

Students “dig in” to excavate buried “fossils.”



BARBARA COMINES

Primary Paleontologists

By Patricia Kalish Sylvan

EVERY JUNE, OUR PLAY-ground rings with excited cries. “Look at my dinosaur bone—it’s bigger than my arm!” “Wow, we found a dinosaur track!” “Keep digging, but be careful. I think we’ve found something!” Second-grade paleontologists are immersed in the thrill of discovery at a *simulated* dinosaur dig right on our school grounds, unearthing buried “fossils” at the excavation site created by their teachers.

By acting out the roles of experts at a dig, the students are able to apply what they’ve learned in the classroom. This unique hands-on experience can be easily recreated at any school using a sandbox or a cleared earth area on the school grounds.

A model dig is an exciting culmination to a unit on dinosaurs and a wonderful opportunity for children to learn by doing. Students are engaged in a careful, systematic investigation in which they find, collect, and record discoveries. They have an opportunity to use map skills, take notes, write descriptions, and use linear measurement. Just as paleontologists work together sharing expertise and assistance, so do the students as they engage in a truly cooperative science learning experience.

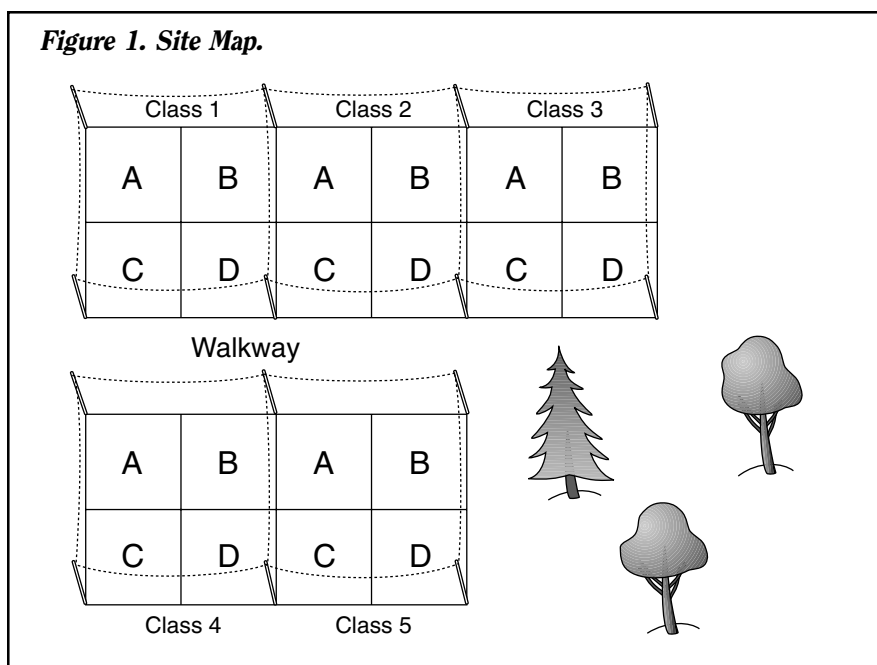
Paleontologists Prepare

The dig is held in June to best approximate the dry, hot climate at most dig sites. To conduct a simulated dig, we use the following materials:

- a sandbox or cleared earth area;
- large, cleaned chicken, beef, or other bones (prepared at home according to the instructions provided);
- plaster dinosaur footprints;
- papier-mâché dinosaur eggs;
- clam shells;
- shovels and spades;
- wood stakes and string;
- USGS topographic maps of the geographic region;
- site maps (Figure 1);
- hand shovels;
- plastic beach toy strainers;
- a camera and film;
- old paintbrushes and toothbrushes;
- “shellac” (water colored yellow);
- clipboards, pencils, and paper;
- journals and/or activity sheets (Figure 2, next page);
- tissue paper and/or newspaper;
- plaster tape (optional, found in a pharmacy);
- shoe boxes;
- straw (enough to cushion the fossils stored in each shoe box);
- and a “fossil-hunting license” for each student (Figure 3, page 19).

Using a sandbox for the dig site has several advantages. It is easier for the teachers to bury the fossils and for the students to dig them out. In this smaller area, fossils are less likely to get lost. Sand is cleaner to work in than earth, especially if it rains prior to the dig. However, since we no longer have a sandbox available, we use a 25 m x 15 m section of the school grounds that was cleared by a

Figure 1. Site Map.



backhoe. The larger site gives the 108 children involved in our dig more room to work. However, the dig can be easily scaled to meet the needs of any size group.

A few weeks before the dig, we send a letter home with students listing needed materials, instructions on how to prepare the bones to be used as fossils, and appropriate clothing for dig day. The children collect drumstick, sparerib, and large beef or ham bones from home to serve as fossils.

These bones are prepared at home. They are boiled in water for one hour to remove meat (one tablespoon of bleach may be added) and then dried in a 250°F oven for one hour. This is essential to prevent mold and odor and to deter animals from unearthing the bones after burial. We always include one or more large cow femurs from a local butcher for added

drama—you can imagine the awe inspired when these large bones are discovered.

The remainder of the “fossils” are made in the classroom. Fossil dinosaur footprints are made by molding clay footprints and stamping out tracks through wet plaster of paris held in aluminum pans. Fossil ferns are made by coating real ferns with oil and pressing them gently into oiled jar lids filled with plaster of paris. When the plaster hardens, the fern is carefully lifted off, leaving an imprint. Students must wear goggles and gloves while preparing the plaster of paris fossils. Finally, we make papier-mâché dinosaur eggs in the shape of a large potato. Not only do these activities provide fossils for the dig, but they help children understand how fossils are formed.

Two days before the dig, the

Prior to the students’ dig, we have a teachers’ dig in which each of the second-grade teachers models the role of an excavation expert.

teacher(s) prepare the site. The teachers loosen up the site area with shovels and spades to a depth of 6–8 cm. We divide the plot into a grid of approximately 6 m x 6 m squares and mark off each square with wooden stakes and string. The teachers also mark off a 3 m walkway between the squares. Then each square is divided into four sections (see Figure 1, previous page). We try to distribute the fossils equally throughout the squares. The eggs are buried together in a circle like a nest. Once everything is in place, we fill in the earth and rake over it.

The Teachers Excavate



Prior to the students’ dig, we have a teachers’ dig. Each of the second-grade teachers models the role of an excavation expert in the same square of the dig site. The teacher experts are a geologist, paleontologist, workers, photographer, specialist, draftsman, and journalist. The geologist begins by showing the children topographic maps of the area and describing the exposed “geologic formations.” The geologist then explains the maps and why this area might contain fossils. The geologist might say that dinosaur trackways had been found in sedimentary rock in other local areas, which is true for us.

The workers then begin to dig while explaining the need for care to prevent damage to the fossils. They use hand shovels and strainers.

As soon as the fossils are uncovered, the photographer takes a photograph before they are removed from



Figure 3. Dinosaur Digging License.



Dinosaur Digging License
Special Permit No. PGS-2831

Issued to:
Name _____
Address _____
City _____ State _____ Zip _____

*Issued by authority of the U.S. Dinosaur Control Commission
Restricted to Farmington Valley, Avon, Connecticut*


This license entitles the holder to dig for and remove from the area known as Dinosaur Control Area of Avon, Connecticut, which is in the vicinity of the Pine Grove School, the following types of dinosaur fossils:

- A. *Tyrannosaurus rex*—adult male
- B. *Diplodocus giganticus*—either sex and not less than 2,000 kg.
- C. *Stegosaurus*—males any size
- D. *Maisura*—eggs only

The holder of this license agrees to remove all fossils, legally bagged by him or her under the proper restrictions, properly preserved and in sanitary condition within five days of the time of discovery and agrees to have said fossils inspected by the Pine Grove Paleontologist Society before removal.

Signed _____

Issued by Daniel R. Saurus
Deputy Dinosaur Warden Avon, CT



student photographers would be too expensive. All of the children have a chance to apply their classroom learning to the job of paleontologist. One child is appointed team leader and keeps track of the rotation so each individual gets to try out all of the experts' jobs.

Students come appropriately dressed in shorts, cotton pants, or jeans; hats; and sunglasses (or some other kind of eye covering). They bring canteens of water and their tools—hand shovels for digging, strainers for sifting, and old toothbrushes and paintbrushes for the delicate work of dusting dirt off the fossils. They also bring shoe boxes that we pack with straw for carrying their fossils. We provide jugs of “shellac,” clipboards, pencils, and paper.

Children also fill out an official fossil-hunting license, similar to a hunting license, that they must carry with them. This gives them permission to work at the dig and to take away fossil finds. The “dinosaur warden” (our science coordinator) comes to inspect all licenses at the dig.

When we get out to the site, the children give new meaning to the phrase “dig in.” All the children, without exception, are engaged and enthusiastic. They collect, they record, they interpret, they hypothesize. Their imaginations run free. Even though they know that they have collected and prepared the fossils themselves, they are excited to uncover the “new” finds.

As the children return from the dig, dirty and flushed with excitement, the refrains we hear are “Wow, the dig was awesome!” and “This is the best thing we did all year!”

After cleaning up, the groups carefully place their fossils in the shoe boxes on a table designated as the “Fossil Museum.” They label the boxes with their site number and eagerly join their team of “paleontologists” to write up an account of their adventure.
(continued on page 60)

the soil. The specialist brushes the fossil bones with “shellac” (water colored yellow) to help prevent crumbling. The bone is numbered directly on the bone’s surface, sketched, and measured by the draftsman. This information is recorded along with a sketch and description of the object’s exact position before removal.

The specialist carefully wraps the small bones in tissue paper and/or newspaper. The larger bones are wrapped in plaster tape. This simulates, in a simple fashion, the wrapping of fossils in gauze and covering with plaster. All the fossils are packed in shoe boxes and cushioned with straw.

Meanwhile, the journalist writes a description of the site and its surroundings; records the weather and the time; and notes the size, shape, and position of the finds. The journalist shares this information with the students at the end of the teachers’ dig.

Students Dig In

The following day, the children are divided into teams of four or five and given dig instruction sheets. The instruction sheet contains a list of possible fossils students might find and directions for taking field notes. In their field notes, children should include the name of their group, date, site, and a description of each find. Students should make a separate page for each specimen. Each team is assigned a specific square at the site. A map of the dig site, created by the teacher(s), is given to each team and they must find their square using coordinates.

A job rotation of draftsman, workers, photographer/journalist, and specialist is set up. Several of the roles included in the teachers’ dig are left out in the students’ dig. The role of geologist is not included in the student dig because it is not participatory. Providing film and cameras for

(Primary Paleontologists,
continued from page 19)

ture using their field notes. A display map showing each fossil find and where in the site it was found is drawn. These are then hung over the team's boxed fossils in the "Fossil Museum." The "primary paleontologists" are proud to show their finds and explain the workings of a dig to all who visit the museum.

This simulated dig is a memorable culmination to our classroom study of dinosaurs. The dig reinforces what students have learned about dinosaurs and paleontology and allows them to apply this knowledge in a hands-on science experience.

Resources

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- Lasky, K. (1990). *Dinosaur Dig*. New York: Morrow Junior Books.
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