

Activity 26: An Indoor Fossil/Archeological Dig

Maine Geological Survey



Objectives:

To engage the students in a simulated fossil hunt or archeological excavation. To have students try to infer information from the materials excavated such as the environment these materials existed in, and the events that occurred at the time of burial.

Time:

One to two (1-2) class periods

Background:

Paleontological and archeological excavations yield a wide variety of useful information not only about vanished species and civilizations but also about larger, global topics such as long-term changes in climate, continental drift, and polar wandering to mention a few.

Unfortunately such activities, and the information they generate, are often viewed as having little real value by a significant portion of the general public. To bend an old adage, we do need to learn from, and be aware of, prehistory's events and/or "mistakes."

This activity can be handled in a number of ways, using many types of artifacts or fossils. It can be as elaborate as you wish or relatively simple. A number of common themes should apply to all digs and these include the following:

Completeness. Students should recover as much of the buried material as possible; the more incomplete the record, the more tenuous the inferences become.

Description. Students should accurately describe EACH item recovered and each item's position with respect to the other items. This will require extensive sketching and note taking.

Identification. Students should identify, in a general sense, what they have recovered. A description of genus/species is not important here. What is important, are such things as land animal, marine animals, plants, artifact classification (tool or weapon), and so on.

Interpretation. Students should use the information gathered from the excavation to make some inferences about the conditions - climatological, ecological, environmental, situational, or cultural - that existed at the time the fossil/artifact was buried. This process is fraught with possible sources of error and false leads, but allows students to engage in a higher order thinking process they seldom get a chance to use.

This particular version of the exercise is written using a large number of marine fossils scattered through all layers of the "sediment," indicating a warm, stable, and prolific inland sea environment. Other options are listed under follow-up activities. Analysis questions will vary from option to option; it is often a great deal of fun for students to create their own situations for other students to excavate.

Materials:

Each group of students (4-6 students per group) should have a box or container that represents the excavation site. A child's wading pool can be used for an especially ambitious dig. These can be quickly made by taking a paper shipping case (10 reams) and filling it with Styrofoam peanuts or shredded newsprint. A better alternative is to construct a 24" by 36" by 6" wooden frame and use either dry beach sand or washed, screened, gravel for fill. The larger size allows 4-6 students to work at a "site" and

provides greater realism. When filled, these units are heavy and need adequate support if they will not be placed on lab counters.

Bury your materials by placing them where you wish and then filling in around them with the sand or gravel. Unless you are constructing a single-event dig, artifacts/fossils should be placed at various levels. For this dig you will also need about 20 plastic or real fossils including bryozoa, horn corals, colonial corals, spirogyra, and so on. Real fossils/artifacts are more exciting than plastic, but can be expensive to purchase from catalogs. Ward's has a number of period sets (5 - 16 specimens) that run from \$15 - \$80 a set. Each dig site will also need some plastic buckets to place the excavated soil into, small trowels and scoops for removing soil and debris. Each student will need their notebook, pens, a ruler, and some sticky tags for tagging artifacts/fossils.

Procedure:

Once the dig sites are set up and filled, each group of students can start excavating. While it may slow down the initial stages of the activity, it is very productive for each group to devise its own plan for doing the dig as well as possible divisions of labor. Regardless of these details, each group should tag, number and label, and record the position and details of all fossils/artifacts encountered. They should make site sketches as each layer is removed. In real life a continual photographic record is normally maintained. You may wish to use plastic sheeting to define layers, or different types or colors of sediments. When all the objects have been found, and all the information obtained, the group should compose a "field report" on the dig site. Beyond the factual data, the report should include THEIR inferences and conclusions about the site. Questions (see attached) may aid in this process. Once all the reports have been collected, a summary discussion (if all the dig sites were similar) is a good follow-up.

Comments:

If you use real fossils/artifacts be certain that YOU have a sketch map or tally so that no materials get lost; also make certain that the students understand that these are valuable items and need to be handled and treated accordingly. The reporting sheet is only a sample; teachers should modify this to meet their own needs.

Follow-Up:

The options that can be explored in this type of activity are almost limitless; you may wish to consider the following.

Placing fossils from obviously "impossible" time periods or incompatible environments into close context with each other.

Duplicating a small portion of the geologic column.

A tool building site with lots of partial tools and roughly worked artifacts.

A hunting site, lots of animal bones of same type.

A single-event catastrophe where the layers above are totally devoid of fossils and all the fossils are in close proximity.

A more gradual environmental change, such as the water temperature decreases, the food supply lessens, the fossil shells become smaller. (Plastic fossils make this much easier).

A lateral progression from ocean to shoreline with subsequent shift in species.

A classic assemblage such as the Pennsylvanian period with the large ferns and horsetails.

References:

Adapted by Duane Leavitt from concepts described in *Hands on Geology: K - 12 Activities and Resources*, edited by MacDonald and Stover (Society of Economic Paleontologists and Mineralogists (SEPM), Tulsa, Oklahoma, 1991)

Name _____



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Student Sheet

Purpose:

To have you engage in a mock fossil or archeological dig, and to use the results of this dig to infer some information about a prehistoric environment.

Materials:

Each group of students will be provided with a dig site - this is a container of some sort with fossils or artifacts buried in some type of sand or filler material such as Styrofoam peanuts or shredded paper. Your teacher will also give each student a site report sheet which should be filled out as the dig progresses. You will also have trowels or scoops to dig with, pails to place the excavated materials in, and sticky tags to label any fossils/artifacts that you recover. You will also need your notebook, pens, and a ruler.

Procedure:

Each group should decide how they will excavate their dig site. You will probably want to have some plan of operation besides that of randomly digging holes. As you slowly and carefully excavate the site, you will place the excavated material into the pails.

When you encounter objects that you think are fossils or artifacts you need to do the following.

- BEFORE removing the object, note its size, shape, and orientation in the sand or filler material, and any other information which you feel is pertinent. Once this information is recorded, tag, label, and remove the specimen, placing it to one side. DO NOT write on the specimens themselves; write on the sticky tags which are attached to the specimens.
- Continue excavating and recording data until the entire site has been excavated. At this point you should answer the questions attached to your site report sheet, either individually or as a group. The group should then write a summary report of the dig site including conclusions and deductions about the site.
- Clean up and store materials as directed by your instructor.

NOTE: If the dig site contains REAL fossils or artifacts, which it well may, these need to be handled carefully as they are valuable items. Take care not to drop them or bump them together.

With your group, prepare a report on this site; include as many inferences and deductions as the data will support.

Fossex Incorporated Site Analysis Sheet:

Site Location: _____ Date: _____

Team Members: _____

Size of area being excavated: _____

Fossil/artifact numbers: _____ to _____

Description of surface prior to excavation, include nature of soil or material to be excavated.

General summary of fossils/artifacts found; refer to specific items by number as well as name.

Size range of fossils/artifacts – smallest to largest