

Discovery Series

2020-2021 Season

Celebrating
30 years
of
Wonder!

DAYTON
LIVE

EDUCATION

WHEN

SCIENCE

GOES

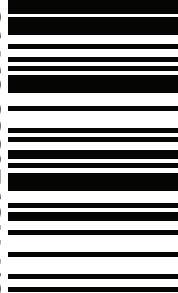
VIRAL

FULL STEAM AHEAD LIVE VOL. 3



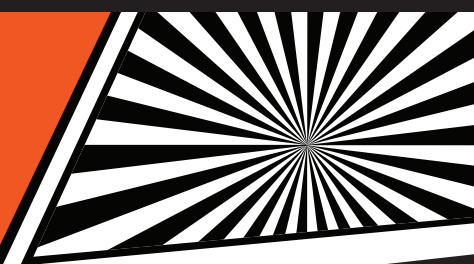
2021 RESOURCE GUIDE

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WHEN SCIENCE GOES VIRAL



ABOUT THE SHOW

Join Mister C in his at-home lab for another amazing day of fun learning as he attempts the world's coolest experiments! Mister C brings his regional Emmy-nominated television show, **Full STEAM Ahead**, to life with hair-raising experiments, toe-tapping music, and media that captures the imagination of students & parents!

Full STEAM Ahead Live Vol. 3 - When Science Goes Viral is an action packed adventure that inspires students' curiosity to explore science found in our everyday lives! Are you ready to take the #SuperSTEAMchallenge & make the ordinary extraordinary? Mister C is!

WHO IS MISTER C?

Mister C is not your ordinary educator! As an 19 year education veteran, he has spent time as a classroom teacher, principal, curriculum specialist & district administrator. His specialty is inspire and engage learners of all ages using video, music & live presentations.

Mister C is the Emmy Award-winning producer for the program **Speakers & Beakers** & is also a 2-time Emmy-nominated producer and host for **Full STEAM Ahead**, which airs on PBS Stations across the US.

Mister C can also be found on his YouTube channel, LearningScienceisFun. Millions of learners have had the opportunity to enjoy learning to a different beat with silly songs, exciting experiments & dazzling demonstrations.

Whether online, on-air or live on-stage, Mister C's high-energy and infectious positive attitude will have you out of your seats, having fun learning together!



TEACHER FOCUSED

Activities designed to kickstart critical thinking and minds-on learning.



STUDENT-DRIVEN

Fun activities to introduce students to STEAM Learning.



EDUCATOR CREATED

Mister C created these learning experiences to foster critical thinking and a love for learning.

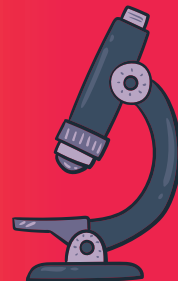
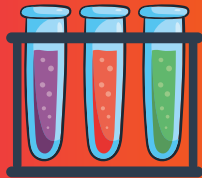


SHARE YOUR LEARNING

Snap a photo and share it online. Use #MisterCFullSTEAMAhead



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PRE-SHOW CONVERSATION STARTERS

1. Why are models and prototypes so important for scientists and researchers?
2. Why is it important for a scientist to take good notes and maintain records of their work?
3. Explain the importance of failure? Why could it be good for a scientist to fail and make mistakes?



VOCABULARY

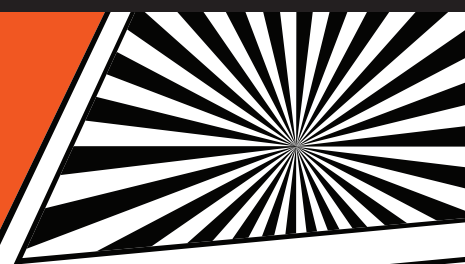
Chemical Reactions - A chemical change happens when one chemical substance is transformed into one or more different substances. The resulting substances have different properties because their atoms and molecules are arranged differently.

Physical Reactions - Physical changes are changes affecting the form of a chemical substance, but not its chemical composition.

Optical Illusions - An optical illusion (often also called a visual illusion) is an illusion caused by the eyes and brain being tricked by what is being seen.

LAB SAFETY

- Anytime you're doing science, it's important to remember Science Safety.
- Report all accidents, injuries, & breakage of glass or equipment to your instructor immediately.
- Keep pathways clear by placing extra items (books, bags, etc.) on the shelves or under the work tables to avoid people tripping and falling or spilling materials.
- Long hair (chin-length or longer) must be tied back to avoid catching fire or dipping in chemicals.
- Leave your work-station clean & in good order before leaving the laboratory.
- Learn the location of the fire extinguisher, eye wash station, first aid kit, and safety shower.
- Walk calmly in the lab without running to avoid bumping into materials or one another.



Powered by the

ENGINEERING DESIGN PROCESS

**THE ENGINEERING
DESIGN PROCESS (EDP)**
is a flexible process that
can include many variations.

What makes the EDP unique
is that engineers AND students
can begin anywhere in the
process because the EDP is
a cycle without a start and end point.

DILEMMA:

What is the identified problem? Have
others approached it? How? What are
your constraints?

ASK QUESTIONS:

What could be possible solution? Brainstorm ideas
individually or with your team. Select one of your ideas.

MAKE A PLAN:

Draw your design and determine what materials will be
needed to build your design.

CREATE & DESIGN:

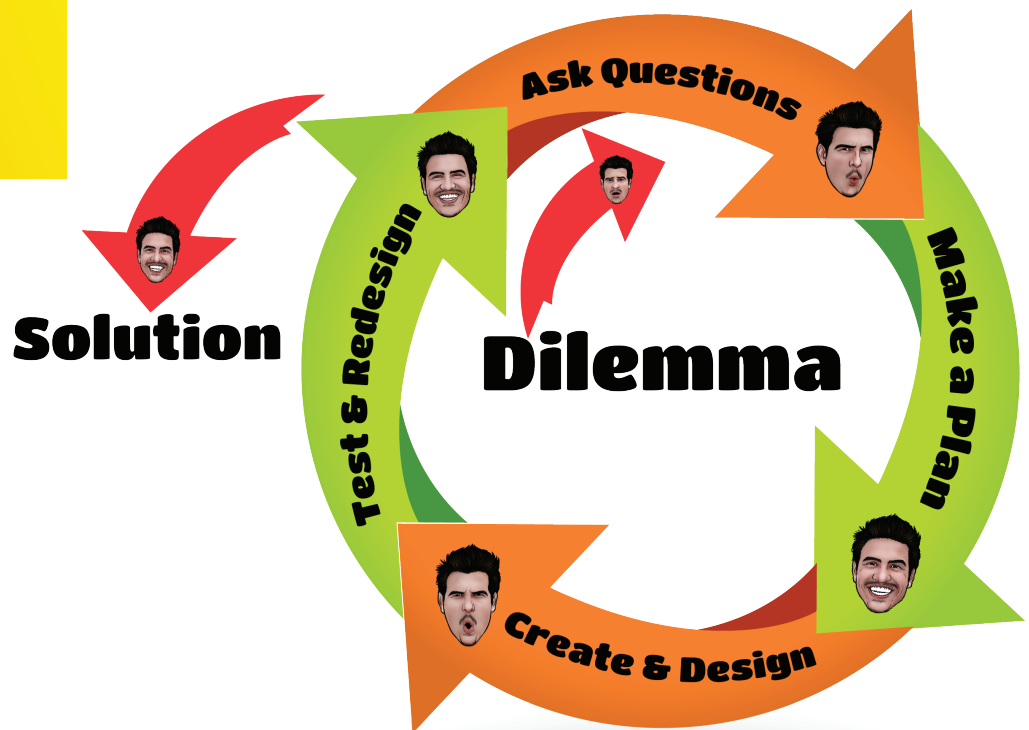
Work to make your plan come to life.

TEST & REDESIGN:

What works? What doesn't? How can you improve your design.
Make adjustments to your design and make it better.
Then test it again.

FIND A SOLUTION:

Test, redesign and continue planning if needed until you find a solution.



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FOR MORE SCIENCE FUN!

DIY Elephant Toothpaste



FUN FACT

Seaweed is in our toothpaste! Seaweed acts as a thickening agent that allows toothpaste to be squeezed from its tube!

MATERIALS

- Yeast
- Dish soap
- Measuring spoons
- Empty plastic bottle
- Cup with warm water
- 3% Hydrogen peroxide

DIFFICULTY



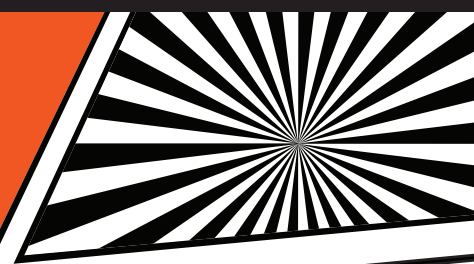
CHEMICAL REACTIONS

Chemical reactions take place when the molecular or ionic structure of a substance is rearranged. When a chemical reaction occurs, a new substance is created and the process is irreversible. Today you'll make elephant toothpaste with a parent!

Why are chemists great at solving problems?

*Answer on the next page

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DIY Elephant Toothpaste

EXPERIMENT

Step 1: Gather materials.

Step 2: Place 2 tablespoons of yeast into 3 oz of warm water.

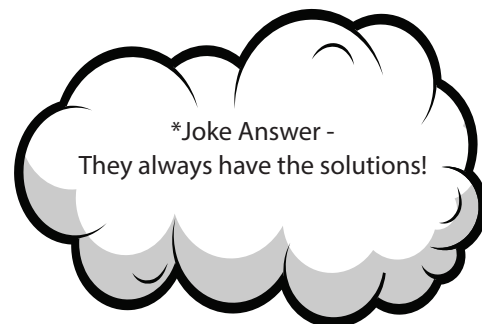
Step 3: Mix yeast and warm water, let stand until it gets frothy (about 3 minutes).

Step 4: Pour 4 ounces of hydrogen peroxide into an empty bottle.

Step 5: Squirt 1 tablespoon of dish soap into the hydrogen peroxide.

Step 6: Pour your yeast mixture into the bottle.

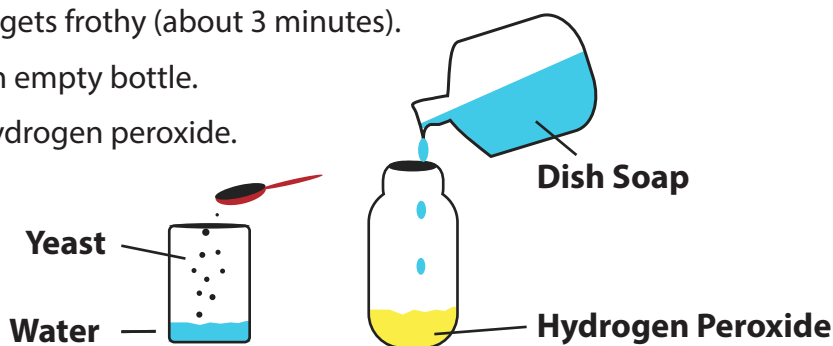
Step 7: Observe what happens!



*Joke Answer -
They always have the solutions!

WHY IT WORKS

"Elephant toothpaste" is created when a chemical reaction takes place and releases one oxygen atom from the hydrogen peroxide (H_2O_2). Hydrogen peroxide decomposes, or breaks down, into water (H_2O) and oxygen (O_2) naturally over time, but the yeast causes this to occur faster. The yeast has an enzyme in it called catalase. Catalase is a catalyst, something that increases the speed of the reaction. The catalyst is what causes the oxygen to be released quickly to create our "elephant toothpaste." So why did we add soap? We wanted to capture all of the released oxygen (gas) from the chemical reaction!



EXTEND YOUR LEARNING

- Would the experiment still work if you added more yeast?
- What happens if you don't add the soap?
- Does the shape or the size of the bottle change how the elephant toothpaste flows?

WORKFORCE CONNECTION

Cosmotogists, people who study the application of beauty treatments, work carefully with chemical reactions on a daily basis to help color people's hair. When someone's hair is bleached, a chemical reaction takes place to change the melanin from brown to a colorless (pale yellow) color. This irreversible process (chemical change) then allows the cosmotogist to apply a new color to the hair.

DIY Super Slime



FUN FACT

Slime was first sold as a toy in 1976. Slime behaves like both a liquid and a solid and is considered a non-newtonian fluid.

MATERIALS

- Glue
- Contact Solution
- Baking Soda
- Measuring spoons

DIFFICULTY



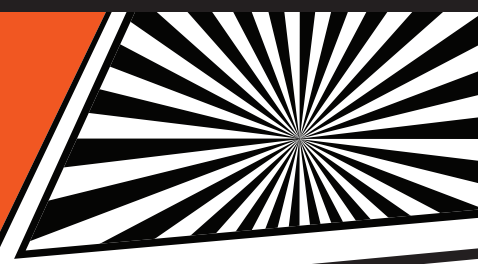
POLYMERS

Polymers are materials made of long, repeating chains of molecules. Some polymers like rubber and polyester bend and stretch, while others can be hard and tough. Have fun exploring polymers and creating your very own slime at the same time!

Why does slime make people so happy?

*Answer on the next page

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DIY Super Slime

EXPERIMENT

Step 1: Gather your materials.

Step 2: Carefully pour 8 ounces of glue into the large bowl.

Step 3: Add .5 tablespoon of baking soda to thicken the glue.

Step 4: If you want to have colorful slime, add food coloring to the mixture.

Step 5: Add 1.5 tablespoons of contact solution and stir.

Step 6: Mix until a slime consistency is formed. This may take a few moments. If you need to, add more contact solution to firm up your slime faster.



1 cup

+



.5 Tablespoons

+



1.5 Tablespoons

Slime



*Joke Answer -

Because there's a S-M-I-L-E mixed in with every S-L-I-M-E!

WHY IT WORKS

You are witnessing a chemical reaction right before your eyes during this experiment. The glue is a polymer and the Borax in the contact solution acts like a missing link which traps the water and causes the polymer to connect chemically. In a chemical change, something new is formed and the chemical make up is different. Although you can't see the molecules bonding and breaking, you can usually see the evidence of a chemical reaction. In this case, you will notice that the texture and properties of the water, glue and Borax have changed.

EXTEND YOUR LEARNING

- What would happen if you doubled the amount of contact solution in the recipe?
- Does clear glue, or colored glue, behave the same way?
- How does the slime behave when it's chilled in the freezer? What about if you warm it?
- Research other ways to make slime? Can you develop the perfect slime recipe?
- Experiment mixing colors to create some beautiful or disgusting slime. What other things can you add? Glitter?

WORKFORCE CONNECTION

A chemical engineer can produce many different materials from fuels and fertilizers to processed foods, polymers and medicine. They may also help design chemical process equipment and factories. There are many branches of chemical engineers to choose from. Some examples include petroleum, environmental and combustion chemical engineers.

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