

Shoebox Dig

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Archaeologists excavate a new site without knowing exactly what they will find. This simulated dig provides the same experience (although the teacher can provide clues) and offers a manageable, compact, and fun opportunity for older elementary school children to learn archaeological thinking and principles of excavation. It can be modified for middle school. Two other small-scale AIA digs (Layer Cake Archaeology and Transparent Shoebox Dig) allow younger students to see the stratigraphic layers of a site before digging them.

Acknowledgements: This shoebox dig owes a great deal to dozens of archaeologists who have brought archaeology into schools. The lesson attempts to address their interest in teaching budding archaeologists the importance of context. Special thanks to AIA member Craig Lesh.

Overview

To excavate this small dig, older elementary school children excavate in teams, uncover three or four layers of a “dig site” in a shoebox, record their findings, and answer questions that reveal what they learned about digging carefully and recording the location of the artifacts they find. Since archaeologists use the metric system, the teacher may incorporate metrical calculations into the lesson.

Grade Levels

The dig is designed for third graders and older students. To adapt the dig for use by middle school students, the shoe boxes can be modified so that they are not all identical. Each older team is then responsible for an area of the site, and the whole site will not be completely comprehensible until all the teams join forces to discuss and interpret their findings.

Class Time

The project takes the students at least several hours and requires adults to oversee it. It will take more time and require more adult supervision if the teacher allows everyone to rotate through needed roles on the team and gives each student a chance to dig. Cleanup takes between a half hour and an hour, depending on the number of students. Discussion of the dig and follow-up with questions and answers should take another hour.

Goals

Students become archaeologists on a small scale and uncover the stratified layers in a shoebox. The dig teaches basics of archaeology, including identifying stratigraphy, conducting horizontal excavation (rather than digging holes), and keeping records. The teacher can control the number of layers and the complexity of the site and of excavation.

Interdisciplinary goals are to help students:

- practice critical thinking skills applicable across many disciplines.
- understand the importance of context when interpreting data.
- share ideas and build on the work of others.
- distinguish between observations (the discoveries we make) and inferences (the stories we make up).
- imagine multiple interpretations.

Archaeological goals are to:

- introduce principles of stratigraphy and excavation (digging horizontally, excavating one layer at a time).
- illustrate how careless work can affect interpretation, destroy context, and disguise cultural change.
- emphasize that excavation and archaeological research are not treasure hunting but learning about past people.
- teach students to record finds and understand a top plan.

Students experience in a kinesthetic way the fact that excavating an archaeological site destroys it, so that afterwards there is no possibility of checking information not recorded. Even if record-keeping needs to be simplified with young children, they should still be asked to do some form of recording as they dig, and the dig should still end with discussion of what the students observed in each layer and why it is important to dig one layer at a time.

Materials and Preparation

The teacher should first read *Basics of Archaeology for Simulated Digs*, including Dig Design Tips, and look at *Shoebox Dig Photos*.

In preparing shoebox digs, the teacher will need to acquire a sturdy shoebox for every four or five students and bags for the finds from each layer. There must be a dumping box (or separate small boxes) for the dirt being excavated. Each dig will contain layers composed of sand or dirt, possibly mixed with colored sugar crystals, birdseed, or other ingredients to create different colors and textures and help students recognize changes. Each layer should be thick enough (more than an inch deep) to be identifiable before students dig through it accidentally.

Depending on the number of teams, filling boxes and cleaning up afterward may each take over an hour. Excavating, recording, and discussing will take several hours.

It is best to create the digs at the school or location where the boxes will be excavated, preferably outdoors or on protected tables indoors. (The teacher will ideally have some adult assistance.) Once all the boxes, dirt, and objects have been obtained, the easiest way to proceed is for the teacher and helpers to complete the lowest layer of dirt and artifacts in all boxes in the same way before moving up to the next layer. The layers should be packed down quite tightly to resemble the more compact soil of a real dig as closely as possible. This also helps protect fine particles in upper layers from filtering downward. See *Shoebox Dig Photos*.

Making context important

The dig should be built around a story the teacher has in mind, which may vary depending on the artifacts. These can be inexpensive and include small objects saved up from past projects. When artifacts are not representative of genuine cultures, they permit students to focus on observation and analysis and help them avoid jumping to conclusions based on cultural cues. Alternatively, teachers of older students may choose to add culturally specific simulated artifacts, replicas, or laminated images of real artifacts to relate the lesson to cultures students are studying in class.

In at least one layer, the teacher should place several related objects near one another, or broken pieces of one object. Small beads can be arranged to create a necklace pattern. A small circle of pebbles with a fragment of charcoal inside it can represent a fire pit. The fragments of a broken artifact can lie where they fell. Associated objects in an archaeological context can tell us much more than a single object by itself.

For middle school students the teacher can increase the complexity of finds and recording, emphasize both teamwork and individual accountability, and can ask students to participate in planning and design for different groups.

- One possibility is to leave some objects out of certain boxes so that it will only be possible to learn about all the finds if teams share information.
 - A mystery artifact in one layer of each box might relate to another fragment in another layer – or a different box.
- Different shoeboxes can represent different areas of a site altogether.
- Teams or classes can design the shoebox digs for one another and exchange them or can design the dig(s) for the next year.

Materials (for four layers)

- Shoeboxes, numbered and with one side labeled left or west at the teacher's discretion
- A separate set of small boxes or other containers for the discarded dirt
- Sand, not too fine and dusty
- Potting soils, ideally of different textures and colors, and not too fine (choose soils of a uniform consistency to make it easy to spot artifacts)
- Colored sugar crystals or bird seed
- Oregano, sesame, coffee, or other additives with a distinctive odor

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- A selected number of artifacts for each layer (for example, 3 green beads, 3 plastic fish, and so on, for a total of 15 in each layer)
- Sugar cubes, clay, or plastic building blocks to create features (if desired)
- Plastic sheets or tablecloths to work on

Excavation and recording tools

- Shallow spoons (excavation tools)
- Small plastic bags to hold the artifacts from each layer
- Waterproof black markers to label the bags
- Pencils
- Rulers
- Small brushes
- Clipboards as needed
- Artifacts and/or laminated images of artifacts
- A top plan for each layer: a sheet of graph paper with a square or rectangle drawn on it to represent the excavation square is fine
- Record sheets (see examples), requiring (in a simple version) just a list of artifacts found in each layer, or (in a more complex version) a description and sketch of each artifact.

Record-keeping

The teacher can use the record sheets provided here or easily design his or her own top plans and record sheets based on the dig goals, the age and number of students, and the number and type of layers and artifacts. See *Sample Record Sheets*.

Procedures

The class learns basic rules and procedures of archaeology. See *Basics of Archaeology for Simulated Digs*.

The teacher should tell students they will excavate and infer the story of the site based on the finds. Explain how archaeologists know about the site (perhaps through old records and surface survey). Several finds have turned up in a farmer's field and the artifacts may reveal something about the nature of the site.

During excavation, some finds might seem contradictory or confusing, and these should lead to discussion of multiple uses of a site or changes in activities through time. Stress that archaeologists must separate observations (what they can see) from inferences (conclusions, stories about the finds).

The ultimate story of the site invented by the teacher should include simple examples of cultural change indicated by easily obtainable artifacts. For example, people who eat fish and live on a sandy coast are succeeded, once the sea has receded, by people who eat fast food and

now live on soil. Or warlike people with small plastic weapons and coins are followed by peaceful ones whose material remains include images of hearts and flowers. . .). The stories can be modified based on available artifacts, the students' ages, and the degree of complexity desired in the dig site.

Excavation

The teacher reminds students that archaeologists would not dig just to “find things,” but rather to understand someone’s culture and way of life. On a real dig, nothing would be removed until it had been drawn, photographed, and recorded. Every dig destroys as it uncovers.

The team members need to know that all the members of a dig team are contributing. Whether they are digging or recording, finding artifacts or not, everyone shares in interpreting the puzzle that is the site.

- Each team and box has 4–5 students (more only if necessary).
- Each layer’s artifacts are labeled with a letter written on a plastic bag for finds..
- With young students the teacher can helpfully say how many types of artifacts (not the total number) they will find.
- Team members or the teacher decide on roles (excavator, top plan draftsman, artifact recorder, artifact bagger and labeler). The teacher may allow everyone to have a chance to dig.
- Each team receives a top plan and a record sheet for each layer. The age of the students and the time allotted will determine whether this is a very simple process or records will be more detailed.
- When everything has been excavated, the teams present and discuss their finds.
- The students answer the teacher’s questions about the artifacts and come to conclusions about the people who lived in the different layers.
- The teacher tells the story of the site.

Pitfalls

Sand and loose potting soil are very easy (and messy) to remove compared to hard soil at a real site. The layers need to be packed down tightly, and students should be motivated to dig carefully to experience the rewards of stratigraphic excavation.

- If the layers contain too many artifacts, these may become confusing and difficult to record. Too few artifacts may prevent everyone from finding something.

Assessment

It can be difficult to grade an excavation project on results, since it is acceptable to make mistakes and learn from them. The teacher should design a series of questions to help students recognize what they learned from evaluating their specific artifacts in context.

Careful observers and diggers can be rewarded for their understanding of collaborative teamwork, their careful stratigraphic analysis, and their attention to detail. The questions should help students recognize the value of the information they can gain from artifacts evaluated in context (see below).

Summing Up

Teams come together to share their conclusions and show the accuracy and care they maintained during excavation. Students might start by discussing how information can be lost by carelessness. If the contents of the shoe boxes are different, the teacher can ask groups to present their different finds and draw conclusions. Discussing them all together will reveal more than can be learned from one box (i.e. one small section of a larger site).

Questions should require the excavators to observe closely. In a more complex dig, or in one using laminated images of artifacts that represent a real culture, older students can first develop hypotheses (educated guesses) about what finds they will excavate based on the surface finds. Then after excavating they may think about what they might find if they dig farther.

Following up

As a subsequent activity, students might imagine and design (on paper) the possible stratigraphy under their school building. Older students might research, with assistance, life at the school site before the school was built, and draw the imagined material remains in layers shown under the present-day surface. Their stratigraphic drawings can range in size from notebook paper-size to the height of the classroom or hallway wall.

In the real world, a dig ends with questions that are still unanswered and reconsideration of hypotheses that were not validated. Middle School students may continue their analytical thinking by studying the AIA's *Mystery Cemetery*. They can draw conclusions about the site (Map 1 and photographs) and then checking their ideas through further excavation (Map 2).

SAMPLE Dig and Assessment Questions

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The dig described below is intended to serve as a sample for the teacher and not as a fixed template. Here there are four layers, but two are side-by-side at the top (so the single “top layer” at first sight is really two layers needing different labels). The clearcut division between two soils and artifacts in exactly one layer is unlikely in real life, but it makes identifying them easier. If this sample is too complicated for your classroom, redesign it.

Soils for sample dig layers

- Sand (layer D, bottom)
- Soil with birdseed mixed in (layer C, middle)
- Two soils with different textures and color (layer A and B, top)
 - Soil without birdseed (layer A, top), left/western half
 - Soil mixed with colored sugar crystals (layer B, top), right/eastern half

Examples of artifacts for sample dig (these relate to the sample “site story” below)

- Fake coins (modern, not ancient) or pennies
- Miniature plastic doll dinnerware
- Popcorn
- Small plastic bugs
- Fake “gemstones” or beads
- Small dried pasta shapes
- Marbles

Recording

If handed out in advance this sample record sheet shows how many layers there are. Each teacher must decide what students can handle.

Record Sheet **Box #** _____ **Team #** _____

- Top LAYER A (top left/west, soil)
- Top LAYER B (top right/east, colored soil)
- Middle LAYER C (soil with birdseed mixed in)
- Bottom LAYER D (sand)

Simple story to guide site design

Young students may need to be reminded that the cultures developed in time from the bottom up, in the reverse order of the way archaeologists dig.

Layer D (sand, bottom)

Artifacts include popcorn, plastic gems, one marble. If possible, arrange gemstones or beads in a circle to reveal the pattern they may have formed in a necklace or bracelet. Do not explain the marble; students will draw their own conclusions later.

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Long ago there was a sandy desert in this part of the world. The sun was very hot, and the people who lived in the desert used to make popcorn by putting the kernels out on hot rocks. The popcorn-eaters did not use money. Instead, they traded jewelry for the corn grown by farmers who lived far away near a river (where corn could grow because there was dirt and water instead of sand).

Layer C (soil mixed with birdseed, middle)

Artifacts include pennies or toy coins.

After many years something very upsetting happened. The farmers stopped growing popcorn! They started producing birdseed, AND they wanted money for the seeds, too—not jewelry. The popcorn-eaters tried to adapt. But they had very little money and they really hated to eat birdseed. They became so discouraged that they moved their whole village 100 miles to be near some other farmers who still grew popcorn and were willing to trade. The popcorn-eaters left behind the birdseed they hated, and money, too.

The whole area was abandoned. Later two groups, A and B, moved into the area:

Layer A (soil, no birdseed, top left or west)

Artifacts include plastic bugs and another marble like the one in layer D.

Layer B (soil mixed with sugar crystals, top right or east)

Artifacts include dried pasta.

Long after the unhappy popcorn-eaters left, the far-away river changed its course and brought water to the desert. The dry desert became green. Now there were dirt and grass and trees. Two new groups of people moved into the area. They lived side-by-side, but they lived their lives in very different ways. For example, one group liked to eat bugs, and the other, pasta. One group liked sugary sweets, while the other did not.

Sample questions based on the sample story and artifacts

- What did the people who used shiny gems eat?
- Did the people who ate bugs use green stones, or metal pennies?
- Did the people who ate popcorn live in this area before or after the pasta-eaters?
- What one artifact did both the pasta-eaters and popcorn-eaters share? (The marble.)
 - Can you come up with an explanation for how the two groups came to use the same object? (*Possible inference: the later people found an artwork left by the earlier people and kept it.*)
 - How might the object have been used? (*Here it will ideally become clear during discussion that sometimes there is just no way to find out the answer.*) What might further digging uncover to help answer the question?)
- What kind of jewelry was made in layer D? (Were gems or beads in the soil arranged in a patterned necklace or bracelet?)
- What kinds of pasta did the pasta-eaters eat?

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- How many different kinds of bugs did the bug-eaters eat?
- How careful was your group in keeping the layers separate?
- What surprised or interested your team members the most?

Resources

AIA's *Basics of Archaeology for Simulated Digs*

Coan, J. 1999. *Digging into Archaeology: Hands-On, Minds- On Unit Study*. Pacific Grove: Critical Thinking Books & Software.

Cochran, J. 1999. *Archaeology: Digging Deeper to Learn About the Past*. Nashville: Incentives Publications, Inc.

McIntosh, J. 2000. *Archeology*. London: Dorling Kindersley Ltd.

Moloney, N. 1997. *The Young Oxford Book of Archaeology*. Oxford: Oxford University Press.

White, J.R. 2005. *Hands-On Archaeology: Real-Life Activities for Kids (Grades 4–10)*. Waco, TX: Prufrock Press.

Online:

“Doing Archaeology in the Classroom: A Sandbox Dig”

<http://www2.sfu.ca/archaeology/museum/classroom/sandbox.html>