

## Cookie Excavation

### Summary

Students attempt to excavate items from cookies and relate their experiences to the effects of varying soils and types of materials paleontologists and archeologists encounter.

### Objectives

- Nevada Science Standards
  - Content Standard N.2.A: Students understand that science is an active process of systematically examining the natural world.
    - N.2.A.1: Students know how to make observations and give descriptions using words, sentences, numbers, and drawings.
    - N.2.A.2: Students know tools and instruments can be used safely to gather data and extend the senses.
  - Content Standard E.2.C: Students understand that Earth materials include rocks, soils, and water.
    - E.2.C.1: Students know Earth is composed of different kinds of materials (e.g. rocks, soils, and water).
    - E.2.C.2: Students know rocks come in many sizes and shapes, with various textures and colors.
    - E.2.C.3: Students know soils have different colors and textures.
- Nevada Social Studies Standards
  - Content Standard H1.0: Students understand the development, characteristics, and interaction of people, cultures, societies, religion, and ideas.
    - H1.2.2: Use artifacts to understand how people lived their daily lives.
    - H1.2.7: Examine artifacts from around the world for important clues as to how people lived their daily lives.
- Common Core Standards for English Language Arts
  - Speaking and Listening Standards
    - 1: Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups
      - 1.a: Follow agreed-upon rules for discussions (e.g. gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).
      - 1.b: Build on others' talk in conversations by linking their comments to the remarks of others.
      - 1.c: Ask for clarification and further explanation as needed about the topics and texts under discussion.
    - 3: Ask and answer questions about what a speaker says in order to clarify comprehension, gather additional information, or deepen understanding of a topic or issue.
    - 4: Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences.

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- Language Standards
  - 1: Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
    - 1.a: Use collective nouns
    - 1.b: Form and use frequently occurring irregular plural nouns
    - 1.c: Use reflexive pronouns
    - 1.d: Form and use the past tense of frequently occurring irregular verbs
    - 1.e: Use adjectives and adverbs, and choose between them depending on what is to be modified
    - 1.f: Produce, expand, and rearrange complete simple and compound sentences.
  - 6: Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using adjectives and adverbs to describe.

### Materials

- Photos of excavated materials (See On-line Resources)
- Hard Cookies with Chocolate Chips (1 for each student)
- Soft Cookies with Chocolate Chips (1 for each student)
- Hard Cookies with Raisins (1 for each student)
- Soft Cookies with Raisins (1 for each student)
- Toothpicks (enough for each student to have 6 toothpicks)
- Paper towels

### On-Line Resources

- See [www.nevadaplaces.com](http://www.nevadaplaces.com) for historical photographs from Nevada
- See [news.discovery.com/archaeology/](http://news.discovery.com/archaeology/) for international historical photographs

### Introduction

Paleontology and archaeology involve fieldwork and excavation – the digging of fossils and ancient artifacts from the ground. The work is very painstaking and detailed, requiring patience, skill, and the ability to focus in on a small area for a long period of time.

Paleontologists and archaeologists typically use dental tools, like metal picks and scrapers, and brushes for their excavation work. They also use trowels when they are sure there are no small objects in an area that could be damaged. They may work years or even decades excavating a single site. Archaeologists have worked on a single site in Egypt since 1928 and they are still finding new information.

### Lesson Plan

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1. Display enlarged photographs of excavated materials from the local region.
  - a. What were these items used for?
  - b. What would life be like if we still had to rely on these tools or items? How is life different today?
2. Display enlarged photographs of excavated materials from around the world.
  - a. What were these items used for?
  - b. How do they compare with the tools and items found in Nevada?
3. Give each student one of each type of cookie, two paper towels, and six toothpicks.
4. Have the students use the toothpicks to extract the chocolate chips from the hard cookies. If a toothpick breaks, it must be discarded.
5. After 3-5 minutes, stop and find out if any of the students successfully extracted a chocolate chip.
6. As a class discuss:
  - a. What is the condition of the chips extracted? Are they whole or are they broken? Are there bits of cookie still clinging to the chips or are they relatively clean?
  - b. What was it like trying to remove the chips from the cookie?
  - c. Has anyone already used all their toothpicks?
7. Repeat steps 1-4 extracting the chocolate chips and the raisins from the remaining cookies.
8. As a class discuss:
  - a. What was it like extracting chocolate chips from the hard versus the soft cookies? Was one type of cookie easier to extract items from?
  - b. What was it like extracting chocolate chips from cookies compared with extracting raisins? Were the chocolate chips easier to extract or harder?
  - c. Discuss the effects of soils: some soils and sedimentary rocks are firmer and denser, making excavation more difficult. Others may be soft and allow fossils and artifacts to be relatively easily removed.
  - d. Discuss the effects of materials: some items may be relatively smooth and hard, making excavation relatively easy. Others may have large amounts of detail, such as combs or tools. These items may be a bit more difficult and require a bit more effort to excavate.

### Assessment

Students are assessed through the following:

- Participation and contribution to activity
- Participation and contribution to class discussions

### Extensions

Excavating raisins or chocolate chips from a cookie is similar to the work paleontologists do in the field, but working in a classroom is much different from excavating fossils on your hands and knees in the hot sun. To give your students a more realistic feel for paleontological fieldwork, bury some items in a



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school garden or other area where digging is acceptable and have them excavate the items. This time, instead of toothpicks, provide them with screwdrivers and a garden trowel.