

# SCIENCE MAGIC

INCLUDES  
**20**  
TRICKS

You will like these fun science kits too!!

Cause a cosmic commotion! Shoot the Cosmic Rocket as much as 15 meters into the air; use a balloon to set the awesome Cosmic Jet Robot or Cosmic Jet Racer into action! These fun, reusable Kits are great for parties, scouts, and family get-togethers! Check out our website for other exciting science projects!



**00-03235 Cosmic Rocket**  
A hands-on rocket launching science Kit for the whole family. Includes a booklet of fun rocket science, detailed launching instructions and a rocket that flies up to 50 feet. A unique experimental kit that inspires young scientists.



**00-03262 Cosmic Jet Robot**  
Construct 2 unique robots powered by simple balloons. Learn how Isaac Newton's Law of Motion works as you and a friend let them go! It's another cool science kit beloved by kids and adults.



**00-03234 Cosmic Jet Racer**  
Demonstrate Isaac Newton's Law of Motion with your very own balloon powered Cosmic Jet Racer! A fun, hands-on Kit for kids and adults. Makes a great group activity for all sorts of gatherings.

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IS IT MAGIC OR IS IT SCIENCE? BE THE JUDGE YOURSELF AS YOU PERFORM A VARIETY OF 'TRICKS' USING COMMON, EVERYDAY OBJECTS. FROM GRAVITY TO MATHEMATICS, YOU'LL DISCOVER THAT MAGIC IS ALL ABOUT SCIENCE!



FOR AGES OVER 8

**WARNING:**

**CHOKING HAZARD** – This toy contains small balls and small parts. Not for Children under 3 years.



**Kidz Labs**  
FUN SCIENCE PRODUCTS

**4M**

## A. SAFETY MESSAGES

1. Please read all instructions before you begin.
2. Adult assistance and supervision is recommended.
3. The kit is intended for children aged over 8.
4. This kit and its finished products contain small parts which may cause choking hazard. Keep away from children under 3 years of age.
5. Scissors are required for some tricks. Not included in this kit. Please ask an adult's assistance getting it from home. Adult supervision is required when using scissors.
6. Some domestic materials are needed to complete the tricks. Please ask an adult for help when getting these materials.

## B. CONTENTS

Specially designed screw cap x 1, straw x 2, metal washer x 3, plastic cup x 1, suction tube x 1, mini U shape magnet x 1, mini plastic boat x 3, glow marble x 2, paper clip x 4, long paper strip x 2, printed paper leaflet x 1, printed card board x 1, adhesive tab x 1, plastic bag x 1, rubber band x 1, instruction booklet x 1 (Some domestic materials are needed. Please ask an adult for help when getting these materials.)

## C. TIPS OF BECOMING A MAGICIAN

1. Be a serious performer. Practice your tricks long before you send out invitations to your show. You will need to practice the tricks regularly, for example twice a week for several weeks, before you will be ready to perform. Don't get discouraged, it takes time! To further polish your performance, practice in front of a mirror, that way you'll see what your audience sees. It is also a good idea to have your performance video-taped so you can watch it and evaluate the areas of your performance where improvements are needed.
2. Hold a small rehearsal performance in front of your parents or family members before performing for a larger group.
3. Memorise the tricks by writing notes, speech lines etc. on a paper and use your notes when you practice.
4. Master one trick at a time. Wait until you are fully confident with the trick before moving on to another.
5. Being a magician is really about being a good stage actor. Practice your lines, timing and movements. This will make your performance more polished and impressive.
6. It's not easy to become a perfect magician, but your audience will always show appreciation for a well-practiced show. Most importantly, HAVE FUN!

## BEFORE THE SHOW

1. Design a poster and send out invitations. To give your show a professional touch, try to find a magician or wizard costume that you can wear for your performance and decorate your stage with some props or posters.
2. Make a show planner that lists all the tricks of the show in one column and the props required for each trick in the column next to it.
3. Get all props ready. Check them once again before the show starts.
4. Start the show with a short, impressive, easy-to-understand trick. It will help draw the audience's attention and get them in the spirit of the show.
5. Plan your trick sequence beforehand. Do not perform tricks of similar effect, similar length, or those that use similar props next to each other. Mix them up so that your audience will feel there is greater variety.
6. Speak clearly and loudly so that everybody can hear you. Pace yourself so you do not speak too fast.
7. If you are performing for the first time, you might experience some kind of stage fright like a fast heart beat, palm sweating etc. Remind yourself that all great magicians experienced the same thing when they were on stage for the first time. Just take a deep breath and start. It will become easier once you get warmed up. Remember, if you are having fun, so will your audience!
8. Get the audience involved. Ask them to say together "It's Magic!" after completion of each trick.

## OTHER TIPS

1. Sometimes it's tempting to tell your audience the secret of a trick. Most magicians will recommend you never do that, as it will dilute the impact of your show. However, it's also fun to share with your friends the science principles you have learned from this kit. The decision is yours.
2. Do not repeat the same trick in front of the same audience. If they know what comes next, there will be more chance for them to find out the secret behind it.
3. Run a smaller show initially with 4-5 tricks. When you are confident enough, organise another show with more tricks.





## TRICK 1 : Magic Fountain

### You'll need

From the kit: Screw cap, straws, adhesive tab

From home: Plastic water bottle (make sure its mouth fits the screw cap provided), 2 water containers, e.g. water tray, bottles etc.

### Show effect

Create a fountain inside a plastic water bottle. The fountain is powered by an invisible force.

### Preparations

Set up the screw cap and straws as shown in Diagram 1.1. Fill the bottle to 1/3 full of water. Insert the straws into the plastic water bottle, and tighten the screw cap. Use adhesive tab to make the whole system as air tight as possible (Diagram 1.2). Prepare another two bottles/containers, one empty and one filled with water. To make the fountain more spectacular, add some food colouring (or condensed drink syrup) to the water inside the supply container.

### Show time

Start by asking your audience how a fountain works. Now tell them you could make a mini fountain inside a bottle, which is powered by a magic, invisible force. Insert the "fountain straw" to the container with water and the "drainage straw" to the empty container. Now slowly invert the bottle. Make sure the other end of the "fountain straw" is dipped inside the water (Diagram 1.3). What happens? While the water flows out to the empty container from the "drainage straw," you will see water blowing out from the "fountain straw," creating an interesting fountain. You may also try lifting the fountain bottle a bit so that the "fountain straw" is above the water level of the water container. Instead of flowing out, the water will "shoot" out.

### Science explanations

When water flows out from the "drainage straw", air pressure decreases inside the bottle. The air pressure outside is stronger and forces the water in the supply container to go up and flow out from the "fountain straw", thereby creating a fountain scene. When the fountain bottle is lifted, there is water half way inside the straw. With the straw above the water surface, air, instead of water, flows inside the straw. The pressure of flowing air causes the water to shoot up.

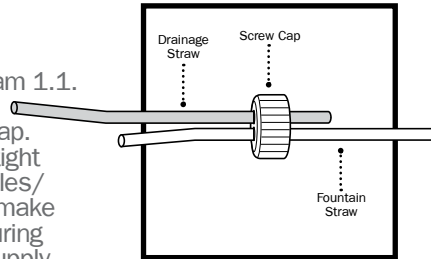


Diagram 1.1

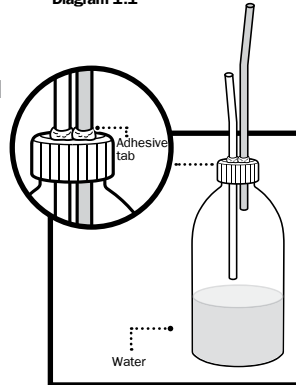


Diagram 1.2

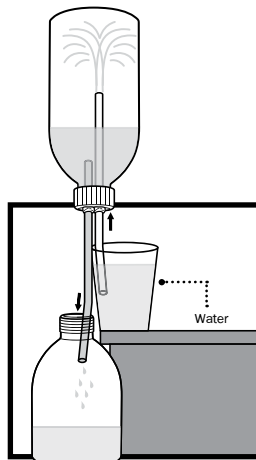


Diagram 1.3

## TRICK 2 : Self-inflating Bag

### You'll need

From the kit: Screw cap, straws, plastic bag, and adhesive tab

From home: 2 plastic water bottles, rubber bands, a water container e.g. water tray

### Show effect

Make a plastic bag inflate inside a bottle without touching it.

### Preparations

Set the props up as shown in the diagrams. Use a rubber band to tie the plastic bag to one straw (Diagram 2.1). Insert the straws and plastic bag into the plastic water bottle. Tighten the screw cap. Apply adhesive tab to all connecting gaps to make the whole system air tight (Diagram 2.2).

### Show time

Tell your audience that you have a magic plastic bag which will inflate by itself. Show them the system you prepared. Now invert the bottle to let the water flow out to the water container (Diagram 2.3). Bravo, the bag starts to inflate magically by itself.

### Science explanations

It is the same science principle as in Magic Fountain. The outside air is forced to go through the straw due to the pressure difference when the bottle is inverted and the water begins to drain. The difference in air pressure causes the bag to inflate.

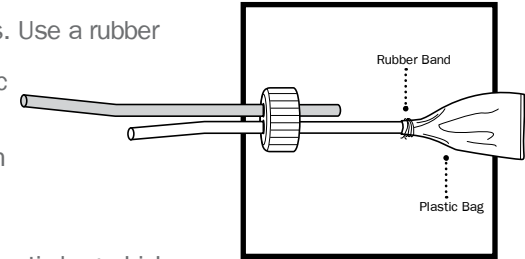


Diagram 2.1

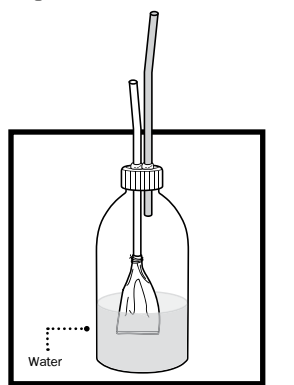


Diagram 2.2

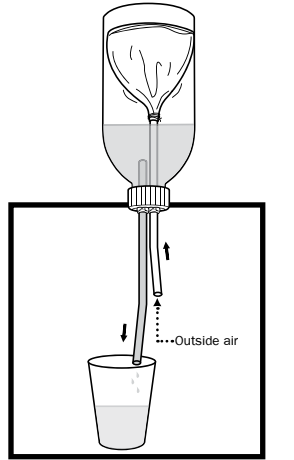


Diagram 2.3

## TRICK 3: Stubborn Bag

### You'll need

From the kit: Screw cap, straws, plastic bag, adhesive tab  
From home: Plastic water bottle, rubber band

### Show effect

Challenge your audience to blow up a plastic bag which is installed inside a plastic water bottle. Seems easy, but it's not!

### Preparations

Set up the props as shown in the diagrams, use a rubber band to tie the plastic bag to one straw (Diagram 3.1). Insert the straws and plastic bag into the plastic water bottle. Tighten the screw cap. Apply adhesive tab to all connecting gaps to make the whole system as air tight as possible (Diagram 3.2).

### Show time

This trick could be a continuation of the Self-inflating Bag done previously. You have shown your magic bag inflated by itself. Now tell your audience that only you can inflate the bag! They won't believe you, so ask a volunteer to try. In the meantime, pretend that you are helping your volunteer to hold the bottle. Without being seen by the audience, block the opening of the other straw with your finger (Diagram 3.3). No matter how hard your volunteer tries, the bag will not inflate. Now it's your turn. Clean the straw. Release the finger that has been blocking the other straw's opening (Diagram 3.4). Blow gently and the bag inflates. Bravo!

### Science explanations

When you blow into the straw, air tries to go inside the bottle. However, since the only air passage is blocked by your finger, the air inside the bottle can not escape. This airtight pressure stops the air you blow from going in and the plastic bag cannot be inflated. When you release your finger, the inside air pressure no longer exists, and the plastic bag can then be inflated.

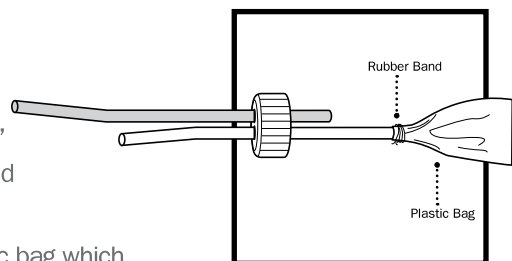


Diagram 3.1

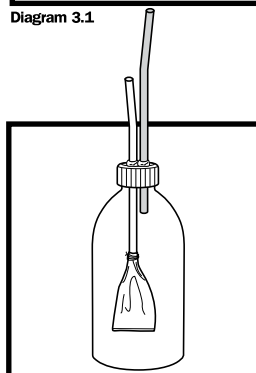


Diagram 3.2

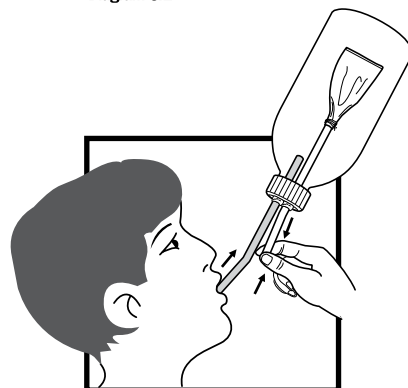


Diagram 3.3

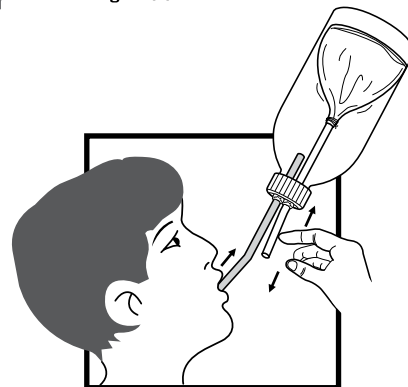


Diagram 3.4

## TRICK 4: Magic Diver

### You'll need

From the kit: Suction tube, metal washers  
From home: Plastic water bottle

### Show effect

Amaze your audience with your magic power as you control a diving tube inside a bottle without touching it.

### Preparations

Start with inserting the 3 metal washers to the suction tube (Diagram 4.1). Squeeze the suction tube gently and immerse its mouth to a cup of water. Water will be sucked into the tube. Fill the tube with water so that it is two third full (Diagram 4.2). Place the suction tube inside the plastic bottle filled with water. Make sure it stays afloat at the water level. If it submerges, take the suction tube out; adjust the amount of water inside by squeezing out some water. Now fasten the bottle cap tightly. (Diagram 4.3)

### Show time

Tell your audience that you have the ability to move an object without touching it. Show them the bottle with the suction tube. Tell your audience that you are going to control the suction tube's up and down by a magic spell. Now say "DOWN" and slight squeeze the bottle, the suction tube will submerge (Diagram 4.4). Say "UP", release the squeeze and the suction tube will surface (Diagram 4.5). Repeat, and the suction tube will go up and down like a magic diver. Show time hints: you may need to apply a stronger squeeze to submerge the suction tube when it is afloat at the water level. However, when it is in the middle of the water, a very light squeeze will be sufficient to control its movement. To prevent your audience from noticing your hand movement, it is recommended that you first squeeze the bottle in the backstage so that the suction tube is submerged in the middle of the water. Hold the bottle to maintain the suction tube's position when you show it to your audience. A slight squeeze will be enough to submerge the suction tube.

### Science explanations

The up and down movement of the suction tube is controlled by the air bubble trapped inside the tube. When the bottle is being squeezed, the pressure inside of the bottle increases, causing the air bubble to contract. Its buoyancy is decreased and causes the suction tube to submerge. When the squeeze is released, the air bubble expands again and its buoyancy is increased, making the suction tube surface. Trouble shooting: if your suction tube does not submerge, there is probably too much air inside the suction tube and the buoyancy is too high. Suck in more water.

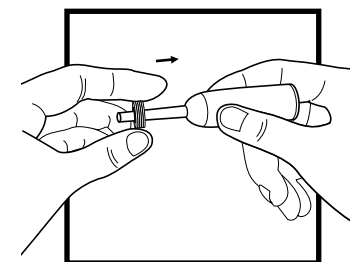


Diagram 4.1

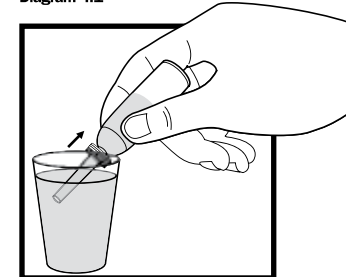


Diagram 4.2

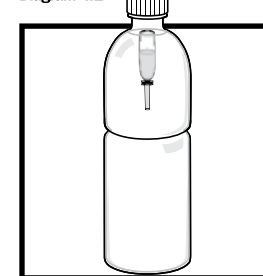


Diagram 4.3

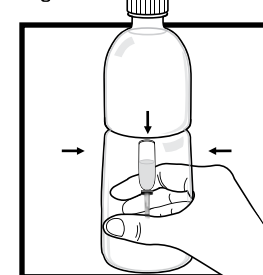


Diagram 4.4

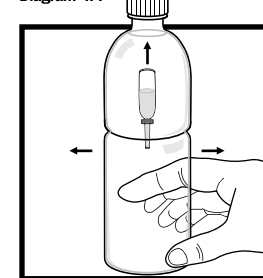


Diagram 4.5

## TRICK 5: Coin on the Edge

### You'll need

From the kit: Nil

From home: A small coin and a relatively new bank note. You may use a piece of paper of similar size as a substitute for the money note.

### Show effect

Amaze and challenge your audience by balancing a coin on the edge of a piece of money note or paper.

### Preparations

Not much preparation is needed for this trick, which makes it easy to perform just about anywhere.

### Show time

Ask 2 volunteers to come up the stage. Ask one of them to hold and straighten the bank note /paper. Ask the other one to balance the coin on the paper edge. That's impossible. Now it's your turn. You could even tell your audience that you could do the whole thing all by yourself! Fold the bank note in half and make it stand on the table in right angle (Diagram 5.1). Place a coin on top of the fold line so that it stands firmly on top of the bank note (Diagram 5.2). Hold the note by both sides. Slowly pull open the note until it is straight (Diagram 5.3). If done correctly, the coin will stand on the bank note without falling (Diagram 5.4). To make it more spectacular, you may ask an assistant to hold a newspaper in front of you to hide what you are doing. Ask your assistant to take away the newspaper after you finish. How you did that? Your audience will be amazed! Tell them it's magic!

### Science explanations

When you pull open the note, the coin on top of it moves too. Since there is a frictional force between the note and the coin, the centre of gravity of the coin is moved and maintained at a balanced status. When the note is pulled straight, the coin's centre of gravity aligns with the straight line and the coin stands.

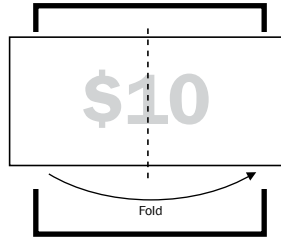


Diagram 5.1

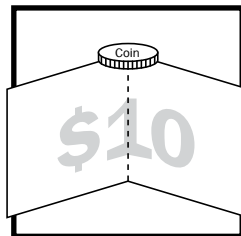


Diagram 5.2

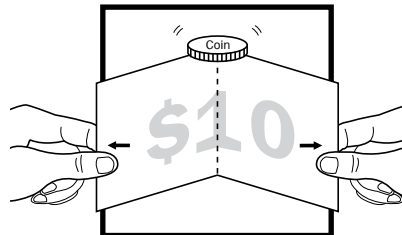


Diagram 5.3

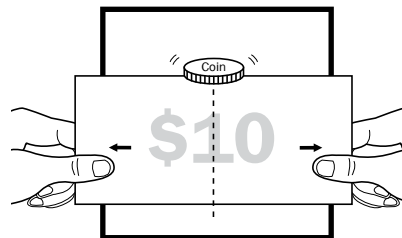


Diagram 5.4

## TRICK 6: The Great Coin Escape

### You'll need

From the kit: The paper strip with circles lines printed at the center

From home: A coin, a pair of scissors.

### Show effect

Amaze your audience by pushing a coin through a hole that is smaller than the coin itself.

### Preparations

Choose a small coin. On the paper choose a circle line which is about 20% smaller than the coin. Fold the paper in half. Cut a circular hole along the chosen line. Test and make sure the coin can not go through the hole (Diagram 6.1).

### Show time

Show the coin and paper to your audience and point out that the hole is smaller than the coin. Challenge a volunteer to push the coin through the hole without tearing the paper. Not possible, right? Now it's your turn. Fold the paper in half. Drop the coin in so that it sits in the half circle hole (Diagram 6.2 -3). Now slightly bend the two side of the folded paper. The coin will slowly emerge through the hole (Diagram 6.4).

### Science explanations

If you try to push the coin through the hole with the paper flat, the maximum passage width of the hole is its diameter, which is obviously much smaller than that of the coin. You cannot get the coin through without stretching and tearing the paper. However, by folding and bending the paper as instructed, you are making use of the circumference of the hole as the passage's width limit.  $\text{Circumference} = \text{Diameter} \times 3.14$ . So even folded and reduced in half, it is still close to 1.5 times bigger than the hole's diameter.

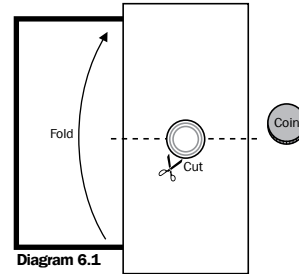


Diagram 6.1

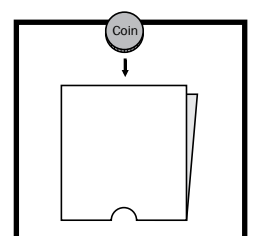


Diagram 6.2

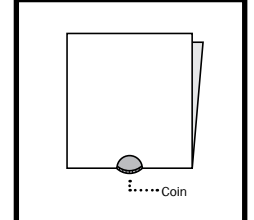


Diagram 6.3

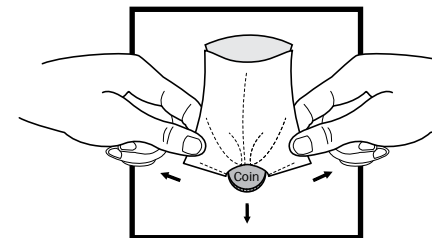


Diagram 6.4

## TRICK 7: See Through Magic

### You'll need

From the kit: Plastic cup

From home: 3 coins of sizes or shapes that are noticeably different. You may ask the audience to donate the coins during the show to make it more fun.

### Show effect

Amaze your audience with your “see through” ability to recognise a coin tightly held by a volunteer.

### Preparations

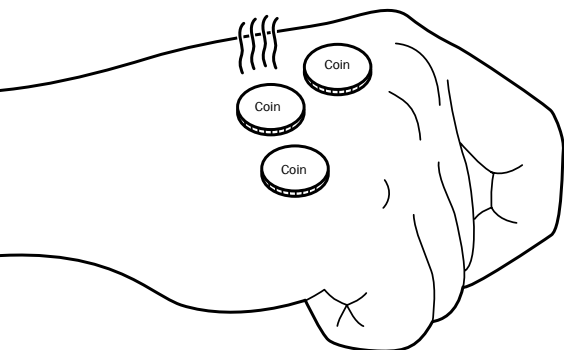
Practice.

### Show time

Pass out a cup and ask 3 audience members to donate a coin into it. The coins should be of different sizes or shapes for the audience to recognise the differences. Pass the cup of coins to a volunteer. Ask the volunteer to pick one out and show it to the audience without you seeing it. Tell the volunteer to hold the coin as tight as possible, so that you can not see it. Ask him/her to raise the fist that contains the coin. Tell the audience that you have x-ray vision - and the ability to tell which coin the volunteer is holding. Pretend that you are examining his/her fist with your power and ask the volunteer to really concentrate. After about a minute ask the volunteer to return the coin back to the cup without showing you. Quickly place all coins one by one on the back of your hand. Feel the temperature of the coins and find the one that is relatively warmer. That is the one. Tell your audience the answer and have it verified by the volunteer. Bravo!

### Science explanations

Coins are made of metal, which is a heat conductor. When it is held tight by the volunteer, the body transfers some of the heat to the coin, making it a bit warmer than those that stayed in the cup. But remember, you need to do the temperature check quickly before the coin cools down. Why place it on the back of your hand? The skin layer at the back of your hand is thinner and tends to be more sensitive to outside stimulus like temperature changes.



## TRICK 8: Invisible Engine

### You'll need

From the kit: The tiny plastic boat

From home: Dish washing detergent, a toothpick and a large tray of water. The tray must be very clean, and free of any oil or detergent to make the trick work.

### Show effect

Amaze your audience with a tiny boat, which moves by itself on the water.

### Preparations

Dip the toothpick with dish washing detergent.

### Show time

Fill the tray with water. Tell your audience that you have the world's tiniest boat, which is powered by not only the world's smallest, but also invisible, engine. Ask a volunteer to come up to the stage. Ask the volunteer to put one of the boats onto the water surface and see if it moves by itself. Of course not! Now explain to your audience that the volunteer forgets to pump the fuel to power the boat. Now show to your audience the fuel, the toothpick dipped with detergent. Tell them it is the most expensive petroleum we could find on earth. Now use the toothpick to dip the detergent to the back of the boat (Diagram 8.1). Slowly place the boat onto the water surface, it will start to move forward for a while (Diagram 8.2). Bravo!!

### Science explanations

There is a surface tension for water. When you apply the detergent, the surface tension is reduced at the back of the boat. Since the surface tension applying to the front of the plastic boat is greater than that to the end of the plastic boat now, a forward force is formed that causes the boat to move forward. After the boat has sailed for a while, the detergent is carried and spread above the water surface. The boat stop working as the water tension difference no longer exists.

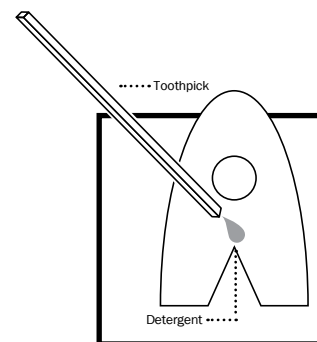


Diagram 8.1

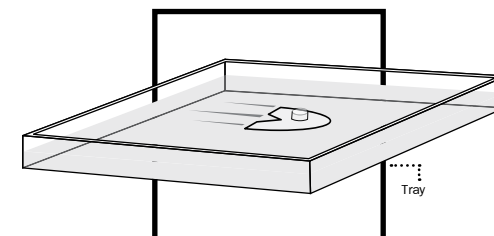


Diagram 8.2

## TRICK 9: Paper Ring Magic 1

### You'll need

From the kit: The long paper strip  
From home: Scissors (adult supervision is required), glue.  
Hints: you could use newspaper to produce the paper strips required for future shows.

### Show effect

Cut a paper strip along the middle of its width. Surprise your audience by creating a much larger ring instead of the two rings, which most of the audience will expect.

### Preparations

Twist the paper strip once (Diagram 9.1) and connect both ends with glue (Diagram 9.2).

### Show time

Show your audience the paper ring you have prepared. Hold the ring at the position where it twists, so that your audience will not notice it. Ask your audience to guess what will happen if you start cutting the paper ring lengthwise. Right, most of them will say you will get two rings. Tell your audience that you have a magic scissors, which will create something different. Hmm..... start cutting and when you finish, ask the audience to guess what you get (Diagram 9.3). To their surprise, it is a continuous ring, twice the size of the original (Diagram 9.4).

### Science explanations

By making a twist when connecting the ends, you actually make the ring's two surfaces become one. It is called a Mobius strip which was co-discovered independently by German mathematicians August Ferdinand Möbius and Johann Benedict Listing in 1858. The cut is like a continuous cut on one plane surface. Instead of using scissors, use a pen to draw a line down the middle of the ring. You will end up drawing one complete circle over the two planes. Pretty cool!

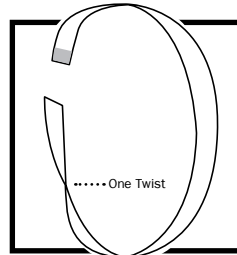


Diagram 9.1

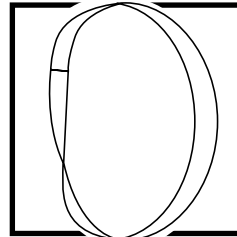


Diagram 9.2

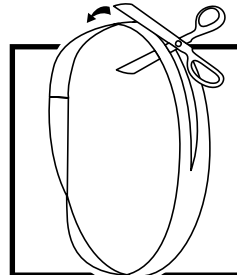


Diagram 9.3

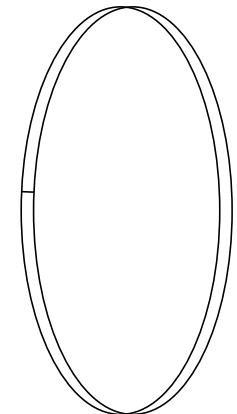


Diagram 9.4

## TRICK 10: Paper Ring Magic 2

### You'll need

From the kit: The long paper strip  
From home: Scissors (adult supervision is required), glue

### Show effect

Cut a paper strip along the middle of the width. Create an unexpected outcome by making two interlocking rings instead of two separate rings, which most of the audience will expect.

### Preparations

Make TWO twists in the middle (Diagram 10.1) of the paper strip, then connect both ends with glue (Diagram 10.2).

### Show time

You could combine this trick with the Trick 9 Paper Ring Magic 1. After you have cut and shown the larger paper ring, bring out the paper ring (with two twists) you prepared for this part of the act. Ask your audience again what will happen if you start cutting in the same manner as in the previous trick. Hmm....your audience will be puzzled and they may guess: one big ring! Give them a cunning smile and start to cut. Afterwards, show them 2 interlocking rings. Bravo! (Diagram 10.3 & 10.4)

### Science explanations

This is another interesting combination of the Mobius strip as described in the previous trick. By giving one more twist to the paper strip before connecting the ends, it produces different interesting results after it is cut. Try three twists, it will produce a strip tied in a "trefoil knot".

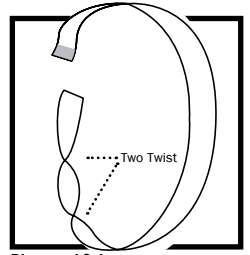


Diagram 10.1

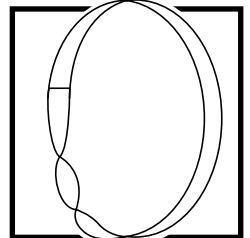


Diagram 10.2

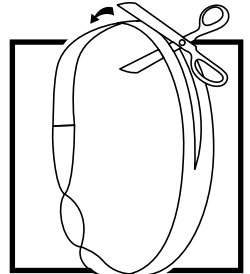


Diagram 10.3

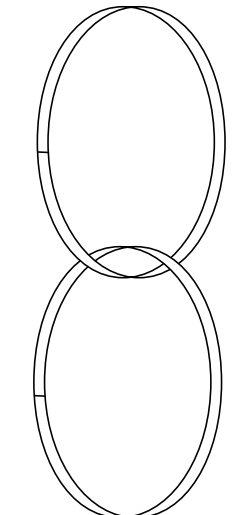


Diagram 10.4



## TRICK 11: Space Water

### You'll need

From the kit: Plastic cup, the square paper card  
From home: Water

### Show effect

Amaze your audience with a piece of paper that prevents the water from flowing out of a cup when the cup is inverted.

### Preparations

No preparation is required.

### Show time

Show your audience a cup of water, which is almost full. Tell your audience that the water is collected from space and has the power of defying the force of gravity. Now cover the mouth of the cup with the square paper card (Diagram 11.1). Holding the card with one hand, invert the cup slowly with the other (Diagram 11.2). Magic! The water will stay in the glass without flowing out (Diagram 11.3).

### Science explanations

The water does not flow out because the water pressure inside the cup is smaller than that air pressure outside the cup. The card is pushed to the cup by the air pressure outside. Moreover, a surface tension is formed in between the water and the cup's edge. This prevents the outside air from going into the cup, and the water will not flow out immediately. Do more experiments by squeezing the cup, what happens? Add less water to the cup, will the water hold longer?

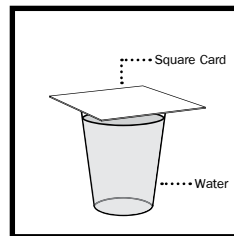


Diagram 11.1

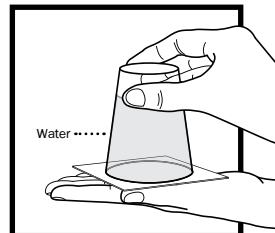


Diagram 11.2

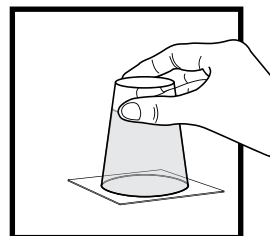


Diagram 11.3

## TRICK 12: Missing Coin

### You'll need

From the kit: Plastic cup, the square paper card  
From home: A bottle of water, a paper stand (e.g. a dictionary), and a small coin

### Show effect

Place the coin underneath the empty cup. Amaze your audience by making the coin disappear after water is poured into the cup.

### Preparations

Prepare a glass full of water.

### Show time

Place the coin on the table. Put the plastic cup on top of it (Diagram 12.1). Place the card on top as a cover (Diagram 12.2). Tell your audience that you have magic water, which can “dissolve” the coin and make it disappear. Your audience will not believe it. Now place a self-standing object (e.g. a dictionary) in front of the cup. This will block the audience from seeing what is going on and serves to create a mystic feeling and distract the audience's attention. Show both your hands to the audience to prove you are not touching the coin or cup. Now take away the cover card with one hand. Pour water into the cup with the other (Diagram 12.3). When the cup is fully filled with water, put the cover card back on top of the cup. Take away the thick book. Ask a volunteer to see through the cup and check if the coin is still there. Bravo, the coin has disappeared (Diagram 12.4).

### Science explanations

The coin is still underneath the cup. However when water is added to the cup, the light ray is reflected and causes the coin to disappear from the volunteer sight. However, it still can be seen from the top, which is why a cover card is needed.

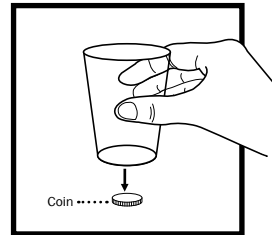


Diagram 12.1

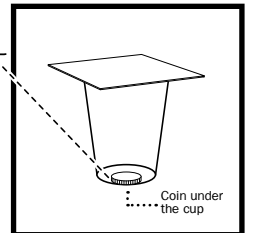


Diagram 12.2

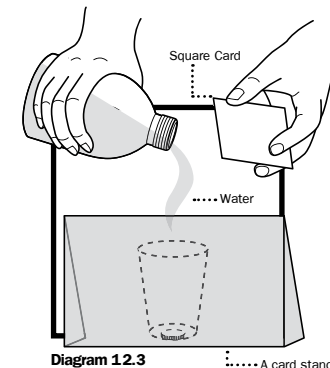


Diagram 12.3

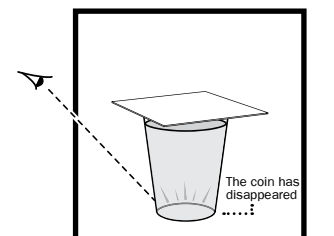


Diagram 12.4



## TRICK 13: Flying Bank Note

### You'll need

From the kit: Nil

From home: A money note

### Show effect

Challenge your audience to catch a piece of falling money note. Seems easy enough, right?

### Preparations

No preparation is required.

### Show time

Start by holding a money note in your hand. Ask a volunteer to come up to the stage. Ask him to open his thumb and index finger and place it to the money note (Diagram 13.1). Tell him you are going to release the note, and if he can catch it, the note will belong to him. Sounds easy, but it's not (Diagram 13.2).

### Science explanations

Your brain controls your hand's catching action. Before your brain can send the signal to your hand to catch the falling note, it normally takes 0.2- 0.3 second. A normal bank note is about 15 cm long. When the volunteer's finger is placed half way of it, the "catching" falling distance is further shortened to 7 cm. It takes less than 0.2 second for the bank note to fall that distance. The note falls faster than the eye's signal sent to the brain. Thus, there is always a delay in hand action unless the volunteer makes a very accurate prediction of when you will release the note.

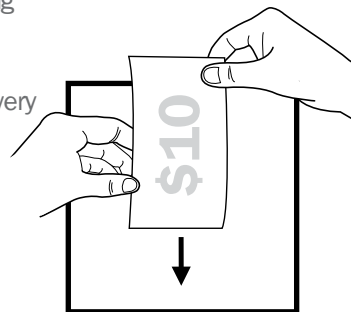


Diagram 13.1

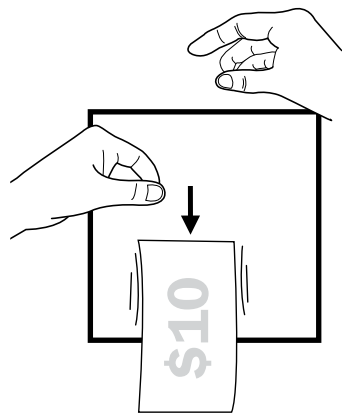


Diagram 13.2

## TRICK 14: The Heaviest Sumo

### You'll need

From the kit: Paper strip with a printed sumo

From home: Nil

### Show effect

Amaze your audience with a light paper sumo, which will never fall over no matter how hard you blow on it. Not as easy as it sounds!

### Preparations

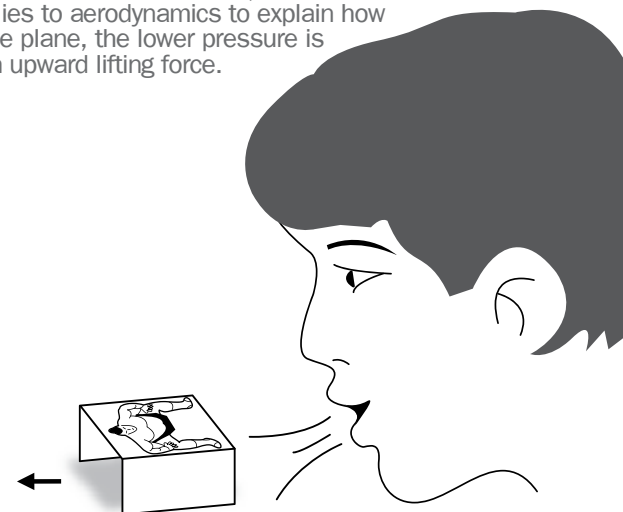
No Preparation is required.

### Show time

Start by telling your audience that sumo wrestling is the national sport of Japan, and sumo wrestlers are all very heavy. Now tell your audience that you have invited one of the heaviest sumo wrestlers to attend your show. While everyone is expecting a giant to appear on stage, you show them your paper sumo. With a reassuring tone, tell your audience that your sumo is the heaviest. No matter how hard your audience try, they cannot blow him over. Your audience must be thinking that you are joking as it is only a piece of thin paper. Pretend that you talk to the sumo. You relay the sumo's message saying that he would like to invite a volunteer to come up on stage to challenge him. Now fold the paper like a bench. Place the sumo on the table. Whoever blows him over will win. The only rule is they have to blow the sumo from the front. Most audience will think that is very easy, but it is almost impossible no matter how hard they try.

### Science explanations

When air is blown toward the front of a paper bench, its current is divided by the folded paper to stream above and beneath the object. The lower stream flows faster due to the folding design. Faster air has a lower air pressure. The upper stream flows slower and has a higher pressure, which presses upon the paper sumo. No matter how hard you try, the paper sumo could not be blown over as there is always a higher pressure pressing upon it. You may even see the paper clings more firmly when you blow even harder. Daniel Bernoulli, a Swiss scientist of the 1800s, first demonstrated the principle. The same principle also applies to aerodynamics to explain how a plane gains lift. But in the case of the plane, the lower pressure is created on top of the wing, creating an upward lifting force.



## TRICK 15: Maths Magic

### You'll need

From the kit: The special pattern card set.

From home: Nil

### Show effect

Amaze your audience with your ability to guess a number in the mind of a volunteer.

### Preparations

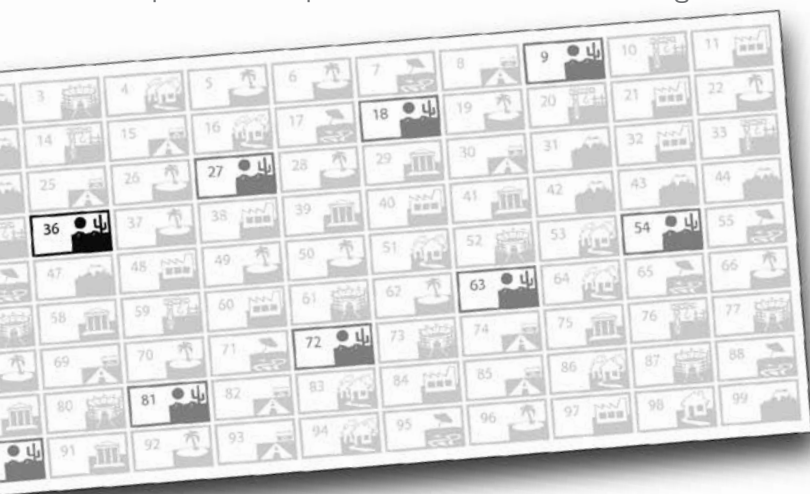
No preparation is required.

### Show time

Tell your audience that you have super mind reading abilities. They won't believe it, right? Now ask a volunteer to think of a two-digit number (e.g. 45). Next ask the volunteer to sum up the two digits (i.e.  $4 + 5 = 9$ ). Afterwards, ask the volunteer to subtract this sum from the original two-digit number chosen (i.e.  $45 - 9 = 36$ ). Ask the volunteer to memorise the difference (i.e. 36). Show your audience the special number card. Ask the volunteer to find the resulted number (i.e. 36) on the card and memorise the pattern next to it. In the meantime, you should look at the pattern next to number 9 or its multiples and memorise it. Now tell your audience that you knew the answer already. From the pile of small pattern cards, select the pattern which is printed next to number 9 or its multiples. Show it to your audience. Bravo!! It's magic.

### Science explanations

This is a maths trick. No matter what two-digit number the volunteer chooses, the difference your volunteer will arrive at after the series of calculations is always a multiple number of 9. (i.e. 9, 18, 36, 45...) The patterns printed next to the numbers are arranged in such a way that all multiples of 9 share the same pattern. But the audience will not notice this. By finding the pattern next to number 9 or its multiples, you can tell the audience the number without really knowing the exact number, because it will always be a multiple of number 9. (Note: If you would like to repeat the same trick in the same show, show the audience the reverse side of the pattern card, which uses a different pattern for 9 multiples. This will prevent the audience from knowing the secret of the trick.)



## TRICK 16: Floating Metal

### You'll need

From the kit: Plastic cup, paper clips

From home: Water, 2 toothpicks

### Show effect

Amaze your audience with a metal clip which floats on water, defying the law of density.

### Preparations

Prepare a cup of water.

### Show time

Tell your audience that metal normally sinks in water due to its higher density. Demonstrate that by dropping a paper clip in a cup of water. Afterwards tell the audience that you have some special paper clips made of space metal and they float on water! They won't believe it. Now fill the plastic cup with water (Diagram 16.1). Break and bend two toothpicks as shown. Place a paper clip onto the bended arms. Hold the toothpicks as shown and slowly submerge them into the water (Diagram 16.2). When the paper clip reaches the water surface, slowly remove the toothpicks. If this is done correctly, the paper clip should be able to float on the water surface. Bravo! (Diagram 16.3)

### Science explanations

Metal, being a substance with a higher density, should sink in water. However, there is a kind of water tension on the water surface. This tension can hold heavier substances if they are small enough and they are placed gently on the surface without breaking that tension. Hints: if you have difficulties floating the clips on the water surface, try applying some wax on the clips surfaces before the show.

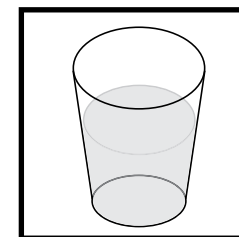


Diagram 16.1

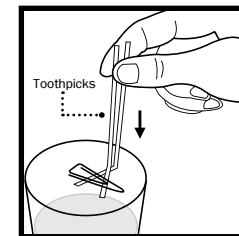


Diagram 16.2

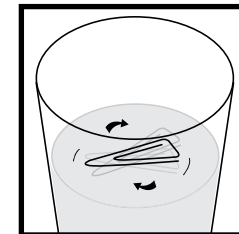


Diagram 16.3

## TRICK 17: Tricky Paper Clip

### You'll need

From the kit: Plastic cup, paper clips and the U shape magnet  
From home: Water, 2 toothpicks

### Show effect

Amaze your audience with a floating clip which moves by itself!

### Preparations

Before the show, magnetise the paper clips by attracting them to the U shape magnet for a while (Diagram 17.1).

### Show time

Tell your audience that the metal which made the paper clips is from a remote planet and has a kind of special energy. It always points to the planet where the metal is from. Now break the toothpick, place the clip on the water surface and make it float as you did previously in Trick 16 (Diagram 17.2 - 17.3). Now gently rotate the clip with the toothpick. Afterwards, leave the clip to free float on the water. It will go back to its original pointing direction. Repeat this for a few times to prove your point. Now further tell your audience that when two metal clips come close together, there will be an energy exchange causing the floating clip to move. Now bend another paper clip like a mini wand. Place it close to the floating one and start moving slowly. The floating clip will follow. It's magic! (Diagram 17.4)

### Science explanations

Since the clips have been magnetised by the U shape magnet before the show, they have in fact become a temporary magnet. When they are left free floating on the water, their movements are affected by the earth's natural magnetic field, thus they always achieve an equilibrium in the north-south direction. They are acting like a compass. If you have a compass at home, verify that it points to the same direction. When another clip is placed nearby, the magnetised clip is attracted to the wand-shaped clip, causing it to follow its movement.

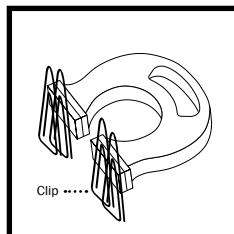


Diagram 17.1

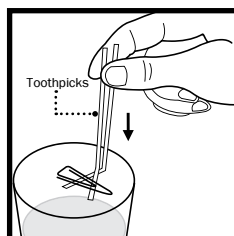


Diagram 17.2

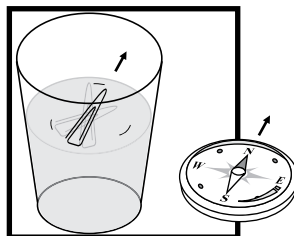


Diagram 17.3

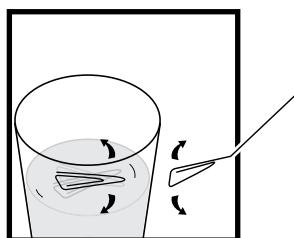


Diagram 17.4

## TRICK 18: UFGlow

### You'll need

From the kit: The mini U shape magnet, the glow magnet marble  
From home: Length of thread, a clear plastic water bottle

### Show effect

Amaze your audience with a magic pendulum which glows and swings in mid air in a mysterious movement. It's a good trick to perform at night.

### Preparations

Tie the length of the thread to the gap at the centre of the marble (Diagram 18.1). Cut the thread to a length which is about 10 cm longer than the bottle body. Drop the marble into the bottle, adjust the length of the thread so that the marble is just above the bottom of the bottle (Diagram 18.2). Screw the bottle to fix the thread and the marble position.

### Show time

Tell your audience that you have a magic marble which is collected from the outer space. Not only does it glow like magic in the dark, it is also charged with a space energy that makes it move in a mysterious movement by itself. Now take out the bottle which you prepared. Turn the lights off and the audience will be attracted by the marble which glows. Without letting your audience know, hold the U shape magnet in the palm of your hand. (Your audience will not see it when it is dark enough!) Now place the bottle to the palm holding the magnet (Diagram 18.3). Give the bottle a light shake, the marble will swing in a mysterious movement as if it is alive (Diagram 18.4).

### Science explanations

A magnet has two poles, South and North. The same poles repel each other whereas the different poles attract. Both the U shape magnet and the glow marble have magnets inside. When it is left dangling, the magnet poles inside the marble change their position from time to time. When its poles come near to the U shape magnet poles, the repelling and attracting forces between poles come into action in an irregular manner, causing the marble to move mysteriously. Why does it glow? Some fluorescent pigments were mixed to the plastic when the marble casing was made. It absorbs light and glows in the dark. Charge the marble with any light source for a while. Turn the lights off and you will see it glows like magic.

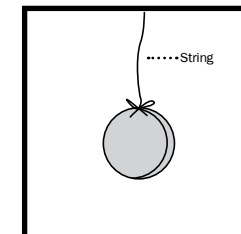


Diagram 18.1

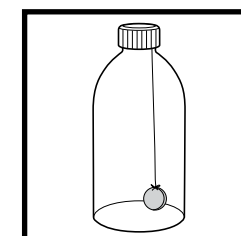


Diagram 18.2

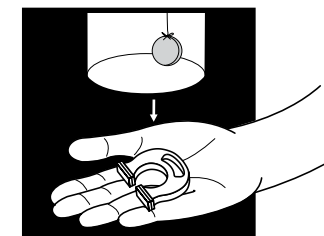


Diagram 18.3

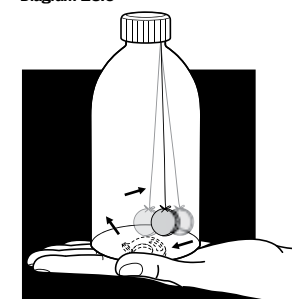


Diagram 18.4

## TRICK 19: Coin Soda Bath

### You'll need

From the kit: Plastic cup

From home: Coin, any kind of soda drink or simply vinegar, a piece of cloth

### Show effect

Amaze your audience by turning the dull coloured coin into one that is shiny gold/silver.

### Preparations

Prepare a cup of soft drink or vinegar solution.

### Show time

Ask your audience to donate some dull coloured coins. Tell them their coins have been used for a while and they need to take a bath, and that you have the ability to restore their shiny appearance. Now put the coins into the cup filled with soda drink (Diagram 19.1). Let the coins stay in the cup for a few minutes, then take the coins out of the cup. Rub them with a piece of cloth. Bravo, they become shiny again (Diagram 19.2 - 3)!

### Science explanations

Coins are made of metals that typically look shiny when they are first manufactured. However, after being circulated and exposed to the air, they start to become tarnished due to oxidation. The oxidised surface makes the metal look dull. The soft drink is acidic. When metal is submerged in acidic liquid, the oxidised surface starts to react with the acid and dissolve. The result is a fresh, shiny coin!

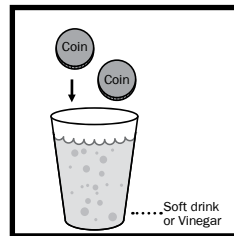


Diagram 19.1

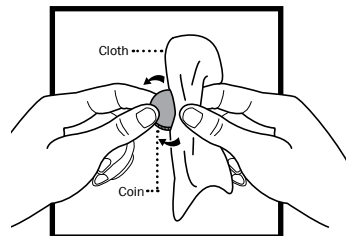


Diagram 19.2

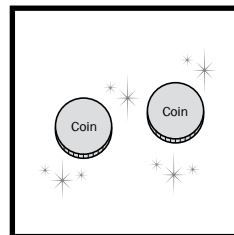


Diagram 19.3

## TRICK 20: Weird Number

### You'll need

From the kit: Nil

From home: A pencil and a piece of A4 size paper. You may also prepare a calculator for quick calculation results.

### Show effect

Amaze your audience with your mind reading abilities. The mystic number will magically show up in a nine-digit number, with the volunteer's chosen number repeated in a row.

### Preparations

Write the number 12345679 on top of an A4 size paper. (Yes, the number is 12345679, the 8 is missing!)

### Show time

Show your audience the number card which is printed with 12345679. Ask a volunteer to choose one of the single digit numbers (e.g. 2), without letting you know. Now ask the volunteer to multiply the number by 9 and memorise the result (i.e. 18) in mind. Tell the other audience members that while the volunteer is doing the calculation, brain waves are emitted that enable you to detect the chosen number. Now hand the number sheet to the volunteer. Ask the volunteer to write the result of the above multiplication (i.e. 18) after the number sequence. Now ask him to write a multiplication symbol to the left of his number. It's time for some maths! Ask the volunteer and the audience to do the calculation together (i.e.  $12345679 \times 18$ ). Number by number, the end result is a mysterious row of 22222222. (2 is the chosen number by the volunteer.) You may do the calculation with a calculator. It will be interesting to see the end number pops out like magic.

### Science explanations

The number 12345679, when multiplied by 9, will equal 111111111. When you further multiply it by any chosen single digit number, the result will be a nine-digit number composed entirely of the number chosen. E.g., if the chosen single-digit number = 2, the final calculation will become  $12345679 \times 9 \times 2 = 22222222$ . By asking the volunteer to do the  $2 \times 9 = 18$  first, you distract them from trying to "figure out" how you did it.

