



# Literature and Biological Diversity

## Materials:

### Activity One:

- ☆ *Grasshoppers* from a *Joyful Noise, Poems for Two Voices* by Paul Fleischman (Harper Row, 1988) or another poem about nature.

### Activity Two:

- ☆ Book-making materials such as paper, crayons and ribbon.

### Activity Three:

- ☆ *I Wish I Were a Butterfly* by James Howe (Gulliver Books, 1987) or another environmentally-oriented children's book.

relate and apply ideas about biological diversity presented in the literature.

## Activity One: The Literature Connection

### PROCEDURE:

1. Analyze how literature and science (environmental science) connect with one other. Share nature stories, books and poems that the students have read (they must contain scientific facts or have science-based story lines) with the class.
2. Read a nature poem, such as *Grasshoppers from Joyful Noise* by Paul Fleischmann. *Grasshoppers* is from a collection of poems for two voices. It is written so that one person or group reads phrases on the left side of the page while the other group reads the phrases on the right side. Center phrases are read simultaneously. After reading, have students discuss the following questions:
  - What scientific information did you obtain from this poem?
  - Could anything in this poem form the basis for a scientific experiment? Justify your explanation.
  - How does this poem illustrate biological diversity? Could you relate this to Arkansas?
3. Students may write a poem showcasing facts about biodiversity in general or biodiversity within a specific

habitat or Arkansas ecosystem (on the playground, in a rotten log, under a rock or on a mountain).

## Activity Two: Be an Author

### PROCEDURE:

1. Create and illustrate a book based on biological diversity in Arkansas to be used by students in a lower grade, a library or shown at a book fair.
2. Cover and contents:
  - Make your own book using blank art or other heavy paper, cardboard or foam board covered with contact paper for covers and ribbon for binding. You may also order bound, blank books and erasable crayons from Treetop Publishing, Box 085567, Racine, WI 53408-5567, (414-884-0501).
  - Include a title, author and dedication page.
  - Create a WOW page! This can be a surprise such as a pop-up, a flap to lift or paper animal from Arkansas.
  - Investigate other nature books for ideas, examples and techniques to use in making your books.
  - Use drawings rather than computer graphics since personal touches make a book unique and special.
  - Vary techniques and arrangements on pages.
  - Writing the book out in

## Rationale

This lesson will enhance student thinking skills through literature that explores nature in Arkansas. This literature should address questions or activities that ask students to observation and critical thinking skills to understand nature in Arkansas.

## Objectives

1. Students will relate biological diversity in Arkansas to literature.
2. Students will learn that biology can be interdisciplinary.
3. Students will gain exposure to various examples of biological diversity in literature and will learn to

list form or outline prior to construction may simplify the finished writing.

- Write the story, divide it up by pages, and then draw a picture for each page.
- Do a rough draft on paper with pencil sketches.
- Use classmates as editors.
- Arrange meetings between the writers and the students they are writing for to gather information, suggestions, and names.
- Host a book party and author signing for other students and grades when the books are finished.

### **Activity Three: Dissecting a Book**

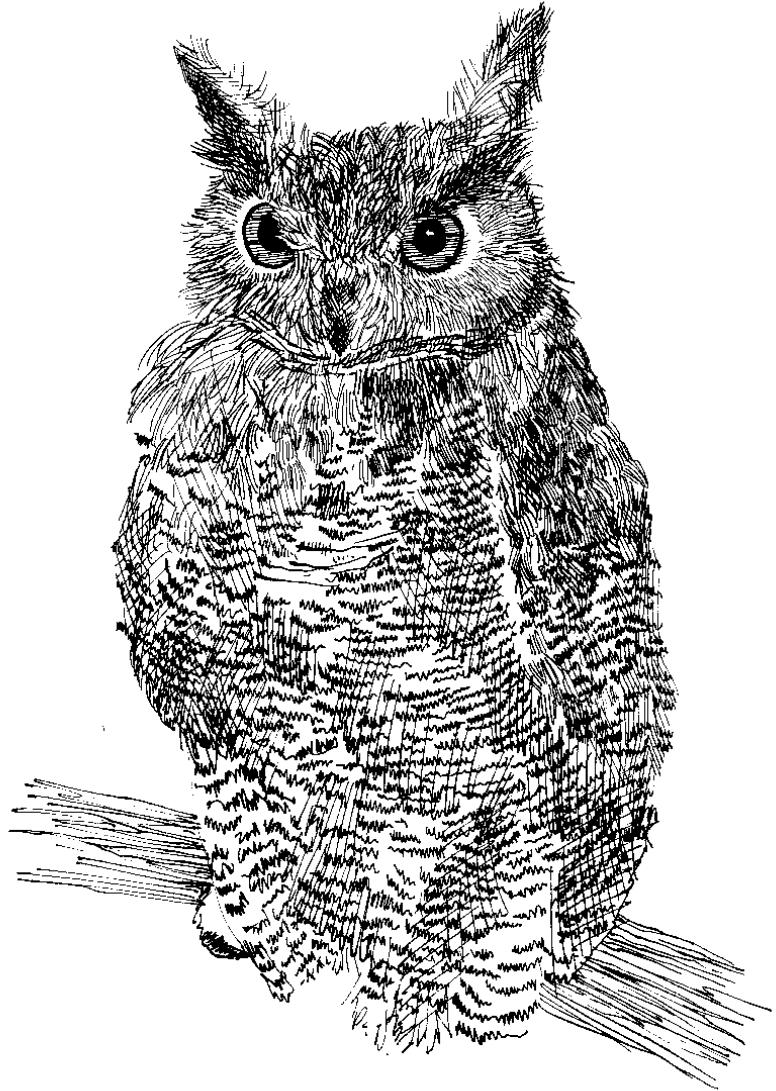
#### **PROCEDURE:**

1. Read to the class, *I Wish I Were A Butterfly* by James Howe (Gulliver Books, 1987). This is a book that expresses a common childhood wish - to be something or someone else. It also is a good source of information about science.
  2. Identify the biodiversity concepts found in the books, including:
    - Variety of organisms.
    - Number of different habitats.
    - Living and non-living things change over time
    - Organisms have different types of locomotion (movement).
    - Organisms have different activity periods.
  3. Analyze books relating to plants, animals and the biological diversity of ecosystems. Conduct one or more of the following biodiversity activities that fit a favorite book or story of the students:
    - Organisms have different means of communication.
    - Capture a jar of fireflies and read by their light. Release them afterwards. Are there any other organisms you can use in similar ways (ex.: glow-worms, the larvae of fireflies)? What is the purpose of the firefly's light (communication)? Count the number of flashes that fireflies make and note the varied patterns their lights make (each species has its own number and pattern).
    - Spend an evening investigating the habitat of spiders. Point a flashlight outward from your forehead, aiming it where you might expect a spider to live (e.g., base of a tree, around rocks, edge of the house). When the light hits the spider's eyes, they will glow emerald green. How many places and how many different spiders can you locate?
    - Describe different methods of animal locomotion (movement) on slips of paper and drop them into a jar. Have each student chose a slip and web. Test how different imitate the movement written on paper. Ask the other students to guess what animal is being depicted (ex.: crickets crawl, spiders run, dragonflies dart, butterflies drift and frogs hop).
- Brainstorm and list which animals are nocturnal (active at night) and those that are diurnal (active during the day). Discuss adaptations (structures, chemical processes and behaviors) these animals exhibit that help them fit their activity period.
  - Conduct a field trip to a small pond or stream that is surrounded by a field or meadow. Investigate how the combination of the pond and its surrounding meadow increases biodiversity of nearby life forms.
  - For a lesson in the diversity of a species, count the spots on the backs of a number of different ladybug beetles. You will find them to be a very diverse group.
  - Locate spider webs and try to identify the type of spider type from the web pattern. Capture a web (without the spider) by placing black construction paper gently against one side of it while spraying the other side lightly with hair spray until the web sticks to the paper. Make your own class web with string and see if you can feel vibrations when something bumps its web.

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items bump against the string web.

- Discuss the metamorphosis of insects. How do cricket metamorphosis (incomplete) differ from metamorphosis of butterflies (complete). Research how some parts of nature do not undergo metamorphosis, but continue to change over time (e.g.: aging of humans, ecosystem succession).
- Using a variety of colored pipe cleaners and tissue paper, make different types of butterflies.
- Hatch a moth, butterfly or frog in the classroom. Keep a daily journal of student observations.



***Correlation to  
National Science Standards***

Unifying Concepts and Processes  
Life Science

***Correlation to  
Arkansas Frameworks***

Science

## Teacher Background Information for the Science Literature Connection

Why integrate seemingly different subjects, such as science and literature? Science is often abstract while story lines and literary structure can make science facts and concepts more user-friendly. Stories build interest and enable readers to absorb information quickly. A science and literature link help students to understand how everyday things work. Both science and literature emphasize process skills, problem solving and manipulation of objects and language.

All students should be exposed to a variety of teaching methods and materials. Students can learn to communicate observations and inferences in a variety of ways. Content, language and thinking skills are necessary to experience, communicate discoveries and the results of hands-on science. Literature can help tame the increasing complexity and content of science and focus attention on scientific concepts using language that is appropriate for various learning stages.

Today, learning is not restricted to isolated subjects but about integrating various curriculum areas and building connections among them. Students must learn to read simultaneously for information, ideas, insights and entertainment, as well as develop skills needed for the future. There are books, essays, poetry and short stories for all science topics (life, earth, space and physical sciences) alone and in various combinations. There are connections among disciplines that lend themselves to classes, small groups or individual activities. Good questions for science teachers to ask themselves about a possible literature selection include the following.

- Are the science concepts recognizable and adequately covered?
- Is the story factual? If it is not, are the science facts discernable from fiction?
- Are there science misconceptions present?
- Are illustrations scientifically accurate? Are animals, plants and other organisms portrayed in a natural manner?
- Does time passage follow a clear and adequate sequence?
- Does the book project science and/or technology in a positive light? Is the science content timely?
- Is the book within the comprehension range and interest level of the students?
- Does the book encourage curiosity and questioning?

To make literature useful to science teachers and students (or to put it into perspective for them), it is sometimes helpful to categorize the material. The following categories are quite broad and can be made more specific if desired (however almost all science-based or related literature will fall into one or more of them). Categorizing science related literature can help students differentiate between what is real and what is fantasy, while helping develop the vivid imagination that is vital and common to all great scientist:

- **Imagination:** a blend of fact and fantasy, often requiring input from the student.
- **Relationships:** systems, cycles and processes.
- **Content Knowledge:** adds to the student's base of knowledge about a particular topic.
- **Archetypal Images:** superstitions, legends and symbols.

Some helpful resources for linking literature to science include the following:

*Science Through Children's Literature*  
Teacher Created Materials, Inc  
ISBN-0-87287-667-5

*Connecting Science & Literature*  
Teacher Ideas Press  
ISBN-1-55734-1

*Vital Connections: Children, Science, and Books*  
Heinemann  
ISBN-0-435-08332-5

*Science and Stories: Integrating Science & Literature*  
Scott Foresman, Glenview, IL 60025

*Science & Language Links: Classroom Implications*  
Heinemann, ISBN-0-435-08338-4

*Science Workshop: A Whole Language Approach*  
Heinemann, ISBN-0-435-08336-8

# ***Grasshoppers***

**By Paul Fleischman**

Sap's rising

Grasshoppers are  
hatching out  
Autumn-laid eggs

Young stepping

Grasshoppers  
hopping  
high  
Grass jumpers  
jumping

Vaulting from  
leaf to leaf  
stem to stem  
plant to plant

leapers  
Grass-  
bounders

springers  
Grass-  
soarers  
Leapfrogging  
longjumping  
grasshoppers.

Ground's warming

Grasshoppers are  
hatching out

splitting

into spring

Grasshoppers  
hopping

Grass jumpers  
jumping  
far

leaf to leaf  
stem to stem  
Grass-  
leapers

bounders  
Grass-  
springers

soarers  
Leapfrogging  
longjumping  
grasshoppers.

