

## Discover a Species



### MATERIALS & PREPARATION

- ▶ Computers with Internet access
- ▶ Make copies of Fact Sheet and Assignment Sheet, one per group of four.
- ▶ Make copies of Northern Dusky Salamander image, one per group of four.

#### STANDARD COURSE OF STUDY CORRELATIONS:

*Science, Grade 5, Goal 1:* The learner will conduct investigations to build an understanding of the interdependence of plants and animals.

- 1.01** Describe and compare several common ecosystems (communities of organisms and their interaction with the environment).
- 1.03** Explain why an ecosystem can support a variety of organisms.
- 1.04** Discuss and determine the role of light, temperature, and soil composition in an ecosystem's capacity to support life.
- 1.05** Determine the interaction of organisms within an ecosystem.

*Science, Grade 6, Goal 7:* The learner will conduct investigations and use technologies and information systems to build an understanding of population dynamics.

- 7.01** Describe ways in which organisms interact with each other and with non-living parts of the environment:
  - Coexistence/Cooperation/Competition.
  - Symbiosis.
  - Mutual dependence.
- 7.02** Investigate factors that determine the growth and survival of organisms including:
  - Light.
  - Temperature range.
  - Mineral availability.
  - Soil/rock type.
  - Water.
  - Energy.
- 7.03** Explain how changes in habitat may affect organisms.
- 7.06** Investigate processes which, operating over long periods of time, have resulted in the diversity of plant and animal life present today:
  - Natural selection.
  - Adaptation.

*Science, Grade 8, Goal 5:* The learner will conduct investigations and utilize appropriate technologies and information systems to build an understanding of evidence of evolution in organisms and landforms.

- 5.02** Correlate evolutionary theories and processes:
  - Biological.
  - Geological.
  - Technological.
- 5.03** Examine evidence that the geologic evolution has had significant global impact including:
  - Distribution of living things.
  - Major geological events.
  - Mechanical and chemical weathering.

*Biology, Goal 4:* The learner will develop an understanding of the unity and diversity of life.

**4.01** Analyze the classification of organisms according to their evolutionary relationships.

- The historical development and changing nature of classification systems.
- Similarities and differences between eukaryotic and prokaryotic organisms.
- Similarities and differences among the eukaryotic kingdoms: Protists, Fungi, Plants, Animals.
- Classify organisms using keys.

**4.05** Analyze the broad patterns of animal behavior as adaptations to the environment.

- Innate behavior.
- Learned behavior.
- Social behavior.

*Biology, Goal 5:* The learner will develop an understanding of the ecological relationships among organisms.

**5.01** Investigate and analyze the interrelationships among organisms, populations, communities, and ecosystems.

- Techniques of field ecology.
- Abiotic and biotic factors.
- Carrying capacity.

**5.03** Assess human population and its impact on local ecosystems and global environments:

- Historic and potential changes in population.
- Factors associated with those changes.
- Climate change.
- Resource use.
- Sustainable practices/stewardship.

**INTRODUCTION TO LESSON:** Students will learn what criteria scientists use to classify new species. They will conduct an independent activity in which they “discover” a species through online research. They will explore the relationship between human activity and the health of a species, its habitat and the overall environment.

**BACKGROUND FOR TEACHER:** Great Smoky Mountains National Park is one of the most biologically diverse areas on the planet, containing an estimated 100,000 species of organisms. Since 1998, a broad coalition of scientists and volunteers has been taking inventory of all the park species—developing checklists, maps and databases that will describe the park for people around the world. While diverse flora and fauna make our national parks beautiful places to visit, the ecological value of biodiversity extends far beyond park borders. Scientists around the globe have come to understand that biodiversity in ecosystems directly influences the natural systems on which humans depend for food production, air quality, water quality, medicine and other critical needs.

**engage** > Write the word *biodiversity* on the board. Ask if any student can explain what it means. Ask students where Great Smoky Mountains National Park is located. Show the location on a North Carolina map. Tell students they are going to watch a video about biodiversity in the park. [Show the video](#). Afterward, lead a discussion about biodiversity. Ask students to explain the purpose of the All Taxa Biodiversity Inventory.

**explore** > Ask students to imagine they are scientists who have just discovered a new species of salamander. What do they think other scientists will want to know about it and where it was discovered? Have students brainstorm what information they would want to share with their colleagues. Have them share their ideas with the class.

### BEYOND THE CLASSROOM

Find a local museum or university expert to discuss with students his or her research on the value of biodiversity.

### Additional Resources:

**Great Smoky Mountains National Park All Taxa Biodiversity Inventory (ATBI)** • <http://www.dlia.org/index.shtml>

**Great Smoky Mountains National Park Web Page** • <http://www.nps.gov/grsm/index.htm>

**International Institute for Species Exploration** • <http://www.species.asu.edu/>  
• A clearinghouse of information on new species discoveries, including the annual Top 10 New Species List.

**New Species News, Science Daily** • [http://www.sciencedaily.com/news/plants\\_animals/new\\_species/](http://www.sciencedaily.com/news/plants_animals/new_species/)

**Finding New Species: The Golden Age of Discovery** • <http://e360.yale.edu/content/feature.msp?id=2129>

*explain* >

1. Divide the class into groups of four. Give a copy of the Northern Dusky Salamander image to each group. Explain to the class that scientists need to know a few key facts about newly discovered species:

**Classification:** Scientists consider internal and external features of an organism and DNA results when classifying it. What are some key field marks (e.g., color, patterns, size, shape) that could be used to identify this salamander? What is the difference between a common name and a scientific name?

**Behavior:** Once a new species is described, scientists observe behaviors including feeding and mating habits.

**Habitat:** Scientists must describe where the species was discovered and what type of habitat it occupies.

2. Hand out Northern Dusky Salamander fact sheets. Explain that this salamander is a well-known species common in North Carolina and Great Smoky Mountains National Park. Review key components of the page. Explain that ecology is the study of the relationship between living organisms and their environment. Emphasize that studying a specific species can provide valuable insight into how human activities may affect that species and its environment.
3. Hand out Assignment Sheets. Tell students they are to research a species that inhabits Great Smoky Mountains National Park and create a fact sheet. Assign each student an animal from the list below. Review with students the components they will need to discover. Tell them that they will present their research results to the class afterward.

Give students the link to the ATBI's Discover Life in America Web site (<http://www.dlia.org/>) as a research starter. They may use the "Search DLIA" menu feature to access information about their assigned species (including photos). Another good reference is the University of Michigan Museum of Zoology's Animal Diversity Web: <http://animaldiversity.ummz.umich.edu/>.

**GREAT SMOKY MOUNTAINS SUGGESTED RESEARCH SPECIES** (For additional species, see the species index of the ATBI: <http://www.dlia.org/atbi/species/index.shtml>.)

- |   |                                  |
|---|----------------------------------|
| 1. Black bear   | 13. Black rat snake              |
| 2. White-tailed deer                                      | 14. Timber rattlesnake           |
| 3. American elk<br>(re-introduced native species)         | 15. Eastern slender glass lizard |
| 4. American beaver  | 16. Northern fence lizard        |
| 5. Gray fox   | 17. Common musk turtle           |
| 6. Red fox  | 18. Cumberland slider turtle     |
| 7. Bobcat   | 19. Great horned owl             |
| 8. Northern river otter<br>(re-introduced native species) | 20. Great blue heron             |
| 9. Coyote   | 21. Pileated woodpecker          |
| 10. Evening bat   | 22. Red-tailed hawk              |
| 11. Wood frog   | 23. Golden eagle                 |
| 12. Mole salamander                                       | 24. Brook trout                  |
|   | 25. Mountain brook lamprey       |

*elaborate* > Have students complete one of the following exercises:

- Investigate how the ATBI is progressing.
- Research articles on the economic and environmental value of biodiversity and prepare a summary or presentation.
- Research a newly discovered species, including how/where it was discovered and described (See *Additional Resources*).

*evaluate* > Have students present their research in class. Student work may be assessed using the rubric.

Student Name: \_\_\_\_\_

Animal Researched : \_\_\_\_\_

Topic	Score = 1- 4	Comments
Common and Scientific Name		
Image and Photo Credit		
General Description		
Key Field Marks		
Key Behaviors		
Habitat and Range		
Ecological Considerations		
<b>TOTAL SCORE</b>		

**Rubric Scoring:**

4 = Excellent research and presentation.

3 = Good information but formatting needs polishing.

2 = Needs work: Information is incomplete and/or formatting is unacceptable; incorrect grammar and spelling.

1 = Incomplete.

*Teacher's Notes:*

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Image

## Northern Dusky Salamander



*Northern dusky salamander photo by Alvin Braswell, N.C. Museum of Natural Sciences.*

## Fact Sheet

## Northern Dusky Salamander



**Scientific Name:** *Desmognathus fuscus*

**Common Name:** Northern Dusky Salamander

This salamander is one of the most common salamanders in North America. This species lives in wooded or partially wooded, moist habitats near water. Because it is generally nocturnal, it can be found during the day resting under debris. The color patterns on its back change as the salamander ages.

**Key Field Marks:**

- Variable in color, but often has a dark (brown or tan) wavy stripe that runs the length of the dorsal surface from head to tail.
- Pale line extends from eye to angle of jaw.
- Back legs slightly smaller than front.
- Juveniles have five to eight pairs of dots that fade away as the animals grow.
- Adults are  $2\frac{1}{2}$  -  $4\frac{1}{2}$  inches long.

**Key Behaviors:**

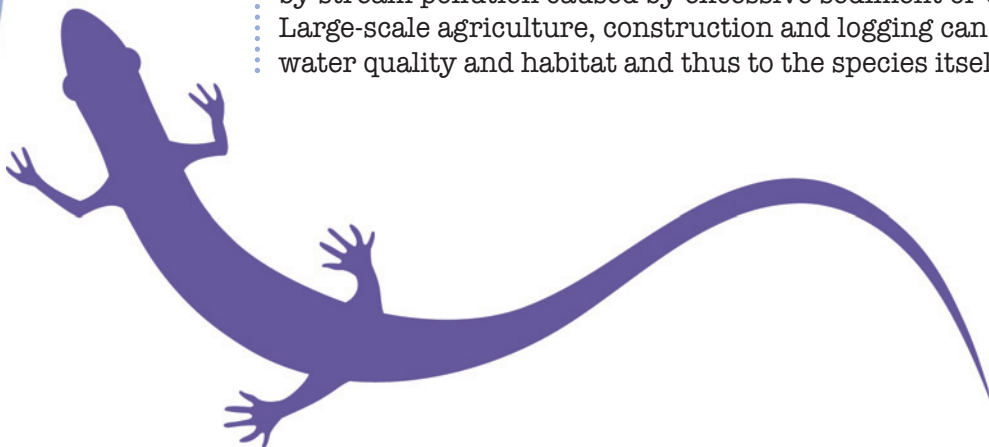
- Eats small insects, spiders and various macroinvertebrates.
- Nocturnal; spends days under debris or in burrows along the sides of creeks.
- Lays 10-20 eggs under rocks or debris near stream; female stays with eggs until hatched.

**Habitat and Range:**

- Found from eastern Canada south to the Carolinas and west to Tennessee, Indiana and Ohio.
- Prefers wooded habitats, especially near creeks and seepages.
- Often found under flat rocks, logs or other debris near water.

**Ecological Considerations:**

Species health is closely tied to water quality. Populations may be affected by stream pollution caused by excessive sediment or chemical runoff. Large-scale agriculture, construction and logging can pose threats to water quality and habitat and thus to the species itself.



## Assignment Research Worksheet

**Common Name:**

**Scientific Name:**

**Brief General Description:**

**Key Field Marks:**

(List at least three key identifying features.)

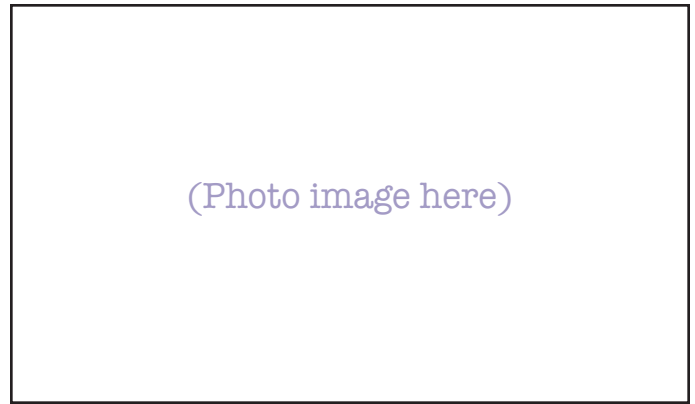


Photo by: (photo credit here)

**Key Behaviors:**

(List at least three behaviors, for example, feeding, migration, reproduction, period of activity.)

**Habitat and Range:**

(What is the extent of the geographical range of this species? What type of habitat does it need to thrive?)

**Ecological Considerations:**

(How does human activity affect the environmental needs of this species? Are there specific current threats to the species? If so, explain. Are humans helping to preserve the species in any way? If so, explain.)