WE <3 CHEMISTRY

CREATE YOUR OWN TOP SECRET FORMULA!

ISSUED BY

WARNING:
This set contains chemicals that may be harmful if misused. Read cautions on individual containers carefully. Not to be used by children except under adult supervision.
YOU CAN UNLEASH THE SCIENTIST WITHIN BECAUSE WE <3 CHEMISTRY!
MAKE YOUR OWN MYSTERIOUS MIXTURES! MIX UP BUBBLING, COLOR-CHANGING,
GLowing CONCOCTIONS IN YOUR TEST TUBES. REMEMBER TO FOLLOW THE INSTRUCTIONS
AND TAKE NOTES SO YOU CAN TRY AND MIX YOUR OWN EXPERIMENTS AS WELL!

ADULT SUPERVISION IS REQUIRED!
REMEMBER TO CLEAN AND RINSE TEST TUBES BETWEEN EXPERIMENTS.
MAKE SURE TO USE A PLATE OR TRAY UNDER YOUR EXPERIMENTS TO CATCH SPILLS.

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WHAT TO DO:
1. SET UP A TEST TUBE ON THE TEST TUBE STAND.
2. ADD 2 MEDIUM SCOOPS OF CITRIC ACID AND 2 MEDIUM SCOOPS OF BAKING SODA TO THE
   TEST TUBE.
3. SWIRL THE TUBE TO MIX THE TWO POWDERS. NOW FILL THE TUBE 3/4 FULL OF WATER.
   THE POWDERS ARE BUBBLING, FIZZING AND FREAKING OUT!
So what happened?
Citric acid is an acid. Acids break down other chemicals. Baking soda is a base. When acids and bases mix in water, they form a gas called carbon dioxide, the same gas we breathe out when we exhale. The bubbles and fizz are caused by the carbon dioxide gas escaping from the liquid. When chemicals (like citric acid and baking soda) meet together and make new chemicals (like carbon dioxide), it’s called a chemical reaction.

Color Change Chemistry
You just made powders FIZZ AND FREAK OUT with an acid and base chemical reaction. But now let's make the same powders change colors!

What's in your kit:
- Baking soda
- Citric acid
- Red Cabbage Juice Powder
- Medium scoop
- Small scoop
- 2 Test tubes
- Test tube stand

What you will need to get:
- Water
- Stirring stick
- Plate or tray to catch spills

1. Fill 2 test tubes 3/4 full with water and set them in the test tube stand.
2. Add 1 small scoop of red cabbage juice powder to each test tube. Don't stir them yet. Watch the marvelous purple powder waft through the water. It’s groovy! Stir the test tubes to mix the powder well.
3. Now you’ve got two test tubes of purple liquid. Add one medium scoop of baking soda to one of the tubes and stir it in. WHOA! The purple liquid just turned blue when you added the white powder!
4. Let's see what else this purple liquid can do. Add one medium scoop of citric acid to the second test tube. Wow! The purple liquid magically turned red when you added the second white powder!

What happened? Red cabbage juice powder is an acid-base indicator. This means that it changes colors depending on how acidic or basic the solution is.
COLOR CHANGE FIZZ

NOW LET'S MAKE YOUR COLOR CHANGE CHEMISTRY BOIL BEFORE YOUR EYES.

WHAT'S IN YOUR KIT:
- BAKING SODA
- CITRIC ACID
- RED CABBAGE JUICE POWDER
- MEDIUM SCOOP
- SMALL SCOOP
- 2 TEST TUBES
- TEST TUBE STAND

WHAT YOU WILL NEED TO GET:
- WATER
- STIRRING STICK
- PLATE OR TRAY TO CATCH SPILLS

WHAT TO DO:
1. CONTINUE OR REPEAT THE STEPS 1-5 FOR THE COLOR CHANGE CHEMISTRY EXPERIMENT.
2. POUR OUT 2/3 OF THE BLUE LIQUID FROM THE TEST TUBE.
3. NOW POUR 1/3 OF THE RED LIQUID INTO THE BLUE TEST TUBE. WHAT A COLORFUL FROTHY REACTION!

SO WHAT HAPPENED?
Since citric acid is an acid, it turned red when you added red cabbage juice powder. Since baking soda is a base, the red cabbage juice powder made it turn blue. When you added the baking soda solution to the citric acid solution, a fizzing, foaming chemical reaction happened. And because the citric acid is red and the baking soda is blue, the two colors mixed to make a purple bubbling potion!

TEST TUBULAR WAVE

MAKE A FLIPPING, FLOPPING, SWIRLY CHURNING, ROLLING TEST TUBE WAVE.

WHAT YOU WILL NEED FROM YOUR KIT:
- COLOR TABLETS
- TEST TUBE AND STAND

WHAT YOU WILL NEED TO GET:
- WATER
- VEGETABLE OIL
- PLATE OR TRAY TO CATCH SPILLS

WHAT TO DO:
1. FILL THE TEST TUBE 1/2 FULL WITH OIL
2. ADD SOME WATER TO THE TEST TUBE. LOOK HOW THE OIL SITS ON TOP OF THE WATER!
3. Add more warm water until the test tube is almost full.
4. Now drop a blue color tablet into the test tube. Tubular! Look at the color bubble like a ocean wave in the oil. Wait for all the bubbles to fizz out.
5. Screw on the cap of the test tube very tightly so that no liquid can come out.
6. Turn the test tube over and over a few times.
7. Rest the test tube on its cap. You just made a test tubular wave lab! Look at the enchanting swirling colors.

So what happened?
- When something is less tightly packed together than something else, it is less dense. Things that are less dense float on top of things that are more dense. Oil is less dense than water, so it floats on top of the water.
- The color tablet is more dense than both oil and water so it sinks to the bottom of the test tube.
- Inside the color tablet is citric acid and baking soda. The citric acid and baking soda react when they hit the water at the bottom of the test tube, making carbon dioxide bubbles that are less dense than the oil and water. These bubbles attach to droplets of colored water and carry them to the top of the test tube. When the carbon dioxide bubbles get to the top, they pop. The colored water droplets sink back down to the bottom, making your bubbling wave in a test tube!

Color Change Lava Eruption

We've mixed a lot of chemicals and had some powerful results. Now let's make an erupting color changing froth!

What you will need from your kit:
- Red cabbage juice powder
- Citric acid
- Baking soda
- Test tube and stand
- Medium scoop
- Small scoop

What you will need to get:
- Water
- Vegetable oil
- Stirring stick
- Plate or tray to catch spills
1. Place two test tubes on the two outside holes of the test tube stand. Put the test tube stand on a piece of paper and mark “cold” in front of one test tube and “hot” in front of the other.
2. Measure one medium scoop of citric acid in each test tube.
3. Put a few small pieces of ice in the “cold” test tube. Fill the rest of the way with cold water and stir until the citric acid dissolves.
4. Have an adult put hot water from the tap in the “hot” test tube. Stir until the citric acid dissolves.
5. Measure one medium scoop of baking soda and add it to the cold water. Think about how much it FIZZED.
6. Now LET US SEE IF THE “hot” test tube WILL FIZZ with more intensity!
7. Add one medium scoop of baking soda to the “hot” test tube. ABRACADABRA! Look at the feverish FIZZ!

**Feverish Fizz**

**Let’s experiment with the speed of chemical reactions.**

**What you will need from your kit:**
- Citric Acid
- Baking Soda
- 2 Test Tubes and a Stand
- Medium Scoop

**What you will need to get:**
- A few ice cubes
- Paper/Pen
- Hot water
- Cold water
- Stirring stick
- Plate or tray to catch spills

1. Add water to the test tube until it is 1/3 full.
2. Add 1 medium scoop of baking soda and stir.
3. Add 1 small scoop of red cabbage juice powder and stir it in.
4. Slowly pour vegetable oil into the test tube until it is almost full.
5. Set the test tube in its stand and get ready for the chemical reaction!
6. Add 1 medium scoop of citric acid. Eureka! Color-changing Lava!

**SO WHAT HAPPENED?**

Why did the citric acid and baking soda FIZZ faster in hot water? The molecules (tiny particles) in water move faster in hot water, which makes the chemical reaction happen faster.
Think about when you leave food out for too long on a sunny day. It begins to spoil, right? To keep food from spoiling, we cool it in a refrigerator. Food spoilage, a chemical reaction, happens faster in hot temperatures than in low temperatures. In the same way, the acid-base chemical reaction happens faster in hot water than in cold water!

**GLOW-IN-THE-DARK BUBBLING CONCOCTION**

**DIM THE LIGHTS AND LET'S MIX UP A GLOW-IN-THE-DARK BUBBLING CONCOCTION!**

**WHAT YOU WILL NEED FROM YOUR KIT:**
- CITRIC ACID
- BAKING SODA
- ZINC SULFIDE
- 2 TEST TUBES AND STAND
- MEDIUM SCOOP

**WHAT YOU WILL NEED TO GET:**
- WATER
- STIRRING STICK
- PLATE OR TRAY TO CATCH SPILLS

**WHAT TO DO:**
1. Fill two clean test tubes 1/3 full with warm water.
2. Add 1 MEDIUM SCOOP full of baking soda to one test tube. Put the cap on and shake gently to mix.
3. Add 1 MEDIUM SCOOP full of citric acid to the second test tube. Put the cap on and shake gently to mix.
4. Remove the cap of the baking soda test tube and carefully pour in half of the zinc sulfide powder. Replace the cap and shake gently to mix.
5. Remove the cap of the citric acid test tube and carefully pour in half of the zinc sulfide powder. Recap and shake gently to mix.
6. Get ready for glowing magic! Turn off the lights or take the test tubes and stand to a darkened room. Look at your test tubes glow!
7. Carefully pour 1/2 of one test tube into the other. VIOLA! A GLOW-IN-THE-DARK BUBBLING CONCOCTION!
WHAT YOU WILL NEED FROM YOUR KIT:
- CITRIC ACID
- BAKING SODA
- RED CABBAGE JUICE POWDER
- CROSS-LINKED POLYACRYLATE COPOLYMER
- 2 TEST TUBES AND CAPS
- TEST TUBE STAND
- MEDIUM PLASTIC SCOOP
- SMALL PLASTIC SCOOP

What you will need to get:
- WATER
- PLATE OR TRAY TO CATCH SPILLS
- PLASTIC CUP
- STIRRING STICK

WHAT TO DO:
1. FILL THE 2 TEST TUBES 3/4 FULL OF WARM WATER, SET THEM IN THE STAND ON A PLATE OR TRAY TO CATCH SPILLS.
2. ADD 1 MEDIUM SCOOP OF BAKING SODA TO THE FIRST TEST TUBE AND STIR IT IN. RINSE AND DRY THE SCOOP. ADD 1 MEDIUM SCOOP OF CITRIC ACID TO THE SECOND TEST TUBE AND STIR IT IN.
3. ADD 1 SMALL SCOOP OF RED CABBAGE POWDER TO EACH TEST TUBE. WATCH WHAT HAPPENS AS IT TOUCHES THE OTHER CHEMICALS. ONE SHOULD BE RED AND ONE BLUE. NOW MIX THEM IN.
4. SET THE CUP ON THE PLATE OR TRAY. POUR ABOUT 1/3 OF THE RED AND BLUE LIQUID INTO THE CUP TOGETHER, WOW YOU NOW HAVE RED, BLUE AND PURPLE!
5. ADD 2 MEDIUM SCOOPS OF POLYACRYLATE COPOLYMER CRYSTALS TO EACH OF THE TEST TUBES. WHAT DO YOU THINK MIGHT HAPPEN? WAIT AND FIND OUT!
6. AFTER ABOUT 2 HOURS, POUR OFF ANY EXTRA LIQUID THAT THE CRYSTALS DIDN’T ABSORB. GO AHEAD AND TOUCH YOUR NEW COLORFUL SOFT CRYSTALS. THEY SQUISH, THEY SQUIRM, THESE ARE SOME JIGGLY CRYSTALS.
WHAT YOU WILL NEED FROM YOUR KIT:
- 2 TEST TUBES AND CAPS
- CROSS-LINKED POLYACRYLATE COPOLYMER
- CITRIC ACID
- BAKING SODA
- RED CABBAGE JUICE POWDER
- TEST TUBE STAND
- MEDIUM PLASTIC SCOOP
- SMALL SCOOP

WHAT YOU WILL NEED TO GET:
- WATER
- PLATE OR TRAY TO CATCH SPILLS
- PLASTIC CUP
- STIRRING SPOON

WHAT TO DO:
1. FILL THE 2 TEST TUBES 3/4 FULL OF WARM WATER, SET THEM IN THE STAND ON A PLATE OR TRAY TO CATCH SPILLS.
2. ADD 1 MEDIUM SCOOP OF BAKING SODA TO THE FIRST TEST TUBE AND STIR IT IN. ADD 2 SMALL SCOOPS OF RED CABBAGE POWDER TO THE SAME TEST TUBE AND STIR IT IN. IT WILL BECOME DARK BLUE.
3. ADD 1 MEDIUM SCOOP OF CITRIC ACID TO THE SECOND TEST TUBE AND STIR IT IN. NOW ADD 2 SMALL SCOOPS OF RED CABBAGE POWDER TO THE SAME TEST TUBE AND STIR IT IN. IT WILL BECOME RED.
4. ADD 3 MEDIUM SCOOPS OF POLYACRYLATE COPOLYMER CRYSTALS TO THE BLUE TEST TUBE AND 4 MEDIUM SCOOPS OF POLYACRYLATE COPOLYMER CRYSTALS TO THE RED TEST TUBE.
5. WAIT AN HOUR OR TWO FOR THE CRYSTALS TO SOAK UP THE LIQUID. POUR OFF ANY LIQUID THAT DIDN’T ABSORB.
6. NOW EMPTY OUT HALF THE BLUE CRYSTALS INTO A CUP AND FILL THE TEST TUBE UP WITH RED CRYSTALS. PACK IT TIGHT WITH CRYSTALS AND SCREW ON THE CAP AND PLACE IT IN THE STAND. TAKE THE BLUE CRYSTALS IN THE CUP AND PACK THEM INTO THE RED TEST TUBE, CAP IT TIGHT AND PLACE IT ON THE STAND.
7. AFTER SEVERAL HOURS (OR OVERNIGHT), LOOK AT THE TEST TUBES ON THE STAND. HOW DID THE PURPLE CRYSTALS GET IN THERE? NOW THERE IS A SMOOTH BLEND OF COLOR, FROM BLUE TO PURPLE TO PINK. IT’S LIKE OMBRE IN A TEST TUBE!
SO WHAT HAPPENED?
The red jiggly crystals contain an acidic solution. The blue jiggly crystals contain a base solution. When the two different crystals bump up against each other, the solutions begin to mix. Remember what happens when the red acidic solution mixes with a blue base solution? That’s right, the acid and the base react with each other and it turns purple. You saw this happen in earlier activities.

GIAN T JIGGLY CRYSTALS

THESE GROWING JIGGLY CRYSTALS ARE PRETTY COOL, BUT LET’S SEE HOW BIG THEY CAN REALLY GET!

WHAT YOU WILL NEED FROM YOUR KIT:
- CROSS-LINKED POLYACRYLATE COPOLYMER
- MEDIUM SCOOP
- TEST TUBE
- TEST TUBE STAND

WHAT YOU WILL NEED TO GET:
- WARM WATER
- PLATE OR TRAY TO CATCH SPILLS
- PLASTIC CUP

1. MEASURE 1 MEDIUM SCOOP OF CROSS-LINKED POLYACRYLATE COPOLYMER CRYSTALS AND ADD IT TO THE TEST TUBE IN THE STAND.
2. FILL THE PLASTIC CUP WITH WARM WATER. USE THE MEDIUM SCOOP TO ADD 5 ML OF WATER TO THE TEST TUBE (ABOUT 4 MEDIUM SCOOPS OF WATER)
3. WHAT DO YOU THINK WILL HAPPEN TO THE CRYSTALS? WAIT 15 MINUTES AND FIND OUT.
4. NOW USE THE MEDIUM SCOOP TO ADD 5 MORE MILLILITERS OF WATER. WAIT ANOTHER 15 MINUTES TO SEE WHAT HAPPENS. IF AFTER 15 MINUTES THE CRYSTALS HAVE SOAKED UP MOST OF THE WATER, YOU CAN CAREFULLY POUR OUT THE REMAINING DRIPS, BUT DON’T LET THE GIANT JIGGLY CRYSTALS SLIDE OUT OF THE TEST TUBE! YOU’RE NOT FINISHED WITH THEM YET.
5. KEEP ADDING MORE WATER IN 5 ML INCREMENTS UNTIL THE CRYSTALS HAVE SOAKED UP SO MUCH WATER THEY’RE OVERFLOWING! THOSE CRYSTALS ARE HUGE! TAKE THEM OUT AND PLAY WITH THEM. WHAT DO THEY FEEL LIKE? DO THEY BOUNCE? CAN THEY BREAK?