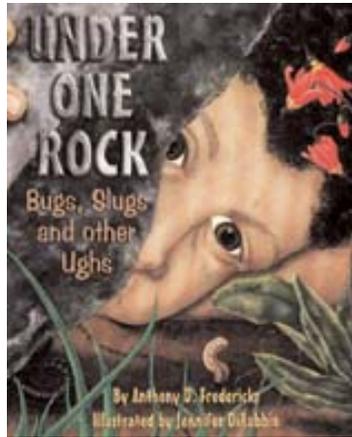


# Under One Rock



*Under One Rock: Bugs, Slugs and Other Ughs*  
by Anthony D. Fredericks

- ☆ 2002 Ecology and Nature Award – *Skipping Stones Magazine*
- ☆ 2003 Teacher's Choice Award – *Learning Magazine*
- ☆ 2008 Book of the Year – *Isaac Walton League*



LEAP into Science



## Overview

A whole community of insects and other creatures live under rocks—worms and ants, spiders and slugs, crickets and beetles. In fact, a whole “community” of neighbors can be found just by lifting up one rock and peeking underneath. What do you think you might discover under one rock?

## Main Ideas

- Many different animals live under a rock.
- Animals sometimes live together in communities composed of various organisms.
- Bugs and insects come in all shapes and sizes...each one fascinating, each one different.

## Materials Needed

- one clean rock (from outside)
- 1 dozen earthworms or night crawlers (available from a local sporting goods store [e.g. Gander Mountain, Dick’s] or bait shop)
- 2 sets of 3/4” square wooden blocks (available from [www.newimageco.com](http://www.newimageco.com) – catalog number: 10477)
- 1 dozen crickets (available from a local sporting goods store [e.g. Gander Mountain, Dick’s] or bait shop)
- 1 Hagen Exo Terra Cricket Pen (available from Amazon.com – catalog #: EHC055)
- 1 bag of dried beans or other suitable markers (checkers, bingo chips)
- 1 set *Scramble Squares – Insects* (available from Amazon.com – catalog #: 10028)
- 2 sets of *Insect Lore Big Bunch O’ Bugs 15-Pack* (available from Amazon.com – catalog #: 04840)
- ink pad
- index cards
- magic markers or crayons (various colors)
- moist towelettes
- duplicated copies of “Bug Board” and “Cricket Bingo”

## Preparation

1. Prepare and set up each of the various “stations” as described below. If possible, place each station on a separate table or in various sections of the room.
2. Duplicate several sets of “Bug Board” sheets (attached).
3. Duplicate each of the four separate “Cricket Bingo” sheets (attached).
4. Read the “Background Information” to become familiar with the characteristics and features of the various animals.
5. Practice reading *Under One Rock: Bugs, Slugs and Other Ughs* by Anthony D. Fredericks prior to reading aloud to the group. Prepare to pause at desired places for asking questions.

## Opening (10-15 minutes)

1. Invite children to sit on the floor in a large circle. Place a rock (the larger, the better) in the middle of the circle. Ask children to imagine that the rock is outside. Encourage them to think about the kinds of animals that might live under the rock if it was outside. Ask, “*What are some of the animals you might find if you were to lift up that rock? What are some animals you would definitely NOT find under that rock?*”

2. Display the book *Under One Rock* by Anthony D. Fredericks and explain that the boy in the story, learns a lot about animals by going into a field, discovering a rock, and lifting up the rock to see what was underneath.
3. Read *Under One Rock*. As you read, invite children to say the last line of each stanza (*That hides a whole crowd on a summer's day.*) along with you as you read it aloud.
4. Occasionally point out the different kinds of animals that can live under a rock. Ask the children why they think these animals are living under the rock.
5. Stop once or twice during the reading (or after the reading) to ask some critical thinking questions. For example, you might ask,
  - Which of the creatures was most amazing?
  - How did the illustrations help you learn about the animals in this book?
  - Which of the animals would you like to learn more about?
  - How are so many different animals able to live together in one place?
  - What other animals do you think could be found under a single rock?
  - If you could tell the author one thing, what would you like to say?
6. At the conclusion of the story, review a few of the young boy's experiences and discoveries and encourage children to add ways that their own experiences are similar and different.

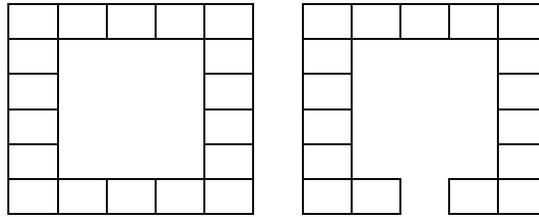
### **Exploration Part 1 (10-15 minutes)**

1. Tell the children that there were seven different animals that the boy discovered under the rock. Invite them to recall each of the animals (assist where necessary). [earthworms, ants, spider, beetle, crickets, millipede, slugs]
2. Ask the children how the animals are similar (they all live under a rock, they are all relatively small). Ask the children how the animals are different (they have different shapes, they eat different foods).
3. Encourage the children to discuss why the animals all live under the rock. *What would they find there? Why is it safe for them? Why is it better than living somewhere else?* Encourage them to share their thoughts.
4. Ask the children how many of them have seen some of the animals before. *Where were they? What do they remember about those animals? What did they notice?*
5. Invite individual children to each select one of the critters mentioned in the book. Invite each child to demonstrate the movement of that insect in a designated area. For example:
  - Earthworm: children can slither across the floor on their bellies
  - Cricket: youngsters can leap on their hands and knees
  - Beetle: children can walk using both their hands and feet
  - Ant: children can walk in a line using their feet and hands
  - Spider: youngsters can lie on their back, push themselves up with both hands and feet, and walk sideways (upside down)
  - Millipede: children can attempt to walk across the floor on their knees and elbows
  - Slug: youngsters can slide across the floor on their bellies

Provide opportunities for children to describe their movements and why they may be unique to each selected animal.

## Exploration Part 2 (10-15 minutes)

1. Invite children to create 1-3 different structures or mazes using the wooden square blocks. The following designs are suggested as “starters.”



2. Place an earthworm in one of the structures. Ask children to predict what the earthworm will do (not move, crawl out of the structure, crawl over the wall of the structure).
3. Place additional earthworms in each of several structures.
4. As each earthworm begins to move invite the children to describe its movements. *How is it moving? How are its movements similar to another animal? Why do you think it is so slow? Do you think this is the way it moves when outside?*
5. Children may wish to use a watch or clock to time how long it takes an earthworm to crawl out of a box or exit a maze.
6. As time allows, invite children to create other structures or mazes for the earthworms to move through.
7. Make sure children understand that earthworms typically live underground and that they move through the soil, rather than on top of the soil (as demonstrated by this activity). The way earthworms move (or wriggle) allows them to traverse over and around particle of soil.
8. [When you are through using the earthworms, and if the weather is appropriate, plan to release your specimens in a garden or other outdoor location.]

## Exploration Part 3 (10-15 minutes)

1. Duplicate each of the four separate copies (#1, #2, #3, #4) of the “Cricket Bingo” sheets (attached).
2. Provide each child with a ‘Cricket Bingo’ sheet. Tell them that crickets do many different things during their lives (chirp, jump, leap, crawl, hop, climb). Some of those actions are on the “Cricket Bingo” sheet.
3. Place about 1-2 dozen crickets into the Exo Terra Cricket Pen.
4. Invite children to observe the crickets inside the Cricket Pen. Ask them to look for some of the actions that are indicated on their individual “Cricket Bingo” sheet.
5. As they observe an action by one or more of the crickets, invite children to place a marker (a bean, checker, chip) on the word or phrase indicated in the “Cricket Bingo” sheet.
6. Challenge children to get five markers in a row (across, down, or diagonal) – **BINGO!**
7. As time allows, invite children to share some of their observations about the crickets. What did they notice? Would the crickets behave differently outdoors?

## Exploration Part 4 (10-15 minutes)

1. Duplicate several copies of the “Word Wise” sheet (attached).
2. Provide each child (or a small group of children) with a “Word Wise” sheet. Inform children that there are many words that can be used to describe insects. Some of those words are on the “Word Wise” sheets. Share each of the words on the sheet and invite children to explain or define each of the words.

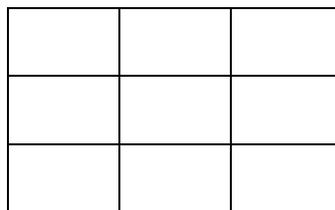
3. Provide children with the plastic insects. Invite children to place an insect in a square on the sheet that has an appropriate descriptive word (For example, a child may place an ant on the “tiny” block.). Invite children to explain why a particular insect is placed in a specific square (Please note that there are many possibilities and many different options for each insect.).
4. Take some time to share some of the “matches” children made. Note any similarities and/or differences.

### Exploration Part 5 (10-15 minutes)

1. Inform children that insects come in all shapes and sizes. Invite children to describe some of the shapes and sizes (of insects) with which they are familiar.
2. Provide each child with an index card and some crayons/magic markers.
3. Help each child press his/her thumb on the ink pad and press the inked thumb on an index card. Wipe off each child’s thumb afterwards using a moist towelette.
4. Invite each child to create an insect drawing using the thumbprint as the insect’s body. Using the crayons/magic markers, each child can create legs, antennae, body parts, head and other features for their insect drawings.
5. Plan time for each child to describe (or perhaps name) his/her insect. *How is that insect similar to other insects you have seen outdoors? How is your insect similar to the insects we read about in the book?*
6. Invite children to take their insect cards home to share with parents and other family members.

### Exploration Part 6 (10-15 minutes)

1. Explain that there are many different kinds of insects in the world. Tell children that they heard about several different kinds of insects and bugs in the book. However, there are thousands...millions...of other kinds of insects in the world.
2. Provide children with the nine “Scramble Squares” and invite them to work on their own or in small groups to unscramble the nine squares pieces by perfectly matching the pictures on the squares’ edges, forming a large square, as shown in the diagram:



Inform children that this is a challenging puzzle and will take some time to complete.

3. As children complete the puzzle invite them to discuss the various insects portrayed. *What do they know about these insects? What body parts do you note? (head, thorax, abdomen, wings, etc.) How are these insects similar to those found where they live? How are these insects similar to or different from the insects described in the book?* [The insects represented on the squares include: Carpenter Ant, Dragonfly, Praying Mantis, Stag Beetle, “Ladybug” beetle, and “Firefly” beetle.]

### Wrap-Up

1. Bring the children back together to share what they learned in the various activities. Encourage them to discuss the features or characteristics of the various insects and/or bugs they worked with.

2. If there is time, read some of the **Fantastic Facts** described at the end of the book. Invite children to comment on selected facts.
3. Invite children to share something new they learned or new questions they have about insects. Talk about some of the different insects found throughout the world or right in their own neighborhood.
4. As a closing, inform children that they were using many of the same skills and talents that scientists use every day. These include the processes of:
  - Observing (using several of their 5 senses)
  - Classifying (putting things into groups)
  - Predicting (making educated guesses about future events)
  - Inferring (making educated guesses about current events)
  - Measuring (calculating time, distance, length, etc.)
  - Communicating (sharing information with each other)
  - Experimenting (trying new things; finding answers to their questions)

## Signs of Success

Children will...

- Share stories or experiences that relate to and reinforce the *insects* activities.
- Explore and observe insects in numerous ways in their home and at school.
- Identify ways they are similar to the young boy in *Under One Rock*, by recalling details from the book.
- Demonstrate engagement, curiosity, and creativity in seeking out and examining insects in and around where they live.
- Work cooperatively, taking turns with materials and sharing ideas.
- Conduct inquiry using a book as a source of information.

## Other Ideas to Explore

1. Invite children to keep a journal of the activities, habits, travels, and motions of a single animal. They may want to select a house pet or some other animal that can be observed quite regularly throughout the day. Provide youngsters with a "Field Journal" – a simple notebook wildlife biologists frequently use to track the activities of one or more wild animals over the course of an extended period of time.
2. Invite children to select a rock near their home. Encourage them to take periodic photographs of the rock over several weeks or months and maintain a diary or journal of the events or changes that take place around the rock. Who comes to visit the rock (animals)? What does the rock look like when it rains, snows or is sunny outside?
3. Talk with children about some of the 'Fantastic Facts' included in the back of this book. Which ones did they find to be most amazing? Why did the author include those facts?
4. People live in a wide variety of houses or dwellings – so do animals. Invite children to create a chart and investigate the wide variety of homes and dwellings used by animals. They may wish to use some of the following examples and add to the list through their library readings:

nest	burrow
cave	tunnel
branch	ledge

Invite children to discuss the similarities between human dwellings and animal homes. What are some of the things that determine where an animal lives? Are those conditions or features similar to the considerations of humans in selecting a living site? Invite youngsters to create a chart of animal homes and examples of the animals that might live in or on those spaces.

5. Provide children with an assortment of magazines that contain pictures of insects and spiders. Encourage them to bring in old magazines from home, too. Invite children to make a collage by pasting pictures of different invertebrates on an *Insects & Spiders* poster.

## **Background Information**

Spiders, slugs, ants and the other creatures in the book can be found throughout the world. The specific species described and illustrated in the book are all native to North America. Their habitat, like other animal habitats, offers a fascinating look into how various ecosystems, food chains or food webs work.

### **Earthworms**

Earthworms are found all over the world in all types of soil. Most move through the ground eating dead fragments of plants along with the soil. The soil passes through their bodies and is deposited in new locations. This not only aerates the soil, but also brings new dirt to the surface. Earthworms are important to farmers and to the life cycle of many plants.

### **Ants**

Ants are some of the most widespread of all animals. Ants typically live in colonies that are divided into groups. These groups may include “soldiers” (ants who guard and protect the colony), “nurses” (ants who take care of the newborn members of the colony), and “farmers” (ants who tend enormous underground gardens).

### **Spider**

There are more than 35,000 species of spiders living throughout the world. Spiders have four pairs of legs; whereas insects have three pairs of legs. Most spiders have eight simple eyes, although some species have fewer. Interestingly, spiders have bad eyesight. Some spiders have such poor vision that they cannot find an insect that is right in front of them. If the insect moves, however, the spider can detect the vibrations it makes and pounce on it.

### **Beetles**

There are about 300,000 species of beetles worldwide. Some crawl on land, others fly, and a few live in water. Their tough, armor-like wings distinguish them from other insects. Some species feed on plants. Others eat various plant pests. Beetles have chewing mouthparts that enable them to eat many things. Some species of beetles live entirely on dead animals.

### **Field Crickets**

Field crickets are black to dark reddish brown. They grow to lengths of approximately 5/8” to one inch. Their diet includes seeds, small fruits, and dead insects. They are noted for their songs—usually a series of triple chirps. Male crickets produce this sound by rubbing together roughened portions of their wings or legs. These sounds are used in courtship, to establish territory, or as a form of warning.

### **Millipede**

The word millipede means thousand-footed. However, no millipede has 1,000 feet. Some have as few as 20 legs, while a few tropical species have as many as 230 legs. Their legs are designed for moving through loose soil and humus. Millipedes have two pairs of legs on each body segment. Millipedes have two very sensitive antennae on their heads. These antennae have sensors that can taste foods, smell odors, measure temperature, and find water. Most millipedes eat dead plants and wood.

## Slugs

Slugs crawl on their bellies, so they are known as gastropods, a word which means “belly foot.” Some slugs live in the ocean, some live on land. Land slugs are covered with gooey slime. This slime helps them glide over rough surfaces and sharp objects. Slugs spend most of the day underground or under rocks. This prevents them from drying out. Many species of slugs are herbivorous. That means they eat mostly stems, leaves, and roots of plants.

## Other Books to Explore

Fredericks, Anthony D. (2011). *Around One Log: Chipmunks, Spiders, and Creepy Insiders*. Dawn. ISBN: 978-1-58469-138-9.

Fredericks, Anthony D. (2005). *No Sweat Science: Nature Experiments*. Sterling. ISBN: 1-4027-2158-7.

Fredericks, Anthony D. (2005). *Near One Cattail: Turtles, Logs and Leaping Frogs*. Dawn. ISBN: 1-58469-071-2.

Fredericks, Anthony D. (2006). *On One Flower: Butterflies, Ticks and a Few More Icks*. Dawn. ISBN: 1-58469-087-9.

Fredericks, Anthony D. (2011). *P is for Prairie Dog: A Prairie Alphabet*. Sleeping Bear. ISBN: 978-1-58536-508-1.

Himmelman, John. (2001). *An Earthworm's Life*. Children's Press. ISBN: 978-0516265353.

Pfeffer, Wendy (2007). *A Log's Life*. Aladdin. ISBN: 978-1416934837.

Silver, Donald. (1997). *Backyard*. McGraw-Hill. ISBN: 978-0070579309.

Tomecek, Steve. (2007). *Jump into Science: Dirt*. National Geographic. ISBN: 978-1426300899.

Ward, Jennifer. (2005). *Forest Bright, Forest Night*. Dawn. ISBN: 978-1584690672.

### **Pennsylvania Educational Standards**

#### Reading

1.2.3 A 1.3.3 A 1.6.3 A, B  
1.8.3 A, B

### **NRC National Science Education Standards**

Content Standard A: Science as Inquiry  
Content Standard C: Life Science

### **AAAS Benchmarks for Science Literacy**

1B Scientific Inquiry  
5D Interdependence of Life  
12A Value and Attitudes  
12D Communication Skills

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## Word Wise

<b>squiggly</b>	<b>round</b>	<b>busy</b>
<b>shiny</b>	<b>black</b>	<b>many feet</b>
<b>creepy</b>	<b>fast</b>	<b>big</b>

# Cricket Bingo #1

One cricket in water tray	Two crickets in water tray	Three crickets in water tray	One cricket hops	Two crickets tail to tail
Three crickets on a black bar	One cricket on a black bar	Two crickets head to head	One cricket in a corner	Two crickets in a corner
Two crickets face each other	Three crickets side by side	<p><b>FREE</b></p> 	Two crickets side by side	One cricket inside a black bar
Two crickets inside a black bar	One cricket in a food dish	One cricket on top of another cricket	Two crickets hop	One cricket on side of cage
One cricket chirps	Two crickets in a food dish	One cricket moves antennae	Two crickets on a black bar	Three crickets in a food dish

## Cricket Bingo #2

Two crickets in a food dish	One cricket on top of another cricket	One cricket chirps	One cricket moves antennae	One cricket inside a black bar
One cricket in a corner	Two crickets face each other	One cricket in water tray	Three crickets side by side	Two crickets on a black bar
One cricket on side of cage	Two crickets hop	<b>FREE</b> 	Two crickets in corner	Three crickets in food dish
Two crickets head to head	Two crickets tail to tail	One cricket hops	Three crickets in water tray	Three crickets on a black bar
One cricket on a black bar	Two crickets inside a black bar	Two crickets in water tray	Two crickets side by side	One cricket in food dish

# Cricket Bingo #3

One cricket chirps	Two crickets tail to tail	Two crickets in corner	Three crickets in water tray	Three crickets on a black bar
Two crickets in food dish	Three crickets in food dish	Two crickets on a black bar	One cricket in food dish	One cricket on side of cage
Two crickets head to head	Three crickets side by side	<b>FREE</b> 	One cricket hops	One cricket on top of another cricket
One cricket in a corner	Two crickets face each other	One cricket on black bar	One cricket in water tray	Two crickets inside a black bar
Two crickets hop	One cricket inside a black bar	Two crickets side by side	Two crickets in water tray	One cricket moves antennae

## Cricket Bingo #4

Three crickets in water tray	One cricket chirps	One cricket in food dish	One cricket moves antennae	Two crickets tail to tail
Three crickets on a black bar	One cricket in corner	Two crickets in water tray	Two crickets on a black bar	Three crickets side by side
Two crickets in food dish	One cricket hops	<b>FREE</b> 	One cricket on top of another cricket	Two crickets side by side
Two crickets inside a black bar	Three crickets in food dish	One cricket on side of cage	Two crickets face each other	One cricket on black bar
Two crickets hop	One cricket inside a black bar	One cricket in water tray	Two crickets in corner	Two crickets head to head