

Professional Development Situation: Training

Skill Focus: Modeling Science Practices

Time Required: 70 minutes

INQUIRY

Participants will conduct the Wonderwise Nutty Investigation to learn how to support youth to engage in science practices.

Agenda

Welcome - 5 minutes

Introduction - 10 minutes

Hands-on Learning and Practice - 40 minutes

- [Wonderwise Nutty Investigation](#)

Conclusion - 15 minutes

- [Science & Engineering Practices](#)

Materials

- Flip chart paper and markers
- Pens for participants
- Nametags
- One copy of [Science & Engineering Practices](#) for each participant
- Materials for [Wonderwise Nutty Investigation](#)
 - Assortment of nuts in the shell¹
 - Tin cans
 - Paper
 - Collection of coins, dried beans, or rocks to use as weights

¹ Be very cautious of allergies when using this activity. Do not use peanuts. Alternate foods include grapes and sunflower/pumpkin seeds. Contact participants to discuss food allergies.

Before the Session

- Read this training guide to become familiar with the content and allow time to personalize the activities to best suit your presentation style.
 - *Italics indicate text that can be read aloud or emailed to participants.*
- Send reminder email about the training. Determine if any participants require accommodations (sight; hearing; etc.).
 - *The next professional development session is scheduled for DATE at TIME and LOCATION. We will focus on “Modeling Science Practices”. To prepare for the session, find a clean, empty food can (like a vegetable or soup can) to bring with you. Please feel free to contact me with your questions or concerns at CONTACT INFORMATION. **Please let me know if you have an allergy to tree nuts.***
- Gather all materials needed for the training.
- Develop a list of possible questions participants might have during the training. Create potential responses to be explored through informal conversation. Review any key terms or ideas that may be unclear.
- On the day of the training, post two sheets of chart paper with the titles “Science Practices” and “Nut Cracking Table” with the names of the nuts you have available for testing and space for each team to record their results.

Nut Cracking Table

Nut name	Total Weight to Crack Each Nut				
Almond					
Brazil Nut					
Hazelnut					
Walnut					

Training Outline

Welcome (5 min)

- Greet participants as they arrive. Make sure everyone feels welcome and comfortable. Pass out nametags.
- Introduce yourself and the focus of the session: “Modeling Science Practices”.
- Ensure participants are aware of the locations of restrooms facilities, refreshments, etc.

Introduction (10 min)

- Group participants into teams of four.
- Have participants introduce themselves to each other.
 - *I want you to introduce yourselves and say in your own words what skills you think all scientists have to have.*
 - *What practices do scientists regularly engage in? (building explanations, designing investigations, recording information)*
- Bring the group back together and create a list of science practices on the chart paper “Science Practices” posted where everyone can see it.

Hands-on Learning (40 min)

- For this portion of the training you will follow this curriculum: [Wonderwise Nutty Investigation](#).
 - *In this activity from the University of Nebraska State Museum, you will investigate the properties of different types of nuts. Although the activity is written to be step-by-step, I encourage you to think of your own investigations you could do related to the strength of nuts’ shells.*
 - *Does anyone have an allergy or sensitivity to tree nuts?*
- As you go through the activity with your group, **write down any questions** that come to mind as you explore the hardness of nuts. Possible questions might include:
 - How can you use these materials to investigate the nuts?
 - Why are nuts so varied in their hardness?
 - What makes some nuts so difficult to open?
 - Do nuts that are difficult to open have more fat inside?
- Facilitate the group following the [Wonderwise Nutty Investigation](#) activity.
 - Part One: Nutty test (30 minutes – this is much shorter than in the activity)
 - Encourage each group to test 2-3 nuts and share their information on the table (be sure at least one group tests each type of nut). This way everyone can learn from each other if they do not have time to test each nut.
 - Part Two: Fat testing (5-10 minutes – this is much shorter than in the activity)
 - Have groups create their own data table on a piece of blank paper.

Conclusion (15 min)

- Bring the group back together to discuss the scientific practices they engaged in during their investigation of nuts' hardness. Refer to the list of science practices that they mentioned earlier in the session.
 - *As you built your nutcracker, which scientific practices did you engage in? (put a check mark next to the ones mentioned i.e. gathering data, generating explanations.)*
 - *Are there more practices you used that we could add to the list? (Add an additional sheet of chart paper if needed.)*
- Pass out the [Science & Engineering Practices](#) handout. Ask participants to read it and then ask them again
 - *Are any of these on this list a surprise to you?*
 - *Should we add more practices to our list?*
- Discuss how children are natural scientists.
 - *We can think of scientific process or inquiry as a way of "finding out." It answers our questions and sometimes creates more questions. Children are born knowing the scientific process. It's how they learn and how they order the information in their universe. It is important to give them opportunities to play with science and to find the answers to their questions.*
- Brainstorm – *What other activities could you do in your program to help youth engage in scientific practices?*
 - Keep notes on this brainstorming process to send to the group in a follow-up email.

After the Session

- From charts you created and brainstorming notes, compile a list of science practices to share back with the group and the list of activities brainstormed by the group. Share these lists in your follow-up email to participants.
- Within 2-3 weeks of the training, email participants
 - *Thank you for your participation in the recent "Modeling Science Practices" training. I hope you found it useful. Attached are some strategies the group discussed during training along with the [Science & Engineering Practices](#) handout. Consider meeting with a co-worker, supervisor, or friend to share what you learned. I look forward to continuing our learning at the next session on SKILL/FOCUS on DATE at TIME at LOCATION. Please let me know if you have any questions. I can be reached at CONTACT INFO.*

Want to Earn Credit? Click2Science has teamed up with Better Kid Care to provide continuing education units. Check it out at: <http://www.click2sciencepd.org/web-lessons/about>

Science & Engineering Practices

From the Framework for K-12 Science Education

As part of scientific inquiry, youth will regularly engage in:

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

Note: These practices are not meant to stand alone, but to be used in conjunction with science content and crosscutting concepts. They should also be driven by youths' interests and developing identities. Read more at www.nextgenscience.org

National Research Council. (2012). [A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas](#). Washington, D.C: The National Academies Press.