Invisible Ink

Magic Science | 15-20 minutes

In this activity, students will write secret messages that can only be revealed if you know how to read invisible ink!

Materials Needed

Per Student:

- Half a lemon (or 1 Tbsp of bottled lemon juice)
- 1 cup
- 1 cotton swab
- At least 1 sheet of white paper

Enough to Share:

- Heated hair dryers

Steps:

1. Squeeze the lemon juice into a cup, or just pour the bottled juice in.
2. Add a little bit of water and stir it.
3. Dip the cotton swab into the mixture and then write a message on a white piece of paper.
4. Let the paper dry- your message should be invisible.
5. When you are ready to reveal your message, heat it up by using a hair dryer.

Explanation:

Lemon juice is very acidic. When you write on the paper with it, it eats away at the paper and makes it weak. When you heat it with the hair dryer, the lemon juice burns before the rest of the paper does. This makes it turn brown!

Try it!

Try it with milk or orange juice instead of lemon juice.

Real World:

There are lots of different uses for acidic liquids. One of the most common uses is for household cleaning. The acidity is really good at eating away at grime and gross stuff.

Levitating Objects

Magic Science | 10-20 minutes

In this activity, students will *magically* levitate objects through the air!

Materials Needed

Per Student:

- 1 latex balloon
- 1-2 coffee filters
- Your own hair!

Enough to share:

- Scissors
- Markers

Steps:

1. Cut the coffee filters into shapes and decorate them. They can be whatever objects you want to see floating. (Ghosts are fun at Halloween!)
2. Blow up the balloon and tie it.
3. Rub the balloon on your hair for a few seconds.
4. Hold your balloon near the shapes you cut out. Move the balloon around and over top of them, and watch what happens!

Explanation:

When you rub your balloon in your hair, *electrons* (tiny little negatively charged electric particles) build up on the balloon. We call this *static electricity.* These tiny electrons have enough power that they can pull very light objects towards them. Your tissue objects are just light enough that they can fly through the air!

Try it!

What happens when you hold the balloon above your head close to your hair?
What does it do if you if you hold it against the wall and let go?
What if you set it on your arm?
Can you stick your balloon to somebody else's?
Try holding your balloon next to various objects around the room.

Real World:

Lightning is a dangerous and very powerful form of static electricity.

Money to Burn

Magic Science | 15-20 minutes

In this activity, students will be shocked as you torch your own hard-earned cash.

This should be demonstrated by an adult. Please do not give the children fire.
JEDC cannot be held accountable for money mishaps.

Materials Needed

- A $1 bill (a $20 is more fun, but…)
- 3 fl oz. 70% rubbing alcohol (be sure to use the right percentage!)
- 1 glass
- 1 stirring device (spoon, stir stick, etc.)
- 1 fl oz. water
- 1 pair of tongs
- A match or lighter
- Safety glasses
- Fire extinguisher (hopefully you won't use it!)

Steps:

1. Pour 3 ounces of 70% rubbing alcohol into a glass. Add 1 ounce of water and mix thoroughly. (The proportions are really important!)
2. Don your safety glasses
3. Using the tongs, dip the bill into the alcohol/water mixture and make sure it is soaked all the way through.
4. Pull the bill out and gently shake excess liquid off.
5. Move away from the glass of alcohol and water, or have someone move it away from you.
6. Hold the bill in one corner with the tongs while you light the opposite bottom edge of the money on fire.
7. When the flame is completely extinguished, feel the bill. It should be cool to the touch.

Explanation:

When you light your money on fire, the alcohol burns while the water saves your bill! When the alcohol burns, the water takes the heat and evaporates, saving your money from ashes!

Do Not Try it!

Don’t do this - If you were to (but aren’t going to) dip your money in pure alcohol (bad idea), the alcohol would catch on fire (here comes danger) and there would be no water to save your bill! It would burn up and be quite crispy. (I say “would,” because you are not going to try this.)

Real World:

Next time your money is burning a hole in your pocket, dip it in water.

Oobleck

Science Magic | 15-20 minutes (if you can stop playing with it)

In this activity, students will have trouble deciding whether this stuff is liquid or solid!

Caution: Do not dispose of oobleck down the drain! Use a trash can.

Materials Needed

Per 2 Students:

- 1 cup of water
- Bowl
- Spoon
- 1.5 to 2 cups of cornstarch

Optional:

- A few drops of food coloring
- Drop cloth, if working in a carpeted area

Steps:

1. Pour the water into a bowl.
2. Add cornstarch a little at a time, mixing thoroughly with a spoon (and then hands, when it gets thicker). When it gets to a nice gooey consistency, stop adding cornstarch (it should crumble when pinched, but ooze when you pick it up with your finger).
3. Add a few drops of food coloring, if desired, and mix thoroughly by hand.
4. Squeeze it. Squish it. Pat it. Make it into a ball, then let it ooze through your fingers. It's a liquid! No, it's a solid! No- what on earth is it?

Explanation:

This mixture of cornstarch and water is what we call a *suspension.* That is when one part of the mixture is finely dispersed throughout the other. In this case, the cornstarch particles are floating in the water. When you apply force to the oobleck, the cornstarch particles are forced to get

really close together and force the water out. This makes it act solid. When you relieve the force, the particles spread back out and it acts like liquid.
The answer to the confusing question is that oobleck is a solid suspended in a liquid! It is referred to as a *Non-Newtonian Fluid.*

Try it!

See if you can build something before it oozes away!
Can you get your hand on the bottom of the bowl.

Real World:

This mixture acts just like quicksand, but instead of cornstarch there is sand! It is a dangerous, ooey, gooey, mess!

Tablecloth Trick

Science Magic | 15-20 minutes

In this activity, students will learn the secret to, and perform, the magical tablecloth trick!

Materials Needed

For the demonstration:

- 1 tablecloth
- 1 place setting- make sure you practice this before using the good stuff!

For students to try:

- A few tablecloths, cloth napkins, or other similar cloths
- Smooth bottomed items to put on top of it- books, bowls, etc.

Steps:

1. Place a tablecloth on a table. It's easiest with only a couple of feet of cloth on the table. Make sure there are no wrinkles.
2. Put a place setting on the table, near the edge of the cloth. (After practicing this, you'll have a better idea of how confident you are and what dishes you want to use.)
3. Hold the bottom of the tablecloth with both hands and then very quickly pull DOWN on the tablecloth. Be careful not to pull it away from the table horizontally or at an angle. You want to yank the cloth down, which will pull the cloth out from under your place setting.
4. After a good demonstration for the students, let them try. They can use a full tablecloth, but they can also get the idea from using cloth napkins or smaller cloth items. Have them place some (safer) items on the wrinkle-free cloth and then yank it in the downward direction.
5. Make them promise you they won't do it at home without permission!

Explanation:

Take a look at your tablecloth and dishes. They aren’t moving. Objects at rest don't move unless you push or pull them. So, to make the tablecloth move, you need to push or pull it. To make it move without knocking over the dishes, you need to pull quickly. Why? Because of friction. Friction is a "sticky" force that appears when two objects rub against each other. If you pull the tablecloth slowly, friction helps pull the dishes along with it by "sticking" them to the tablecloth. If you pull the tablecloth quickly, the dishes still rub it, but the friction force doesn't have time to get them moving. So, the tablecloth flies off without pulling the dishes with it.

Real World:

Now you know how they do it in the movies!