

CONTENT: *Animal Parents Teacher Lesson Plan (1.3.2.1)*
SECTION: *Teacher Resources/Group Lesson Plans/Nests & Nurturing/Animal Parents Teacher Lesson Plan (1.3.2.1)*
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LESSON 3: ANIMAL PARENTS

LESSON OBJECTIVES

1. Students will identify animals that lay eggs .
2. Students will identify which living animals that lay eggs care for nests and baby animals.
3. Students will identify which animals do not protect nests or care for animals.
4. Students will compare bird hatchlings that leave a nest quickly with those that are helpless and stay in the nest.

TOOLS AND MATERIALS NEEDED

This lesson will be done primarily off-line because it requires lots of visual resources most readily available in libraries and school district media centers. Searching for web sites about animal babies and parents is another way students can do research. Student journals are used to collect information.

ESTIMATED TIME TO COMPLETE LESSON

The timing for this lesson is dependent on how structured the teacher chooses to make the research process. The objectives are a bit more open-ended for this lesson. The teacher will have to determine how far to take it. (See the Background Information below to identify the minimum level of knowledge students should acquire.) It can be completed in approximately 60 minutes if books and video resources are teacher-selected. The time needed to read or view material can be limited by choosing resources carefully. Note-taking done by the whole class at once will shorten the time, as well. Increasing the number of resources to be used will lengthen the time to complete the lesson. If students are encouraged to research independently or in teams, using books and Internet web sites, this lesson could take several class periods.

TEACHING STRATEGY

• Background Information

Paleontologists are not able to directly study dinosaur behavior, and fossils do not provide indisputable evidence of how the animals acted. So paleontologists study fossil evidence and behaviors of modern animals for comparison. By matching fossil evidence with what is observed among living animals, some behaviors can be inferred. For example, dinosaur trackways provide clues about how animals moved around – walking, running, swimming. They appear to show herd behavior among some dinosaurs and protection of young. The Trackways module of the DinoLab Challenge covers this. Teeth and bone evidence from dinosaurs is used to infer diets, predator/prey relationships, and how food was consumed.

Nesting behavior and parental care is difficult to determine, as well. Some dinosaurs did lay eggs, but to determine how much, if any, care of infants was done, requires studying living animals. Paleontologists use reptiles and birds because these egg-laying animals are most like dinosaurs in their structure. While not all paleontologists agree with the details, the most commonly held opinions are that among the dinosaurs that laid eggs, some adults built nests, laid eggs, covered the nests and left. This is the behavior of sea turtles today. The hatchlings are on their own as soon as they hatch.

Some dinosaurs probably built nests, laid eggs, covered them and then stayed nearby, protecting the nest until the eggs hatched. Once hatched the infants would also be on their own. This resembles crocodile behavior observed today.

Bird behavior implies that at least some dinosaurs probably stayed with their nests and cared for infants after they hatched. Birds like chickens and ducks take care of hatchlings that are able to leave the nest immediately, but still need parental protection. Many birds, like robins and eagles, are helpless after hatching. Parents must stay on the nests to keep the hatchlings warm and must bring them food. These infants grow more slowly and remain in a nest for longer periods of time.

Among fossilized evidence, paleontologists look for a few key features in nesting sites. A nest with lots of crushed eggshell remains probably indicates hatchlings remained in the nest for a while and crushed the shell pieces as they moved around. Likewise, nests with fossilized bones of various small dinosaurs and worn baby teeth indicate the adults were feeding infants in the nest. Comparing sizes of fossilized hatchlings in nests provides clues about growth rates, the slower growth rates probably indicated babies that stayed in nests, and faster growth rates might mean hatchlings that left quickly.

Large nesting dinosaur sites have been uncovered which appear to be very like the rookeries of modern birds that come together in large areas to nest and care for young. Multiple layers of nests show that the site was used repeatedly.

The positioning of nests and distance between them match the sizes of adult dinosaurs as they do among living birds. Also, footprints of adults and juveniles provide clues about how quickly hatchlings left the nest and the kind of herd behavior that may have protected the young dinosaurs. Many good books are available to further explain how paleontologists interpret dinosaur egg fossils and infer parental behavior.

Students doing this lesson should focus on the behavior of sea turtles, crocodiles and various kinds of birds. They need to observe the differences in parental and hatchling behavior. Lesson 4 makes the connection between living animals and dinosaur behavior.

- Procedure:
 1. Brainstorm with students the kinds of living animals that lay eggs. Keep the list available for collecting information.
 2. Provide students with guiding questions for their study (focus on sea turtles, crocodiles, and birds).
 3. Make available books and/or videos for students to observe the behavior of egg-laying animals.

4. If desired, allow access to computers and time to conduct an Internet search about nesting animals.
5. Have students make notes about their observations in journals or on a chart.
6. Compile student notes for class chart, making sure the key points mentioned in the background information above are included.

- Discussion Questions:

1. What animals do you know that lay eggs?
2. What do the eggs and nests look like?
3. Which animals protect their eggs? Which do not?
4. Which animals take care of their babies after they hatch?
5. How do they care for the babies?
6. What happens to babies if the adults do not stay and care for them?
7. How are chicken and duck babies different from robin and eagle babies?

- Resources:

Adult books:

Eggs, Nests, and Baby Dinosaurs by K. Carpenter (technical but good illustrations and lots of information)

Digging Dinosaurs by J. Horner (about Egg Mountain in Montana, easy reading and lots about inferring dinosaur behavior)

Children's books:

Feathered Dinosaurs by C. Sloan

Dinosaur Parents and Dinosaur Young by K. W. Zoehfeld

The News about Dinosaurs by P. Lauber

- Videos:

(The rest of the children's books and the list of videos is under way and I will have to you in the next few days.)

- Vocabulary:

- hatchling – a baby animal that has hatched from an egg
- juvenile – a young animal
- parental – having to do with the parent animals
- predator – an animal that hunts and eats other animals
- prey – animals that are hunted as food
- nesting grounds (rookery) – places where large numbers of animals, especially
- Birds gather on a regular basis to lay and hatch eggs or give birth to live young

EXTENSIONS/ADAPTATIONS

1. Students may want to study different kinds of bird and reptile nest designs and locations. Carpenter's book has simple drawings of modern nests (p. 153) and patterns of dinosaur egg clutches (pp. 160, 162, 164). Students can construct models or make a computer slide show or wall chart to teach about kinds of nests.

2. This lesson may prompt questions about the connection between dinosaurs and birds. Students can find many excellent books with information on this topic. It could be used as independent study or an extension for the whole class.
3. Students might be directed to study animals that travel in herds or birds that return to the same nesting grounds every year.
4. The parenting behavior of snakes and lizards could be compared to that of crocodiles.

SCIENCE STANDARDS

- Standard 1: Science as Inquiry
 - 1SC-R2 Ask questions about the natural world
 - 1SC-R6 Communicate observations and comparisons
 - 1SC-E6 Analyze scientific reports from magazines, television or other media
- Standard 2: History and Nature of Science
 - 2SC-F3 Understand that science involves asking and answering questions
 - 2SC-E4 Identify characteristics of scientific ways of thinking
- Standard 4: Life Science
 - 4SC-R2 Describe the basic needs of living organisms
 - 4SC-R3 Recognize and distinguish similarities and differences in diverse species
 - 4SC-F2 Trace the life cycles of various organisms

ASSESSMENT/EVALUATION RECOMMENDATIONS

Student journals

Contributions to class wall chart

Individual charts or presentations