



Let's Do Chemistry **Event Overview and Training**

Overview

- *Let's Do Chemistry* kit and project
- Content and learning goals
- Event overview and safety
- Leading the activities

NISE NATIONAL INFORMAL
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Gum & Chocolate





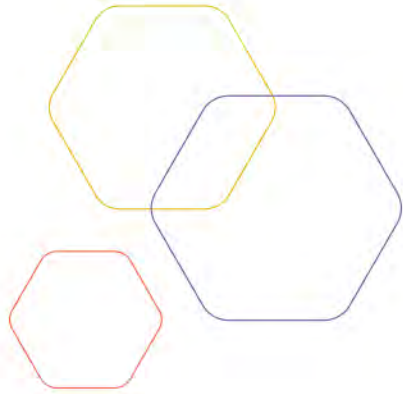
EXPLORE SCIENCE

Let's Do Chemistry

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ACS
Chemistry for Life®



Content and Learning Goals

What is Chemistry?



Chemistry

Chemists are scientists that study

- The elements that make up everything in this world
- the way different materials behave and change
- how materials interact with each other and combine to make new things

Chemistry can help us understand the world around us and solve problems.

Learning Goals

Develop **positive attitudes** toward learning chemistry

- **Interest:** “Chemistry is interesting!”
- **Relevance:** “Chemistry is connected to my life!”
- **Self-efficacy:** “I can learn chemistry!”

Interest
“Chemistry is
interesting!”



Relevance
“Chemistry is
connected to my life!”



Self-efficacy

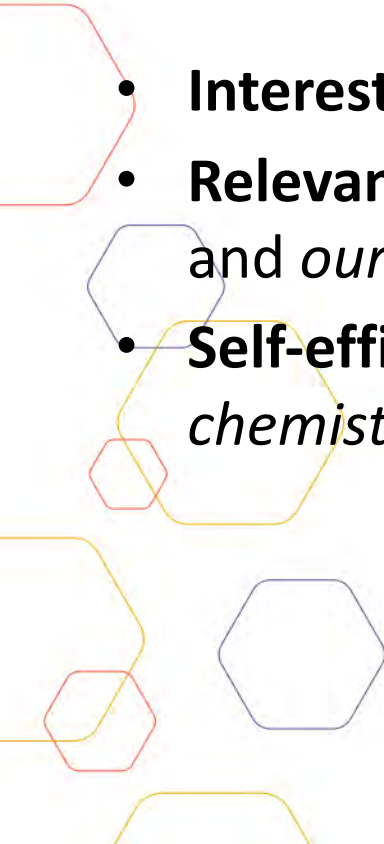
“I can learn chemistry!”





Lifelong Learning

Positive attitudes about chemistry start here and will continue at other times and places:

- 
- **Interest** starts *now* but can carry into the *future*.
 - **Relevance** starts *here* but can connect to *home, school, work, and our community*.
 - **Self-efficacy** starts with specific *activities* but can extend to *chemistry* more generally.

Atoms to Atoms

Smelling

Every time we take a sniff, we're using chemistry! Scent receptors in our own noses react to the shape of different molecules and send a signal to our brain. Most smells are a combination of many different molecules.



Exploring Space

Rockets use specially designed solid or liquid fuels to create chemical reactions that release energy. The powerful energy bursts help speed the rocket away from Earth.



Fun

Enjoyable
Amusing
Pleasing

Enjoyable
Amusing
Pleasing

Fun

Let's Do Chemistry!

More about...

Fun

Confidence

Excitement

Concrete connections

Exploring together

Offering guidance

Asking questions

But it's still **all about chemistry!** And you have an important role as a guide.

Less about...

Facts

Comprehensive knowledge

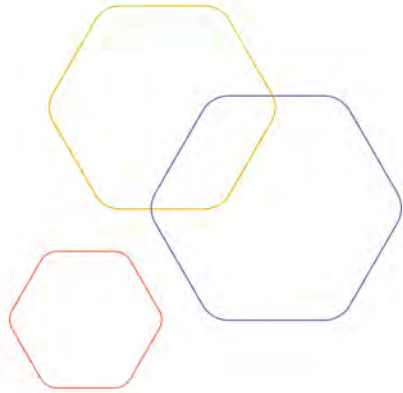
Equations

Abstract ideas

Explaining to someone

Showing the right way

Providing answers



Event Overview and Safety

Event Overview

- Background
- Who's here
- Orientation
- Policies
- Schedule
- Future events and dates

Safety

Event safety might include...

...lost child protocol

...fire alarm protocol and knowing the nearest exit

...other ideas?



Safety

Safe practices might include...

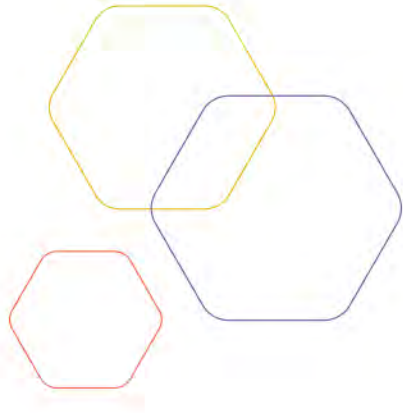
...labels and SDS for all materials

....goggles or gloves (PPE)

...keeping chemistry materials away from mouth, eyes, skin

...disposing of materials properly





Leading the Activities

Activity Materials



LET'S DO CHEMISTRY

Nature of Dye



LET'S DO CHEMISTRY Nature of Dye Facilitator Guide

ACTIVITY LEARNING GOALS

Learners will develop positive attitudes toward learning.

- Learners will increase their feelings of interest in exploration and observations of phenomena.
- Learners will increase their understanding of the applications and uses of chemistry and science.
- Learners will increase their sense of self-efficacy in interaction with real tools and materials.

Learners will explore chemistry concepts, tools, and materials.

- Chemists use tools to discover and make new materials.
- People shape the development and use of new materials.

FACILITATION STRATEGIES

Try to encourage interest and self-efficacy through tools and materials. Ask participants to predict, observe, and experiment with the dye. What was their favorite color?

You can help make connections (relevance) by asking responses. Ask participants to predict, observe, and with the dye. Discuss with visitors what they know about dyes and foods, and what they think about labeling materials more about where the color comes from. Ask if the colors they might be wearing.

MATERIALS

- Cochineal bugs (dried)
- Soda ash (sodium carbonate) solution
- Vinegar solution

LET'S DO CHEMISTRY

Nature of Dye

Prepare a dye

Place two pieces of cochineal bug parts into the mortar. Crush the bug into a fine powder using the pestle. What does it look like?

Use the water dropper bottle to add three or four drops to the mortar and mix the solution using the pestle. How does it change?

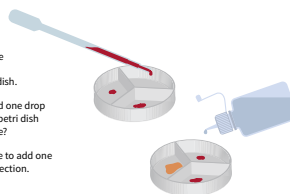


Change the color

Use the pipette at your station to transfer one drop of your bug mixture (cochineal dye) from the mortar dish into each section of the 3-part petri dish.

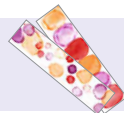
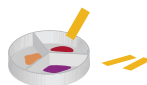
Use the vinegar dropper bottle to add one drop onto the cochineal dye in one of the petri dish sections. What changes do you notice?

Now, use the soda ash dropper bottle to add one drop onto a different cochineal dye section. What changes do you notice here?



Test and experiment

Test the differences in the three dyes using strips of pH paper. How do the different dyes compare? Experiment by mixing the three dyes. You can retest the pH of your new mixture.



Let's keep exploring! Make a cochineal bookmark to take home! Dip a strip of watercolor paper into your dye samples to transfer the color. Or try using the pipette to add colors to the paper. How many shades of reds, oranges, and purples can you make?

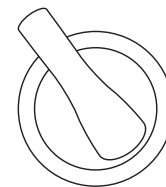


What makes me red?



What makes me orange?

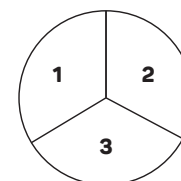
How many colors can you make?



Mortar & Pestle



Pipette



Petri Dish



Chem-Attitudes with Dr. Braxton Hazleby



What's in the box? Improv Game

1. Everyone find a buddy.
2. Person A walks up to person B holding a mimed box.
3. Person B steps forward and asks... "What's in the box?"
4. Person B opens the box and defines the content, with whatever they imagine.
5. Person A gives a specific reason for giving the gift to Person B. The reason should explain how the gift meets one of their partner's needs.
6. *Person B* accepts the reason given by their partner and adds information to help support it.



What's in the box? Debrief

Debrief questions

1. How did you know what was in the box? What did you do to figure out what was inside?
2. Who thought that the object in the box was something different than what their partner said?
3. How would you describe your experience in this exercise? What helped us be successful?
4. What techniques did you use to come up with a specific reason that the gifts were great?
5. How could you apply these techniques to engaging with participants? What is a specific example from your experience?



Tips for Leading Hands-On Chemistry Activities

INVITE PARTICIPATION

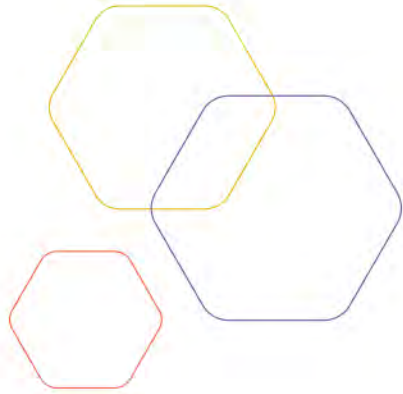
- Greet participants
- Have fun!

SUPPORT EXPLORATION

- Ask guiding questions & listen
- Offer positive feedback

DEEPEN UNDERSTANDING

- Make connections
- Share what you know & acknowledge what you don't



Questions?

A decorative pattern of overlapping hexagons in red, yellow, and blue outlines is located on the left side of the slide.

Thank You!



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