

Magic Box Activities

from



BEFORE YOU CAN SAY ABRACADABRA!

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Try out some of the best and easiest **magic tricks** to keep the whole family enthralled. Wands, Tommy Cooper hats and optional capes to the ready?

OK, **hold tight** for some seriously magical manoeuvres.

All you need is a few simple bits of **equipment** – and enough **practice** to make it look easy!

(A very big thank you to **Adam and Rachel Boon** who kindly tested out both the outfits and the tricks for us!)

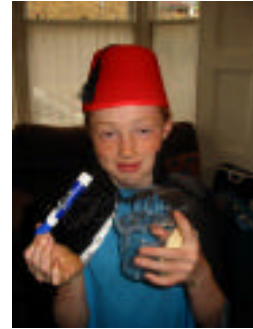


The Amazing Magic Circle

This magic trick will amaze your friends and family with your ability to create a magic circle spinning before their eyes...

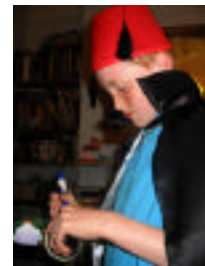
So What Do I Need?

2 plastic see-through drinking cups
Masking tape
1 felt-tip pen



Then What Do I Do?

1. Tape the open ends of the two cups together with the masking tape.
2. Colour the tape with the felt-tip pen.
3. Lay the cups on their side (horizontally) and spin them about the centre (where the coloured masking tape is).
4. As you look down on the spinning cups, you will see a circle - or sometimes a sphere - instead of the cups. Spoooooky....



Why is it so?

As with all tricks, you've probably realised by now that there isn't any magic happening here. The circle appears because your eyes cannot keep up with the spinning cups.

When we see something, the light bouncing off the object hits receptor cells in our eyes, stimulating nerve cells that send a message to our brains. It takes a little time for this message to clear and for the next message to register. By

the time your eyes can cope with the next message, the cup will have moved again, so all you see is a central circle. This phenomenon is called 'persistence of vision'.

The coloured tape in the centre is highly visible while the more transparent parts of the cups appear to fade away. If you have another, closer look at the edges of the spinning cups, you will see that they are just as visible as when they are stationary. This just shows how easily distracted we are, and this is the real key to all magic tricks!

Magic Cotton

Amaze your friends and family with your ability to lift an ice cube using 'only' a piece of cotton....

So What Do I Need?

1 length of cotton thread (or a very thin piece of string)

Ice cube

Salt

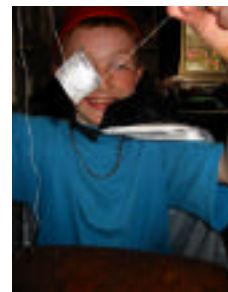
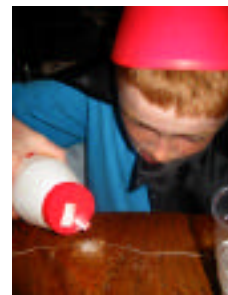
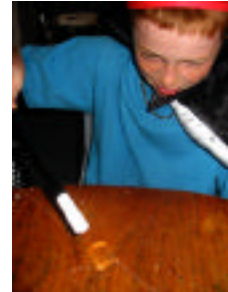
Then What Do I Do?

1. Lay the cotton flat across the top of the ice cube with the ends hanging off either side.
2. Take a pinch of salt and sprinkle it over the top of the ice cube.
3. Wait for a minute or so.
4. Take hold of the thread, one end with each hand, and gently raise the ice cube.

The best thing to do is to conceal the salt and try to sprinkle the salt on without anyone seeing. ('What's that over there? ... Oh it's gone now' may be slightly too obvious – try sleight of hand instead!) And while you're waiting for the salt and ice to do their stuff, you can distract the audience's attention by chanting some magic words to heighten the theatrical mood.

NB: It might be wise to try this trick out once or twice before you summon an audience, just to check how long it takes, so you don't run out of magic words or try to lift the cube too early!

PS: If it doesn't seem to work, try making a loop (a "magic circle" you can tell them) in the middle of the cotton before placing it on the ice cube so that there is more cotton in contact with the ice.



Why Is It So?

It's just chemistry and physics in action. The cotton becomes attached to the ice cube because the salt lowers the freezing point of water and melts the ice. The top of the ice cube quickly re-freezes, trapping the cotton under a thin layer of ice - allowing you to pick it up.

Magic Floating Balls

Every good magician should be able to levitate objects! This trick will enable you to amaze your friends and family with your ability to cause ping-pong balls to mysteriously rise up into the air...

So What Do I Need?

A hair dryer with a 'cool' setting
A ping-pong ball

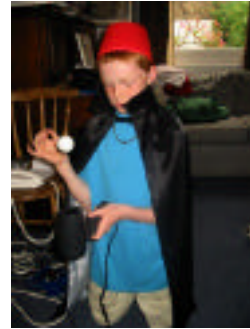
Then What Do I Do?

1. Set the hair dryer to cool, switch it on, and point it at the ceiling.
2. Carefully put the ping-pong ball in the stream of air. Hold the hair dryer very steady and watch as the ping-pong ball floats in the stream of air.
3. Now carefully move the hairdryer from left to right and watch how the ball moves as well, staying in the stream of air.

Before showing this trick to your friends, ask them to predict what they think will happen. Try prompting them to say that the air from the hairdryer will just blow the ping-pong ball away. At this point, you can reveal your magic powers and "demand" that the ping-pong ball levitates in the stream of air.

Why Is It So?

You've probably realised by now that there isn't any magic happening here. Your friends may well have been happy with the prediction that the ball would get blown away, but why doesn't it?



The air from the hair dryer flows around the outside of the ball and if you position the ball carefully, the air flows evenly around each side. Gravity pulls the ball downwards while the pressure below the ball from the moving air forces it upwards. This means that all the forces acting on the ball are balanced and the ball hovers in mid air.

You can make the ball follow the stream of air as you move the hairdryer because Bernoulli's principle says that the fast moving air around the sides of the ball is at a lower pressure than the surrounding stationary air. If the ball tries to leave the stream of air, the still, higher pressure air will push it back in – so the ball will float in the flow no matter how you move it.

Magic Purple Hubbub

Amaze your friends and family with your ability to change a calm oily mixture into a melee of moving madness...

So What Do I Need?

Vegetable oil
Water
A large glass or glass jug
Lots of salt
A spoon
Food colouring

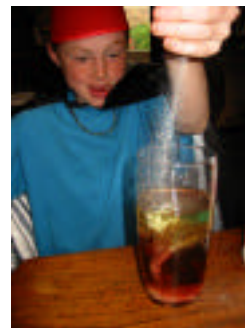
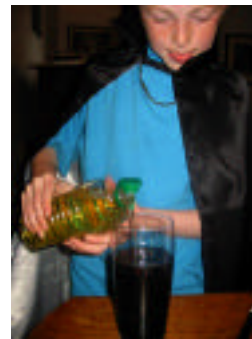


Then What Do I Do?

1. Half fill the glass with water.
2. Add some food colouring and stir.
3. Pour in some vegetable oil – the oil and water will separate.
4. Put two spoons full of salt into the mixture and watch it move.

If you are cunning, you should be able to come up with a way of adding the salt, or 'magic powder', in a way that adds to the mystery of the trick. Try making up some magic words to say whilst you're sprinkling it over the liquid.

Once the mixture of liquids has calmed down you can add more salt and the madness will start up again. If you practice a couple of times, you might be able to add just enough salt to be able to predict how long the liquids will keep moving. Once you can do this, you can also claim to be able to control the moving madness and demand it to become calm again.



Why is it so?

Oil and water don't mix, they are what's known as 'immiscible', so the oil, which is lighter, floats on top of the heavier water. Salt is heavier than both the oil and the water and so when you sprinkle it over the liquid it falls towards the bottom of the glass.

The salt doesn't dissolve in the oil but as it passes through it, the salt physically drags small amounts of oil down into the water layer. When the salt reaches the water it dissolves, releasing the oil which quickly rises to rejoin the oil layer – creating the mad patterns as it goes.

Once all the salt you've added has dissolved, the mixture calms down – until you add more salt!

Amazing Purple Liquid

Amaze your friends and family with your ability to change the colour of a liquid at will...

So What Do I Need?

1 small red cabbage

knife

hot water

bowl

sieve

sodium bicarbonate (also called baking soda – but it's not the same as baking powder)

clear vinegar

kitchen towel

3 glasses

Then What Do I Do?

1. Slice the cabbage, put it into a large bowl and cover with hot water from a kettle – take care not to splash the water on to your hands as you pour.



2. Leave the cabbage to stew until it is tender and the water has cooled. By this time the water should be a deep purple colour.



3. Remove the cabbage from the water – you might need to use a sieve to get rid of the little pieces.

4. Pour some of the clear vinegar into a glass and add some water to it.

5. Dissolve 2-3 teaspoons of sodium bicarbonate in some water. This solution will be a bit cloudy so to get a clear liquid, carefully filter the solution through some kitchen towel.

You will have to do this slowly so that the kitchen towel doesn't rip.

6. Pour a small amount of the magic purple liquid into a clear glass.

You should now have three glasses – one with the magic purple liquid in it and two with clear liquid in them. (If you have gullible friends, you might be able to fool them into thinking that the clear liquid is just water!)



Now for the magic - just by pouring the clear liquids into the purple magic liquid you will be able to change its colour from purple to red to blue to purple again! If you remember which glass contains the sodium bicarbonate solution and which contains the vinegar solution you will also be able to predict what colour the magic liquid will change and hence look like a master magician.



Why Is It So?

As with all tricks, there isn't any "magic" happening here. The colour changes are all down to how the pigment, or colouring, in the red cabbage water reacts when it is mixed with acids and alkalis.

Adding an alkali such as sodium bicarbonate to the cabbage water will turn it blue but adding an acid such as vinegar will turn it red. If you add an alkali and then an acid, you should get back to the colour you started with.

Red cabbage contains the pigment anthocyanin and the structure of the molecules of anthocyanin changes depending on whether it is in an acid or an alkali solution. This change in structure means that the pigment can actually change colour from bright red in acid to deep blue in alkali.

Red cabbage water is a good simple indicator and can be used to tell you whether something is acidic or alkali but it cannot tell you how acidic or how alkali. For that you need a more sensitive indicator such as universal indicator or methyl orange indicator.

Magic Spooky writing

Amaze your friends and family by introducing them to the ghost living in your house!

So What Do I Need?

Paper

Lemon juice

A cotton bud

A desk light with bulb

Then What Do I Do?

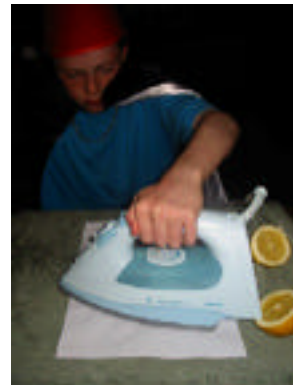
1. Write a message on a piece of paper with lemon juice using the cotton bud.



2. Leave it to dry.

3. Gather your friends and family and try to convince them that there is also a ghost in the room.

4. They might take some convincing, so offer them some evidence. Show them a completely blank piece of paper that just happens to be lying on the ironing board. Get the most sceptical of them to iron the piece of paper.



5. As if by magic the ghost will reveal their presence as the message slowly appears on the paper. Try to write something more ghostly than Rachel did!



To make sure that you don't have to wait too long for your ghostly message to appear, have the iron switched on and the heating up before you start – it can take some time to become hot enough to produce the writing.

Please remember to be very careful with hot irons

Why Is It So?

As you know for yourself, it wasn't a ghost who did that writing... Any organic substance (ie. something which contains carbon) will char and turn into black carbon when heated. The lemon juice contains carbon and remains invisible until it is heated enough to start to burn and the carbon is released.

You can also try this trick with milk – but don't leave the note for too long before you make the 'ghost' appear as it might get a bit smelly!

Magic Sticky Card

Amaze your friends and family with your ability to stick a card to the wall.

So What Do I Need?

A playing card

A willing volunteer

Then What Do I Do?

1. Ask your volunteer to stick the card to the wall just by pressing it against the wall (they're not allowed anything sticky like tape or spit!).
2. ...but they won't be able to – the card will keep falling off.
3. Take the card to the wall yourself, rubbing your feet on the carpet as you go. When you get to the wall the card will magically stick!

NB : The best place to do this is in a carpeted room. Wear rubber soled shoes and make sure the wall is dry and NOT made of metal. Also make sure that you don't bump into anything on your way to the wall.

You may also have to disguise your funny shuffling walk as a 'magic' walk, saying some suitably 'magic' words to cover up the scuffing sound! If you can't get it to work very well, it might be that the weather is too damp for the magic to work.

If you can reach, you could even try sticking the card to the ceiling!



Why Is It So?

...it's all down to static electricity. As your willing volunteer will have discovered, under normal circumstances the card will not stick to the wall. However, when you rub your feet on the ground you are knocking electrons off the atoms in your shoe-soles. Electrons flow from the rest of your body, and the card in your hand, to fill up the gaps, leaving the card with a small positive charge.

When you press the card to the wall, the positive charge attracts negatively charged electrons in the wall. No electricity can flow between the card and the wall, so the electrons in the wall and the positive charges in the card remain separate. This produces an electric field and a force which keeps the card on the wall.

Touching something whilst you are on your way over to the wall will allow electricity to flow and the positive charge that has built up on the card will be cancelled out. If the atmosphere is a bit damp, like on a rainy day, the water in the air can act as a conductor and again the charge on the card might easily become cancelled out.

Magic Up-side Down Water

Amaze your friends and family with your ability to turn a glass of water upside down over their heads without the water gushing out...

So What Do I Need?

A glass

Water

Piece of thin card – a postcard or a playing card will do

A towel in case it all goes wrong!

Then What Do I Do?

1. Half fill the glass with water.
2. Place the card over the top of the glass making sure that it is completely covered.
3. Holding onto the card, turn the glass upside down.
4. Slowly remove your hand from the card.
5. Hey presto – the water remains in the glass!



It might be wise to practice this a few times over a sink before you try it out on your granny. It is also wise not to hold the glass upside down for too long – once the card gets too soggy, the "magic" runs out and the water will give someone an unwelcome shower!

Why is it so?

As with all tricks, you've probably realised by now that there isn't any magic happening here. The water stays in the glass because of a

surprisingly powerful thing called air pressure. Although we can't see it, the air around us is exerting a pressure in all directions.

When you turn the glass upside down, the pressure of the air pushing up against the card is greater than the effect of gravity trying to pull the water out of the glass and so the water stays put.

When the card gets soggy it becomes flexible and deforms making it difficult for the air pressure to hold the card onto the glass. Eventually, though, the card will bend so much that the water can escape from the glass.