Science Read

Issue 06
28 March

☐ Career Guidance ☒ Interesting Science ☐ Real Life Application ☐ Real Time News

Science Festival 2017 - "THE MAGIC OF SCIENCE!"

31 March 2017
2.30pm to 4.30pm
AES School Hall

Sign up with your Science teachers today!

- This race is open to all AES students.
- Every Secondary 1 – 3 class needs to send 1 'wizard class'.
- Form a team of 4 students for each 'wizard class'.
- For each wizard class, the more diverse you are, the more bonus points you get.
- Form a team of students of different genders, races, nationality to earn up to 15 bonus points in the race!

Static Flyer – The Flying Bag

Charge a balloon and use the electrical charges of static electricity to create flying objects!

Who needs a magic wand to create levitating objects when you have a balloon? Well, if you know how static electricity works, you won't need a wand! In the Static Flyer experiment, we'll teach you how understanding electrical charges can result in a trick that would make Harry Potter and even Hermoine jealous.

Method

1. Use a pair of scissors to cut a strip from the open end of the produce bag. Once the strip is cut, you should have a plastic band or ring.
2. Blow up a balloon to its full size and tie off the end.
3. Rub the cotton towel over the surface of the balloon for 30-45 seconds.

4. Flatten the plastic band on a hard surface and gently rub the towel on the band for 30-45 seconds.
5. Hold the plastic band about one foot over the balloon and release it. The plastic band is levitating!

How Does It Work?

Rubbing the towel against the balloon and the plastic band transfers a **negative charge** to both objects. The band floats above the balloon because the **like charges repel** one another. If you really want to impress someone, just tell them that it's a demonstration of "**electrostatic propulsion and the repulsion of like charge**." That should do it.

Similarly, when you rub a balloon on someone's hair the balloon picks up electrons, leaving it negatively charged and the hair positively charged. Because opposite charges attract, bringing the balloon near the hair causes the hair to stand up.

Watch the video: https://youtu.be/XdA6zgLHPws

Cloud in a Bottle

In the real world, clouds form when warm, moist air is cooled and condenses into tiny water droplets, which collectively make up clouds. You can mimic this process (on a much smaller scale, of course!) by using everyday items found in your home or school.

Materials:

- **A clear bottle or mason jar with a lid**
- **A dark-coloured piece of paper**
- **Hot water**
- **Ice**
- **Matches**

Method:

1. **First, rinse your glass to make sure it is clean. (*Do not use soap and do not dry the inside.)***

2. **Add hot water to the jar until it covers the bottom by 1 inch deep. Then swirl the water around so that it warms up the sides of the jar. (*If you don't do this, condensation may immediately occur.)***

   You've just added one of the key ingredients for cloud formation: water.

3. Take the lid, turn it upside-down (so that it acts as a small dish), and place several ice cubes in it. Place the lid on top of the jar. (*After doing this, you may see some condensation, but notice there's no cloud yet.*)

   The ice adds another ingredient needed for clouds to form: the cooling of warm, moist air.

4. Carefully light a match and blow it out. Drop the smoking match into the jar and quickly replace the lid of ice.

   The smoke adds the final ingredient for cloud formation: condensation nuclei for the cooled water droplets to condense onto.

5. Now look for wisps of cloud swirling inside! To see them better, hold up your dark colored paper behind the jar.

6. Congratulations, you've just made a cloud! After you've and named it, lift the lid and let it flow out so that you can touch it!

TIPS & ALTERNATIVES

For younger children:

If you prefer not to use matches, you can substitute air freshener spray in step # 4. Lift the lid of ice, spray a small amount into the jar, and then quickly replace the lid.

Advanced:

Use a bicycle pump to change the pressure and see even more clouds.

Going further:

Try using other sizes of dust particles. Design an experiment to determine the best size of dust particles to use. You could also test different water temperatures.

WARNING! *Due to the use of hot water, glass, and matches, young children are cautioned NOT to do this experiment without adult supervision.*

Rainbow Milk

Did you know you can actually make a simple rainbow using milk, liquid detergent (i.e., soap), and food coloring? How the rainbow is created by this mixture might surprise you! In this science activity, you will make your own milk rainbow and explore how detergent and surface tension are involved in its creation.

Materials:

- *Milk; 1%, 2% or whole. Avoid using non-fat milk.*
- *Red, yellow, green, and blue food colouring*
- *Liquid dish soap or liquid laundry detergent*
- *A plate or some other type of shallow dish. Make sure the bottom is flat and not wrinkled.*
- *Cotton buds*
- *Paper towels are useful for cleaning up afterwards*

Method:

1. Pour enough milk in the shallow dish to completely cover the bottom to the depth of about $^{1}/_{4}$ inch. Allow the milk to settle before moving on to the next step.

2. Add one drop of each of the four colors of food coloring (red, yellow, green, and blue) to the milk. Keep the drops close together in the center of the plate of milk.

3. Find a clean cotton swab for the next part of the experiment. Predict what will happen when you touch the tip of the cotton swab to the center of the milk. It's important not to stir the mix—just touch it with the tip of the cotton swab. Go ahead and try it.

4. Now place a drop of liquid dish soap on the other end of the cotton swab. Place the soapy end of the cotton swab back in the middle of the milk and hold it there for 10 to 15 seconds. Look at that burst of color! It's like fireworks in a plate of milk.

5. Add another drop of soap to the tip of the cotton swab and try it again. Experiment with placing the cotton swab at different places in the milk. Notice that the colors in the milk continue to move even when the cotton swab is removed. What makes the food coloring in the milk move?

How Does It Work?

The secret of the bursting colors is in the chemistry of that tiny drop of soap. Like other oils, milk fat is a non-polar molecule and that means it doesn't dissolve in water. When soap is mixed in, however, the non-polar (**hydrophobic**) portion of micelles (*molecular soap structures in solution*) break up and collect the non-polar fat molecules. Then the polar surface of the micelle (**hydrophilic**) connects to a polar water molecule with the fat held inside the soap micelle. Thanks to the soap connection, literally, the non-polar fat can then be carried by the polar water. This is when the fun begins.

The molecules of fat bend, roll, twist, and contort in all directions as the soap molecules race around to join up with the fat molecules. During all of this fat molecule gymnastics, the food coloring molecules are bumped and shoved everywhere, providing an easy way to observe all the invisible activity. As the soap becomes evenly mixed with the milk, the action slows down and eventually stops. This is why milk with a higher fat content produces a better explosion of color—there's just more fats to combine with all of those soap molecules.

Watch the video: https://youtu.be/l2lpBITDsGk

SCIENCE FESTIVAL 2017 EVENTS
27 – 31 MARCH

WEDNESDAY, 29 MARCH

Forensic competition @ Anderson JC

Be YOUNG FORENSIC HEROES and CHALLENGE yourselves to identify the Science behind forensics and solve the crimes in today's society.

THURSDAY, 30 MARCH

Assembly Programme @ AES

Engage in MAGICAL demonstrations and BE PART OF IT to SOLVE the MAGIC behind them!

FRIDAY, 31 MARCH

Cluster Science Enrichment Day

Engage in CREATIVE Science workshops organised by the different Cluster Schools!

APPLY your CREATIVITY and win competitions for AES!

For selected students ONLY!

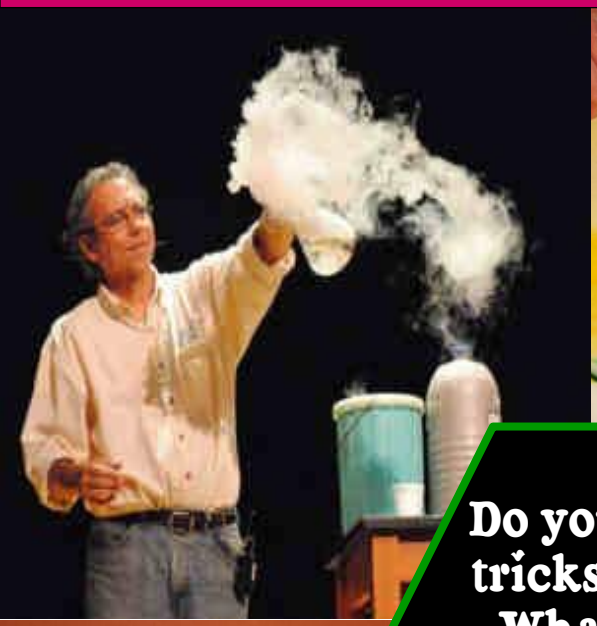
FRIDAY, 31 MARCH

"SCHOOL OF MAGIC" RACE

In the AES School of Magic, trainee wizards are put through seven trainings to be a qualified wizard.

It will be held from 2.30pm to 4.30pm, at the school hall

Science Festival "DIY Video Contest"



Do you know any cool magic tricks that involves Science? What are you waiting for?

Take a video of yourself carrying out the Science demonstration and send it via Whatsapp / email to Ms Chye (94883723)

Stand to win attractive prizes!

GROUP & INDIVIDUAL entries are welcome!

References:

Cloud in a Bottle:
https://www.thoughtco.com/cloud-in-a-bottle-3444311

Static Flyer:
https://www.stevespanglerscience.com/lab/experiments/static-flyer-flying-bag/

Rainbow Milk:
https://www.stevespanglerscience.com/lab/experiments/milk-color-explosion/