

LET'S DO CHEMISTRY

Gum and Chocolate Training Guide

TRAINING LEARNING GOALS

By doing and debriefing this activity learners will develop positive attitudes toward learning about chemistry and cultivate strategies for supporting interest, relevance, and self-efficacy when leading the *Let's Do Chemistry* kit activities with participants.

- Learners will increase their feelings of **interest** in chemistry through hands-on exploration of chemistry concepts and by making connections to everyday life.
- Learners will increase their understanding of the **relevance** of chemistry by exploring the applications of chemistry and by exploring connections to everyday life.
- Learners will increase their sense of **self-efficacy** related to chemistry through simple and easy to understand hands-on interaction and experimentation.

Learners will explore chemistry concepts, tools, and practices:

- Chemists study how different materials behave and change, and how materials interact with each other.

MATERIALS

- Hand sanitizer
- Chewing gum (Orbit regular gum)
- Hershey's Kisses chocolates
- Tissues
- Trash bag
- Allergy sign
- Extra paper towels (optional)

SAFETY

Always follow and model prudent practices when doing chemistry activities.

Think about:

- What **hazards** exist and what associated risks may arise from these hazards?
- How to minimize **risks** through protocols we have designed into the activities and training materials.
- How **safe practices and protocols** should best be communicated with facilitators, participants, and others.

At the start of the activity, ask if everyone is able to chew gum and chocolate. Some people may have allergies or other health/safety concerns with this activity. If a learner or trainee is not able to participate in the activity, you can have them record observations throughout each stage of the activity.

If doing this activity with a public audience, you'll want to clearly display the allergy sign, and also be aware that both of these candies pose a choking risk for children under 3. Additionally, many caregivers may not want young children to consume gum or chocolate. Get verbal adult permission before doing this activity.

Your institution may have special rules or protocols for chemistry related activities, or activities that involve edible components, so check with your facilities staff, safety committee, and/or others. Learn more about safe practices in the *Let's Do Chemistry: Safety Guide* included in the physical kit and with the online digital kit resources.

FACILITATION NOTES

This activity is formatted as a professional training activity for the *Let's Do Chemistry* event training. As the facilitator leading the training you can help model key strategies to that cultivate interest, relevance, and feelings of self-efficacy with participants.

This hands-on activity allows learners to explore chemistry phenomena and experiment with real materials. Lead the activity with participants, and focus on ways that their experience highlights opportunities for increased interest, relevance, and self-efficacy.

Try This!

- Gather 4–8 players together.
- Deal a hand of yellow word cards to every player. Players should all receive the same number of cards. The exact number depends on the size of the group. Try to give everyone at least 3 word cards.
- First, everyone gets a tissue, a piece of gum, and a chocolate.
- Unwrap the gum and make some observations. What does it look, smell, and feel like? *Have participants share a few observations.*
- Now pop the gum in your mouth and chew. Keep the wrapper. How has the gum changed? *Have participants share a few observations.*
- Spit the gum out onto the wrapper and observe any new properties. How has the gum changed as you chewed it? *Have participants share a few observations.*
- Put the gum back in your mouth.
- Next, unwrap the chocolate and make some observations. What does it look, smell, and feel like? *Have participants share a few observations.*
- Put the chocolate in your mouth and to chew it. Chew it right on top of the gum, and really mix it up in your mouth! Try not to swallow any chocolate. What do you notice about the properties of the gum now? *Have participants share a few observations.*
- Spit everything into the tissue. Look at, and even touch the new mixture. What properties have changed? Is it still sticky? *Have participants share a few observations about the gum and chocolate mixture with their fellow facilitators. Did anyone hear anything surprising? What's the mood like in the room?*
- Throw all the gum and chocolate away in the trash and pass around hand sanitizer.

You're doing chemistry in your mouth! You are experiencing a phenomenon chemists sometime describe as "like dissolves like." In this case, gum and chocolate have something chemically in common: they are both oil-based. Can you think of any other instances when you have seen or experienced the "like dissolves like" phenomenon? For example, salt or sugar can be dissolved in water, coffee, and tea. But oil cannot be dissolved in water. This phenomenon has some useful applications, too. For example, we use oil-based stain removers to dissolve oily stains.

Debrief Discussion

Encourage the facilitator trainees to think about how you led and facilitated this experience and the ways that you modeled supporting interest, relevance, and self-efficacy.

Interest is supported in this activity through hands-on interaction and observation of real phenomena. It is further supported by asking questions and encouraging participants to share and talk about their observations. Hands-on interaction and opportunities to explore phenomena are primary methods of supporting visitors interest in chemistry. These methods can be applied to many of the other activities.

Relevance is supported by discussing ways we might all be familiar with the concept of “like dissolves like” in everyday life. Connections to everyday life is a key method for supporting relevance in many of the other activities. Other methods include making connections to applications of chemistry and sharing chemistry concepts.

Self-efficacy is supported by the inherent simplicity of this activity. The activity design is quick and direct, and participants can experiment and do the chemistry themselves. Using simple materials and encouraging participants to keep experimenting are key methods that will be helpful to support self-efficacy in many of the other *Let's Do Chemistry* event activities.

PUBLIC AUDEINCES

This activity can easily be done with public audiences. The overall structure stays the same, but there are a few important things to keep in mind. Visitors will often join in the middle of the activity. Be prepared to quickly catch them up. The challenge here is that the “wow” portion of this activity can be diminished if a visitor already knows what is going to happen. This can happen with many activities, and it's easier to handle multiple entries with some than with others.

This activity can be very challenging for younger audiences. As mentioned in the safety section above, you'll need t to clearly display the allergy sign, and also be aware that both the gum and chocolate pose a **choking risk** to children 3 and under. Many caregivers may not want young children to consume gum or chocolate. Get verbal adult permission before doing this activity. Every activity guide for the event today will have safety information. Please make sure to review and understand the precautions

An activity training video is available at vimeo.com/channels/nisenet.

CREDITS AND RIGHTS



This activity was adapted by the Science Museum of Minnesota from the the JCE Classroom Activity #105. A Sticky Situation: Chewing Gum and Solubility published by Ingrid Montes-González, Jose A. Cintron-Maldonado, Ilia E. Pérez-Medina, Verónica Montes-Berríos, and Saurie N. Román-López, *Journal of Chemical Education* 2010 87 (4), 396-397 DOI: 10.1021/ed800135j. It was adapted as a training activity by Sciencenter for the NISE Network. Copyright 2018, Sciencenter, Ithaca, NY. Published under a Creative Commons Attribution-Noncommercial-ShareAlike license: <http://creativecommons.org/licenses/by-nc-sa/3.0/us/>



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