

Animals with Backbones

Young scientists are surrounded by vertebrates of all sorts. This science resource book suggests ways to build on your students' previous experiences with these animals to develop new concepts.

The activities in this book provide young scientists with practice in the skills of:

- observation
- recording information
- analysis
- prediction
- critical thinking
- comparison

Areas of study address these major themes found in many science frameworks:

- cycles
- change
- structure
- function
- diversity
- cause and effect

Concepts

| | |
|---|----|
| Animals with backbones are called vertebrates | 6 |
| Vertebrates are classified by their body characteristics | 15 |
| Vertebrates change as they grow | 26 |
| Vertebrates have developed different ways of acquiring food | 40 |
| Vertebrate movements are adapted to the animal's needs | 52 |
| Vertebrates have developed many forms of self-defense | 59 |
| Some vertebrates build homes | 70 |

Animals with Backbones is one of ten units in Evan-Moor's ScienceWorks for Kids series. See the back cover for a complete list of titles.

Two sets of Evan-Moor's Science Picture Cards contain illustrations that supplement this unit: *Animal Life Cycles* (EMC 816), *Life in the Ocean* (EMC 865).

Congratulations on your purchase of some of the finest teaching materials in the world.

For information about other Evan-Moor products, call 1-800-777-4362 or FAX 1-800-777-4332

<http://www.evan-moor.com>

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EMC 854

Science That's Appropriate and Doable

This science resource book was written with two goals in mind:

- to provide “good” science for your students
- to make it easy for you

What makes this book “good” science?

When you follow the step-by-step lessons in this book, you'll be using an instructional model that makes science education relevant to real life.

- Your students will be drawn in by interesting activities that encourage them to express what they already know about a concept.
- Your students will participate in hands-on discovery experiences and be guided to describe the experiences in their own words. Together, you'll record the experiences in both class and individual logbooks.
- You'll provide explanations and vocabulary that will help your students accurately explain what they have experienced.
- Your students will have opportunities to apply their new understandings to new situations.

What makes this book easy for you?

- The step-by-step activities are easy to understand and have illustrations where it's important.
- The resources you need are at your fingertips — record sheets; logbook forms; and other reproducibles such as minibooks, task cards, picture cards, and pages to make into overhead transparencies.
- Each science concept is presented in a self-contained section. You can decide to do the entire book or pick only those sections that enhance your own curriculum.



For sites on the World Wide Web that supplement the material in this resource book, go to <http://www.evan-moor.com> and look for the Product Updates link on the main page.

Using Logbooks as Learning Tools

Logbooks are valuable learning tools for several reasons:

- Logbooks give students an opportunity to put what they are learning into their own words.
- Putting ideas into words is an important step in internalizing new information. Whether spoken or written, this experience allows students to synthesize their thinking.
- Explaining and describing experiences help students make connections between several concepts and ideas.
- Logbook entries allow the teacher to catch misunderstandings right away and then reteach.
- Logbooks are a useful reference for students and a record of what has been learned.

Two Types of Logbooks

The Class Logbook

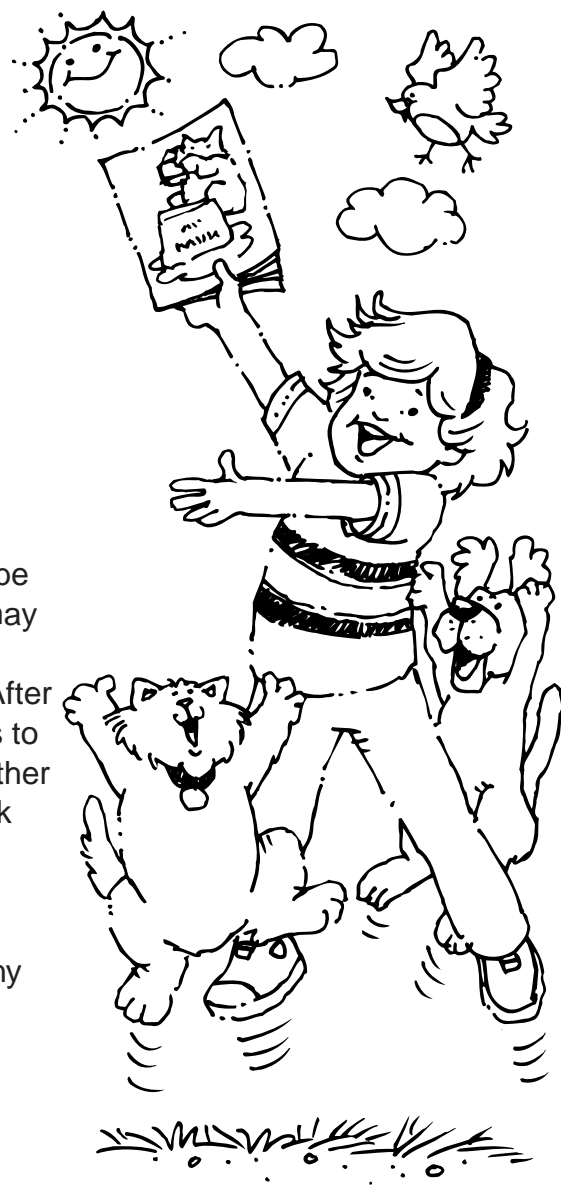
A class logbook is completed by the teacher and the class together. The teacher records student experiences and helps students make sense of their observations. The class logbook is a working document. You will return to it often for a review of what has been learned. As new information is acquired, make additions and corrections to the logbook.

Individual Science Logbooks

Individual students process their own understanding of investigations by writing their own responses in their own logbooks. Two types of logbook pages are provided in this unit.

1. Open-ended logbook pages:
Pages 4 and 5 provide two choices of pages that can be used to respond to activities in the unit. At times you may wish students to write in their own logbooks and then share their ideas as the class logbook entry is made. After the class logbook has been completed, allow students to revise and add information to their own logbooks. At other times you may wish students to copy the class logbook entry into their own logbooks.
2. Specific logbook pages:
You will find record forms or activity sheets following many activities that can be added to each student's logbook.

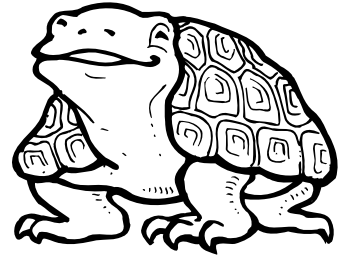
At the conclusion of the unit, reproduce a copy of the logbook cover on page 3 for each student. Students can then organize both types of pages and staple them with the cover.



Note: Reproduce this form for students to record science investigations for their individual logbooks.

Name _____

Investigation: _____



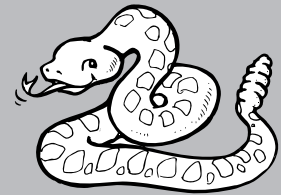
What we did:

What we saw:

What we learned:

CONCEPT

Animals with backbones are called vertebrates.

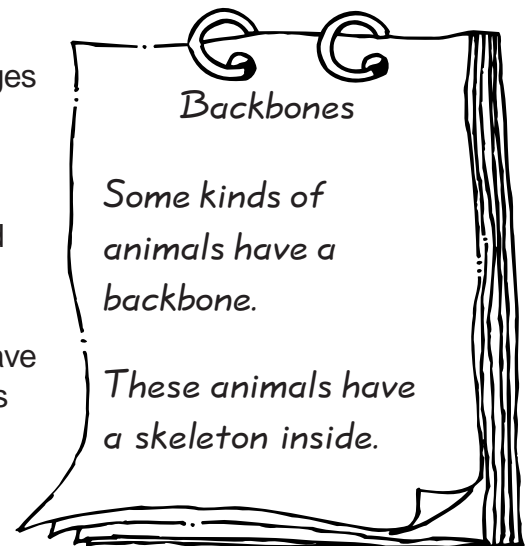


Some Animals Have a Backbone

- You will need the skeletons of a chicken and a fish. Clean all the meat off the bones, wash them thoroughly, and let dry. Place the skeletons on separate trays.

Working with a small group at a time, have students examine the bones and name the ones they recognize. Point to the backbone of each animal. Ask, "Do you know what these skeleton bones are called? Is the skeleton inside or outside of the animal?" Provide the term "backbone" if students do not know the answer.

- Make overhead transparencies of the animal skeletons on pages 8 and 9. Show the transparencies and call on students to point out the backbone on each.
- Reproduce page 10 for each student. Have them locate and circle each animal's backbone.
- Begin a class logbook with a page entitled "Backbones." Have students copy the logbook entry for their individual logbooks using the form on page 4.



Check with a high school science department to see if they have skeletons you can borrow. Borrow x-rays of animals from a veterinarian. Take a field trip to a natural history museum to see skeletons.

