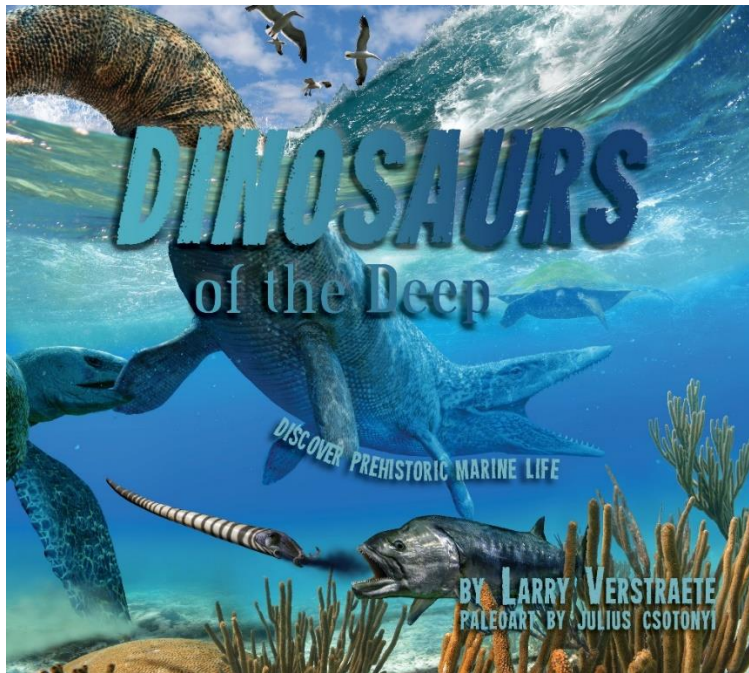


TEACHER'S GUIDE

'DINOSAURS' OF THE DEEP: DISCOVER PREHISTORIC MARINE LIFE

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Turnstone Press, 2016



Driving across the North American Heartland, surrounded by prairie, it is almost impossible to imagine that at the time of the dinosaurs, a huge inland sea split the continent in half. *'Dinosaurs' of the Deep* explores the Western Interior Seaway, its predatory creatures, and the fossil evidence that allows paleontologists to extract information from a period long before human existence.

The activities in this guide are designed to enhance and support the information in the book.

TEACHER-LED CLASSROOM ACTIVITIES

Clue by Clue

Hide one or more objects in the classroom or on the playground then prepare a map, list of directions, or a series of clues that will lead students to the object. Discuss how clues (evidence) are fundamental to scientific investigations, in particular in situations where something that has been lost or missing is finally located

My Story

Paleontologists rely on fossils to tell stories about the past. Invite the class to explore the stories behind everyday objects they possess. Have each student bring an object that has a personal story connected to it, and allow time for them to share the story. Objects could be awards, collections, photos, books, toys, gifts, items of clothing etc.

To hone their deductive skills, ask students to bring 5 -10 'artifacts' that belong to an undisclosed person in their household. Pair students, and allow time for them to examine the objects brought by their partner. From the objects, ask students to infer the age, gender, personality characteristics and habits of the owner. What can they tell about the person from the things he/she owns?

Mystery Object

Invite students to bring 'mystery objects' from home. A mystery object is something that cannot easily be identified. It could be something old and no longer commonly used, an obscure or seldom-seen item, or perhaps a small piece of some larger object. Display the objects and give students time to examine them. Ask them to guess the names and functions of each item, then later have the owners reveal their identities. Relate this to the challenge facing paleontologists and archaeologists who often encounter broken or unidentified artifacts.

Surviving Decomposition

Becoming a fossil is not so easy. The Earth is a very efficient decomposer. To determine what material survives the longest and what conditions are best for preservation, conduct this class experiment.

Gather a variety of small objects such as metal nails, bits of plastic, brick and stone, orange or banana peels, chicken bones, pieces of cloth, paper or wood etc. Separate the materials into three sets with each set containing roughly the same kinds of objects. Bury one set in the soil outdoors. Place a second set in a covered container or sealed bag and leave it in the classroom. Store a third set in another sealed container or plastic bag and

place it in the freezer. After several weeks, examine the objects. How do they compare? What materials decayed? Which survived and have the greatest chance to fossilize? What environment preserved objects the best?

The Observation Game

Paleontologists practice careful and systematic observations, always on the lookout for new clues and insights. Provide your students with a similar experience. With a partner, have students bring 15-20 small objects from home. Have them lay out the items on a desk or table, then cover them with a cloth or large sheet of paper. When all is ready, students swap places with another group, remove the cloth or sheet, and study the items for 30 seconds. Have them cover the objects again, then write down the names or descriptions of as many items as possible. How observant were they? Could they improve their performance with more practice? For an added twist, have one of the pair remove one or two items. Can the other person tell what has been taken away?

I Have a Date

By determining the age of specimens, paleontologists answer key questions. When did the creature live? What other creatures lived at the same time in the same location?

Have students practice their dating skills with this activity. Letters, cancelled stamps, coins, milk cartons, newspapers, e-mails, prescription medicines and dozens of other objects, either have dates stamped directly on them or are date-traceable in some way. Collect these items. Invite students to examine them, determine their dates, and rank order them from oldest to most recent.

As a variation, place the objects in a bag, have students draw them out one at a time, and place each newly drawn object on a number line relative to the ages of the other objects.

Creature Hunt

Conduct a scavenger hunt. Hide numbered and labelled pictures of sea creatures throughout the classroom. Provide students with a similarly numbered, but unlabelled list. Students search for the pictures and write down the name of the creature beside its corresponding number. Students are finished when they have found and correctly identified all specimens.

Missing Piece

Foster an appreciation for the task facing paleontologists and archaeologists through this activity. Have students prepare a written or printed message on a full-sized piece of paper. Instruct them tear up the message into a number of irregularly shaped pieces. Have them randomly remove one of the pieces and set it aside. Put the remaining pieces in an envelope. Exchange envelopes with another student. Try to reassemble and interpret the message with one piece missing. How difficult is the task? What strategies did they use?

Who Am I?

Paleontologists and police detectives work in similar ways. Both gather clues and examine the evidence before arriving at conclusions. Simulate the experience with this activity. Prepare paper bands with labelled pictures of sea creatures and/or dinosaurs. Distribute the headbands. Have students partner together. Without showing the creature, have one student fasten their headband on another student. Students move through the classroom and ask other students yes or no questions about their creature (Example: Do I have fins? Do I have a long neck? Do I have a hinged jaw? Once they have gathered sufficient clues, students guess their creature's identity. Debrief the experience. How many questions did it take to identify your creature? What questions yielded the most information?

Buried Treasure

To give students an appreciation of paleontologists and their work, conduct a simulated dig on the school playground or at another site. Bury objects in the ground at varying levels. Be strategic. The kinds of objects selected and their depth and placement in the soil compared to one another should tell a story to students who will excavate the site.

Provide students with trowels, toothbrushes, spoons and other digging supplies. After teaching them excavation basics such as proper digging and charting methods, have students excavate the site and interpret the evidence they uncover. How are the items connected? What story do they tell?