pencils through the cup. I have to be careful not to accidentally remove any pencils or you might get wet! After saying this, slowly remove the pencils. To everyone's amazement, the water seemingly vanished, or you can pretend that you turn the water to ice!



## Find the Water... But I'll Bet You Can't!

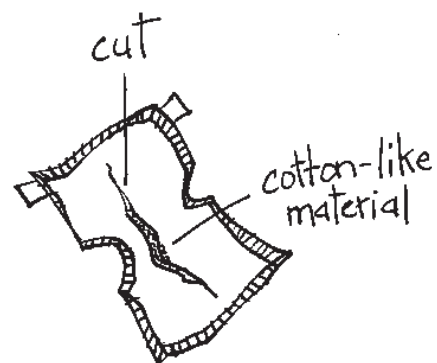
This is a clever adaptation of the classic swindle called the Three Shell Game. In the original game, spectators were asked to wager a bet as to the location of a small pea under one of the three walnut shells. In this version, you will challenge your friends to guess which cup holds the water.

You will need three Styrofoam cups and a glass of water. Before performing the trick, secretly place 1/2 teaspoon of Water Gel in one of the cups, leaving the other two empty. Place the three cups on the table, being careful to remember which one contains the Water Gel. Explain the history of the game to your friends as you pour the water into the cup that contains the Water Gel. I'll mix up the cups to try to confuse you. Mix up the order of the cups, pretending to be careful not to spill any water. Point to the cup with the water in it. Whichever cup they point to, briefly turn it upside down, showing that there is no water in the cup. Remember, you can briefly turn the cup with the Water Gel upside down and it will not fall out. Eventually your friends will realize that the water magically disappeared. Now that's science magic!



## How Does It Work?

Water Gel (or Slush Powder) is actually derived from the superabsorbent polymer found in baby diapers. The secret, water-absorbing chemical in a diaper is called sodium polyacrylate. The polymer soaks up water using the process of osmosis (water molecules pass through a barrier from one side to the other). When water comes in contact with the polymer, it moves from outside the polymer to the inside and causes it to swell. The polymer chains have an elastic quality, but they can stretch only so far and hold just so much water.



## Water Gel Waitress

As I mentioned earlier, I credit the magicians of the world for coming up with a plethora of cruel and unusual jokes to play on people using the superabsorbent polymer. Waitresses seem to be the most popular victims for the following jokes.

### Preparation

You'll need some packets artificial sweetener (the packets found on a restaurant table), and a sharp knife (an X-ACTO knife works well). Carefully cut an opening along the bottom of a packet of sweetener, and discard the contents. Refill the packet with an equal amount of superabsorbent polymer. Seal the packet shut with a small portion of rubber cement or another similar adhesive. Prepare several packets and keep them in your pocket just ready and waiting for some fun.

### Performance

During your next visit to a restaurant, order a cup of coffee. While the waitress is getting your coffee, set one of your prepared packets of artificial sweetener on the table. When the waitress returns with the coffee, nonchalantly open the sweetener and dump it into the cup of coffee. It should take no more than a couple stirs with a spoon, and the coffee will gel! **"Waitress...something is wrong with my coffee!"** Of course, the expression on the waitress' face is priceless. You'll be the talk of the restaurant for the rest of the day.

Remember that this fast-absorbing superabsorbent polymer is sensitive to temperature and ions in solution. You'll find that the hot cup of coffee will not gel nearly as fast as a glass of water at room temperature. For this reason, you may need to use several packet of "sweetener" in order for the coffee to completely solidify.

***Some words of wisdom:*** While the diaper polymer (sodium polyacrylate) is considered non-toxic, it is nonetheless a potentially hazardous chemical in the powder form if inhaled or if it gets in one's eye. The practical joke as mentioned above can be very funny (and used as an educational tool) under the right circumstances. **NEVER** switch out regular artificial sweetener for a prepared packet of superabsorbent polymer and leave it for the next customer. The polymer should always be kept in your possession. The joke should be followed up with a quick explanation of what a superabsorbent polymer is and how it is used. **"Did you know that this is the powder that they use in baby diapers?"**

Add some salt to your solidified coffee to turn it back into a liquid. Beside, this way the kitchen staff will never believe the waitress' story anyway.



## Insta-Snow Magic

Zip up your winter parka and slip on the ear muffs! Make sure you know how to rub two sticks together! It is about to snow in your living room and on your stage!

As a rule of thumb use 1 teaspoon of powder to 2 ounces of water, or 1 tablespoon to 6 ounces of water to make a perfect batch of snow. Try out some of these routine ideas!



1. **Color-Changing Snow!** Kool-Aid works great as a dry coloring agent for use with Insta-Snow. By using a dry coloring agent, the water can stay clear... so that when the colored snow begins to expand, the color will be a surprise. Put about 1/8 of a teaspoon of Kool-Aid in with about 1 tablespoon of Insta-Snow in a container. Add 6 ounces of water to get colored snow! The small amount of coloring means that even with a clear glass, the color will go unnoticed until the water hits the powder. A row of small glasses with different colors in each becomes a very easy, magical, safe water-to-colored-snow ending to a routine. Line up the glasses. Produce a rainbow streamer. Wave it over the glasses, pour in the water and stand back!
2. **Patriotic Snow!** Line up three small clear glasses. In the first one put 1/8 of a teaspoon of Cherry Kool-Aid along with a tablespoon of Insta-Snow. Just put Insta-Snow in the center glass. Blueberry Kool-Aid goes in the third glass with the Insta-Snow. Pour in the water and out comes Patriotic Snow!
3. **Using other liquids.** Room temperature water works best with Insta-Snow. It will not work with alcoholic beverages. Milk will produce a rather thick, yellowish snow that does not really flake.
4. **Chen Lee Water Suspension.** Insta-Snow provides a great climax-pseudo explanation for the classic Chen Lee Water Suspension. Perform the trick as advertised... pouring water into a tube without it coming out the bottom. Push a drinking glass through the tube to "recapture" the water. Explain that the water did not fall through the tube because it was temporarily vaporized. The glass caused it to be recondensed. Show that you can go even one step farther... and crystallize the water into snowflakes! Slip the Chen Lee tube over your arm. Pick up a second glass that contains the Insta-Snow. Pour the water from the first glass into the second and immediately slide the Chen Lee tube up over and off the glass... apparently causing the water to change to snow as the tube passes over it!
5. **In the News!** Prepare the classic In The News trick where water is poured into a folded newspaper, only to vanish, then reappear when the paper is refolded and used to pour the water back out. Into the dry gimmick place one tablespoon of Insta-Snow. An additional kicker is possible if you print up some fake headlines to be

glued on the front of your local newspaper. “Blizzard Closes Airport” or “Snowstorm Overwhelms Theatre” Show the paper, concentrating on the inner and back pages. Fold. Pour water in the gimmick, activating the Insta-Snow. Show that the water has vanished by opening out the paper. Show the front page headline, refold the paper and pour out the snow!

6. Candy Factory. Load your Candy Factory trick with white mints in the secret chamber and put the insert in the real glass. Pour a tablespoon of Insta-Snow in the gimmick where the sugar would normally go. Set the loaded glass on the table and drop the metal tube over it. Show a glass of water and pour it into the tube on the table. Immediately lift the tube to show that the water went into the glass... but that it is also changing into snowflakes! Let the snow grow and spill over the top of the glass. Show the tube empty and drop it back over the glass, make a magic pass, then remove the tube, stealing away the gimmick... to reveal that the snow has changed to mints.
7. Snow Cone. Cover one side of a colorful sheet of lightweight cardstock with clear plastic laminating film. Find a large size thumbtip and put a tablespoon of Insta-Snow in it. Stand the thumbtip upright in your case by putting it in an empty film canister glued or Velcroed in place. Next to the thumbtip, have a small container of confetti. Pre-roll the cardstock into a cone and hold it in this shape long enough so that it will roll into the cone shape easily. In performance, show the cardstock and roll it into a cone. Reach into the case and steal the thumbtip while getting a pinch of confetti. Sprinkle the confetti into the cone as you simply push the thumbtip into the point of the cone. Leave it behind as you reach for a glass of water. Pour in the water, shaking the cone a little to keep the flakes loose. Pinch the thumbtip tightly inside the cone as you tip it forward to pour out the snow! A contrasting color Kool-Aid might be pretty and fit with the Snow Cone theme.
8. In your case have a small clear glass of water and a matching glass loaded with a tablespoon of Insta-Snow powder. During your show, use as a running element a line about how hot it is. Keep going to your case and bringing out the glass of water, from which you sip. Finally, go into the case and quickly pour the water into the other glass. Immediately bring out the snowflake glass and concentrate on it... saying you will make sure the water is cold enough... and then open up your fingers to show the growing snowflakes. Shake the glass as you tip it forward to allow the flakes to fly away.
9. Snowstorm in China. For a different approach to this classic, put a tablespoon of Insta-Snow in the bottom of a short clear glass. Dig out a couple of those plastic joke ice cubes you bought years ago. Also find a folding fan. Put a piece of sponge in the tip of an extra large thumbtip. Slip one plastic ice cube into the thumbtip, making sure it fits loosely. Put a second ice cube behind something on your table. Have a glass of water handy. Show your hands briefly empty, without making a big production out of it... after all, you do have the oversized thumbtip stuck on the end

of one thumb! Leave the tip in the fist of one hand. Pick up the glass of water and pour just a couple drops of water into your fist... actually let more drip on the outside than goes into the fist... but still, just a little. The sponge will absorb the water. Tip the fist over to dump the ice cube into the empty glass on the table. As the right hand replaces the glass of water on the table it steals the second ice cube. To produce this cube, just make a grabbing motion in the air and produce the cube. Show it, then drop it in the glass with the first cube. Pour about 6 ounces of water into the glass now... and watch the water all freeze into snow... which you spread around by fanning with the now open and wildly waving fan! Shake the glass a little and tip it forward as you fan to easily sweep the snow into the wake of the fan.

10. Almost any routine that uses water can be ended with changing the water to snow. No particular finesse is needed here. Simply pour the water into a second glass, containing the Insta-Snow. Use magician's logic to prove that is why the trick worked.
11. Change Bag Snow to Candy. Using an inexpensive cloth change bag you can easily make this up. Scotch Guard the inside of the bag. While the snow is not wet to the touch, this will help preserve your bag. Load the secret compartment with candy. Bring up the birthday child to help you. Turn the bag inside out to show that it is empty and have the child hold it. Change some water into snow by your favorite method... we suggest that you use Insta-Snow! Have the child hold the bag open so you can dump the snow into the bag... so they can keep it forever! Wait, snow won't keep very long at all... so let's change it into... candy! Pour the candy out into their cupped hands, to be shared with the guests.
12. Longer routines can be created using gelling powder in one container, and Insta-Snow in another. The combination provides two very different results, with the same apparent starting materials!



## HIDDEN MESSAGES – GOLDENROD PAPER

*The term goldenrod is typically used to describe a color of paper – golden yellow. Certain brands of goldenrod paper contain a special dye that turns bright red in solutions that are basic like ammonia water or washing soda. The paper turns back yellow with an acid like vinegar or lemon juice. Learn how to use this special color-changing paper to develop a hidden message.*

### Here's What You'll Need

Goldenrod paper, cotton balls, ammonia-water solution (household ammonia from the grocery store), safety glasses, candle

### Let's Try It!

1. Place a piece of goldenrod paper on the table. Make sure that table is clean and the work surface is dry.
2. Place a drop of water on one of the corners of the paper. Does anything happen?
3. Fill a jar with a small amount of ammonia water. Dip a cotton ball in the ammonia water and wipe it across the top portion of the goldenrod paper. Save the bottom half of the paper for step 5. Does anything happen?
4. As you continue to wipe designs on the goldenrod paper, notice that the paper does not stay red forever. What is causing the paper to change back to yellow?
5. Use the old piece of wax candle to write a secret message (such as "Hi!" or "WOW") across the bottom half of the paper.
6. Wipe the cotton ball with ammonia water across the secret message to see what develops.

### How Does It Work?

The ammonia on the cotton ball is a base and causes the dye in the special goldenrod paper to change color. You probably noticed that the red color fades over time and the paper eventually changes back to its original yellow color. Why? The carbon dioxide gas that is in the air we breathe is slightly on the acidic side of the pH scale. The carbon dioxide reacts with the ammonia on the paper to produce ammonium carbonate, which changes the pH of the paper to neutral (roughly a pH of 7) and the dye changes back yellow.

If you use a stronger base like washing soda, the red message will become not disappear with just the carbon dioxide in the air. You will need to use a stronger acid like lemon juice or vinegar to change it from red to yellow.

You can also use goldenrod paper as inexpensive pH paper to classify safe household products as being either acidic or basic.

## The Mysterious Water Suspension

Fill the glass jar with water and cover it with a card. As you turn the whole thing upside down, your students can hardly contain themselves. “Hey, we’ve seen this before.” The room quiets down as you precariously position the inverted jar and card a few feet above a student’s head. Just as they thought, no water spills out because the card magically sticks to the mouth of the upside down jar. but wait. . . there’s more. You do the unthinkable. you remove the card! Your volunteer dives for cover! Fear not, the water magically “floats” in the upside down jar. Kids scream, “How did you do that?” Take your well-deserved bow as you turn the jar right side up and empty the water back into the pitcher. Now that’s science magic!

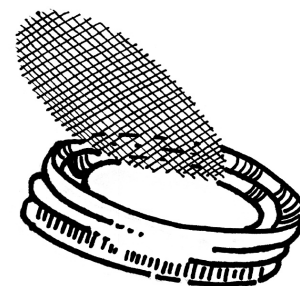


### Materials

Wide-mouth 16 ounce glass jar • Screw top sealing band • Circular plastic screen insert • Square plastic screen for use with other jars

### Presentation

Study the routine, as described above, very carefully. It is tried and true, and ingeniously incorporates the elements of mystery, suspense, humor, and learning into a 3-minute classroom presentation followed by a detailed discussion about air pressure, the properties of air, and surface tension.



Use a 4” by 6” index card to cover the mouth of the jar. Print “Do Not Remove This Card” in big letters on one side of the card. You might want to consider laminating the card so that you can use it again for repeat presentations. You’ll always get an extra laugh when you remove the card and someone notices the printing on it.

### How Does It Work?

**Air Pressure:** The atmosphere exerts about 15 pounds of pressure per square inch of surface at sea level. Because it’s a gas, it not only pushes down, but also upwards and sideways. The card remains in place because the air pressure is pushing upward harder than the water is pushing downward.

**Surface Tension:** The surface of a liquid behaves as if it has a thin membrane stretched over it. A force called cohesion, which is the attraction of like molecules to each other, causes this effect. The surface tension “membrane” is always trying to contract, which explains why falling droplets of water are spherical or ball shaped.

