JUNIOR WILDLIFE SCIENTIST

TEACHER GUIDE

LEVEL 4: HERPETOLOGIST

The Study of Reptiles & Amphibians

This book belongs to

_____

Alabama Wildlife Federation
Junior Wildlife Scientist Pilot Program

Junior Wildlife Scientist Teacher's Guide

The Junior Wildlife Scientist (JWS) Teacher's Guide provides the framework for the Junior Wildlife Scientist program and suggestions on how to make the most of it for your students.

Table of Contents

JWS Nature Notebook Activities' Lesson Plans Format

Each lesson plan includes:

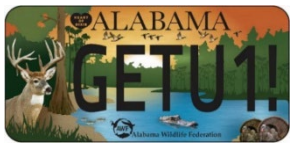
- ☑ **Activity Goal** – the purpose of the activity
- ☑ **Activity Tips** – what time of year is best for conducting the activity, which learning station(s) you should or could use to conduct the activity, and what materials you need for the students to complete the activity
- ☑ **Learning Objectives** – specific tasks and concepts students should understand after completing the activity
- ☑ **AL CoS Standards & Correlations** – specific Alabama Department of Education Course of Study Standards for math, science, social studies, and English language arts that the activity helps to teach
- ☑ **Background Information** – important information about the topic(s) covered in the activity and how it relates to herpetology and being a herpetologist
- ☑ **Optional Educational Resources** – additional resources that can be used in conjunction with the activity including trade books, topical videos, educational sing-a-longs, and Alabama Wildlife Federation Student Exploration Link webpages (See page 5)
- ☑ **Procedural Instructions** – step-by-step instructions for conducting the activity
- ☑ **Activity Page Answers** – answers for the questions asked on each activity page
- ☑ **Expansion Options** – additional activities and AWF Student Exploration Link webpages that are relevant to the topic of the activity and can be used to expand the lesson

Alabama Wildlife Federation Conservation Education Partners

The **Alabama Wildlife Federation (AWF)** is the oldest and largest nonprofit, conservation organization in Alabama. Sportsmen established the AWF in 1935 to promote the conservation and wise use of our wildlife and natural resources and to ensure a high quality of life for future generations of Alabamians. The AWF's conservation education programs include:

- **Alabama Outdoor Classroom Program** - The AOC Program provides technical assistance and support to educators, administrators, students, and community volunteers who wish to create sustainable wildlife habitats that can be used as outdoor classroom sites on their school grounds. These outdoor classroom sites provide hands-on, inquiry-based learning opportunities that allow students to utilize multidisciplinary skills in a fun and exciting environment. Assistance and support are provided through the resources below:
  - ✓ Site Evaluations
  - ✓ Planning Committee Meetings
  - ✓ Outdoor Classroom (OC) Site Maps
  - ✓ Materials List & Estimated Budget
  - ✓ Grant Proposal Review
  - ✓ OC Build/Work Day Assistance
  - ✓ Master Plan Development
  - ✓ Maintenance Plans
  - ✓ Workshops & Webinars
  - ✓ AOC Program Certification
  - ✓ Student Exploration Link Webpages
  - ✓ OC Field Investigation Activities
  - ✓ Learning Station Signs with QR Codes
  - ✓ Plant ID Signs with QR Codes
  - ✓ **Junior Wildlife Scientist Program**
- **Alabama Nature Center** – The ANC strives to educate children and the general public about the wonders of Alabama's outdoors including our rich natural history and biodiversity through our conservation education programs including our Lanark Field Day field trips, homeschool programs, seasonal camps, naturalist-led hikes, animal encounters, and a Nature on Wheels program that provides activities at the school sites.

AWF's conservation education programs are supported through AWF memberships, generous partners and supporters (*see list below*), funds raised through our Wild Game Cook-Offs, and the Alabama Wildlife car tag (*on right*).



For more info: www.alabamawildlife.org | AWF, 3050 Lanark Road, Millbrook, AL 36054 | 334-285-4550

The **Alabama Department of Conservation and Natural Resources** (ADCNR) is the state agency responsible for the management of Alabama's freshwater fish, wildlife, marine resources, state lands, state parks, and other natural resources. ADCNR's educational programs include Hunter Education classes, Archery in the Schools, and the Waterfowl Stamp Art Contest.

For more info: www.outdooralabama.com | ADCNR, 64 N. Union Street, Montgomery, AL 36130 | (334) 242-3151

The **Alabama Cooperative Extension System** (ACES) is the primary outreach organization for the land-grant mission of Alabama A&M University and Auburn University. ACES delivers research-based educational programs that enable people to improve their quality of life and economic well-being including a wide variety of 4-H Programs.

For more info: www.outdooralabama.com | ADCNR, 64 N. Union Street, Montgomery, AL 36130 | (334) 242-3151

Additional Partners and Supporters

Alabama Power Company
Alabama Power Foundation
Altec/Styslinger Foundation
Central Alabama Community Foundation
City of Millbrook
Comer Foundation
John and Joyce Caddell Foundation
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Curtis Finlay Foundation
The Daniel Foundation of Alabama
Gordy Mead Britton Foundation
The Hobbs Foundation
Hyundai
International Paper Foundation
Regions
U.S. Forest Service
Vulcan Materials Company Foundation
Walmart

Junior Wildlife Scientist Student Nature Notebooks

The Alabama Wildlife Federation created the Junior Wildlife Scientist (JWS) program to:

- ☑ Educate our children about the wise use and conservation of our wildlife and natural resources,
- ☑ Introduce children to the outdoors so they will have an appreciation for Alabama's abundant biodiversity, and
- ☑ Provide hands-on, inquiry-based outdoor activities that help teach the Alabama Department of Education Course of Study Standards using a schoolyard habitat or nearby wildlife habitat as a living laboratory.

Each student participating in the JWS program receives a JWS Nature Notebook full of fun, hands-on, inquiry-based activities that help teach her/him the Alabama Course of Study Standards for his/her grade level.

JWS Nature Notebook Activities

All of the kindergarten through 5th grade JWS Nature Notebooks include the following activities:

- ☑ **Junior Wildlife Scientist Pledge** – A list of rules that the students commit to following to become a Junior Wildlife Scientist "___-ologist".
- ☑ **What Does a(n) "___-ologist" Do?** - A description of what the highlighted scientist for that grade level does, including what types of living things they study and the types of career opportunities they have.
- ☑ **Sensory Observations –** Students use their senses to make observations in the OC. We recommend that students do these activities first to help the students feel comfortable in the OC and to help them learn how to record their observations.
- ☑ **Field Investigations** – Hands-on outdoor activities that help teach Alabama Department of Education science standards using your schoolyard habitat or nearby habitat as a living laboratory to make observations and collect data.
- ☑ **Wonders of Wildlife Activities and Web Quests** – Students assess and describe their feelings about an wildlife species native to Alabama before and after researching it. The featured species are those most often misunderstood and feared by people.
- ☑ **Dig Into Plants Activities and Web Quests** – Students research and/ or answer questions about plants native to Alabama.
- ☑ **Weather & Season Observations** – Students assess and predict weather based on their observations, weather station data, online historical data, cloud coverage, and more.
- ☑ **Scavenger Hunts** – Students search for specific items, animals, or animal behaviors in nearby habitat.
- ☑ **STEAM Activities** – Students use science, technology, engineering, art, and math to design new species, models of life cycles, biological processes, and ecosystems.
- ☑ **Alabama Ecology Highlights** – Students learn about Alabama's natural biodiversity including its native plants and animals, waterways, and ecoregions.
- ☑ **Explore Outdoors** – Provides ideas about where students can explore Alabama's outdoors on public state and federal lands.

JWS Nature Notebook Icons

Within the activities in the student Nature Notebooks, there are icons that indicate if the activity requires a visit to the outdoor learning area or an internet connection to access the Alabama Wildlife Federation's Student Exploration Link webpages.

The **magnifying glass icon** indicates that the students need to visit the outdoor learning area in order to complete that part of the activity.

The **tablet icon** indicates that the students need to visit a specific AWF Student Exploration Link webpage to complete that part of the activity. The title of the specific webpage required for the activity is provided in the Nature Notebook, and the webpage's URL address is provided in the teacher guide's lesson plan.

Junior Wildlife Scientist Student Badges

Each school year, students have the opportunity to earn two badges (shown below) and move up a level in the JWS program by completing JWS Nature Notebook activities (see Table of Contents for list) for their specific grade.

JWS Student Badge Requirements

A student must complete **at least three** of the JWS Nature Notebook activities to earn **each** badge (a total of six activities for both badges) for his/her grade level. A list of required and suggested activities for each badge is provided in the Table of Contents. The previous grade's badges are not required for a student to participate in the JWS program for his/her current grade.

Kindergarten

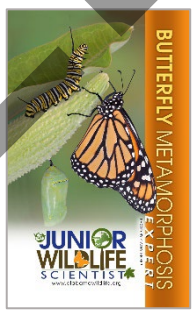
Level 1: Biologist

The Study of Living Things

1st Grade

Level 2: Zoologist

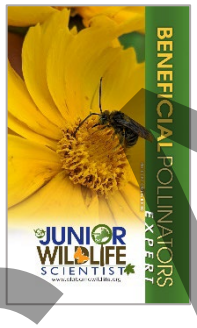
The Study of Wildlife



2nd Grade

Level 3: Entomologist

The Study of Insects



3rd Grade

Level 4: Herpetologist

The Study of Reptiles & Amphibians

4th Grade

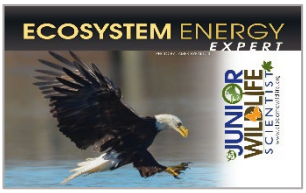
Level 5: Ornithologist

The Study of Birds

5th Grade

Level 6: Ecologist

The Study of Ecosystems

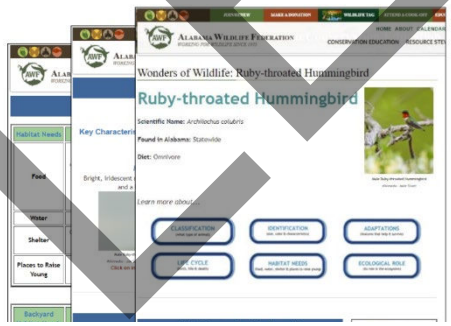


Alabama Wildlife Federation Student Exploration Links

Student Exploration Links are educational webpages on the Alabama Wildlife Federation's website about common backyard wildlife, plants commonly used in outdoor classrooms (OCs), and habitat and ecology topics related to common outdoor learning stations. There are three groups of Student Exploration Links, each containing engaging webpages that are full of interesting information, photos, and diagrams. These webpages allow students to investigate the wildlife and plants in their OC as well as learn about the ecosystem of their OC. Teachers can enjoy having a safe website for their students to visit that has educational content aligned with the Alabama Department of Education's Course of Study Standards.

Wonders of Wildlife

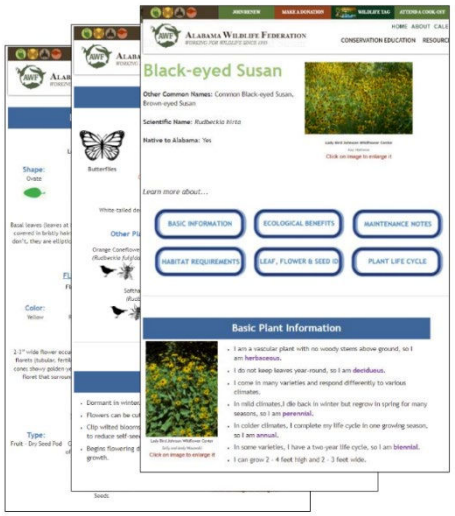
One of the primary goals of an AWF outdoor classroom is to create habitat and to attract wildlife to a school's campus for student observations and study. Our new Wonders of Wildlife webpages allow students and teachers to explore more about the most common wildlife species found in an OC. The pages cover classification, identification tips, animals' amazing adaptations, life cycles, habitat needs, and the role of each species in its local ecosystem. These pages also include a Taxonomic Classification Chart to help students understand why scientists have classified each animal into a particular class such as *Amphibia, Aves, Mammalia, Insecta*, etc.



Dig into Plants

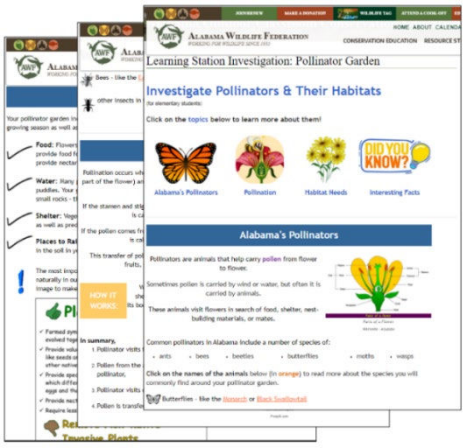
We designed our Dig into Plants webpages to help students and teachers learn about and maintain the plants in their OCs more easily. Each plant species has a customized plant identification sign with a QR code that connects directly to a webpage about that plant. Each webpage includes a general description of the plant including identification information about its leaves, flowers, and seeds; its habitat requirements; and how each plant helps provide the food and shelter that wildlife need to survive.

These webpages can also be used by classes when doing garden maintenance – students can scan the QR code to pull up a plant's webpage and know exactly what the species' flowers and leaves look like. If there is a plant growing in that species' section of the garden that doesn't match the description and photos, they know they can pull it out! They can also see how much watering the plant needs to survive.



Ecosystem Investigations

Ecosystem Investigation webpages are organized into three categories: Habitat Stations, Other Stations, and Ecosystem Topics. Station-focused webpages help teach the students about the topic that the learning station is based around. For instance, a pollinator garden in an OC is filled with native plants that attract pollinators of all kinds – from ants and bees to beetles and butterflies. Our Investigate Pollinators and Their Habitats webpage allows them to take a closer look at Alabama's pollinators, the process of pollination, pollinators' habitat needs, and interesting facts about pollinators and pollination! The educational sign posted next to the pollinator garden includes a QR code that links directly to this webpage so students can access it while exploring the OC. Topic-focused webpages help teach students about ecology-related topics in the OC, such as Alabama's biodiversity, ecoregions, and waterways.



Alabama Department of Education Course of Study Standards

The Junior Wildlife Scientist Nature Notebook activities help teach ALSDE standards for English Language Arts, Science, Social Studies, and Math.

What Does a Herpetologist Do?

Language Arts (2021): See ELA Chart (pg. 7) - R1, R2 R3, 13, 16, 20

JWS Pledge

Language Arts (2021): See ELA Chart (pg. 7) - R1, 1

Habitat Search for Young Wildlife

Language Arts (2021): See ELA Chart (pg. 7) - R1, R2, R3, 13, 16, 17, 32, 36, 37, 40
Science (2023): 10. Make a claim from evidence that an organism's likelihood of survival depends upon access to sufficient resources in its habitat, including sunlight, air, water, food, and shelter.

Field Investigation: How to Provide Wildlife Habitat

Language Arts (2021): See ELA Chart (pg. 7) - R1, R2, R3, R4, 13, 16, 18, 20, 23
Science (2023): 10. Make a claim from evidence that an organism's likelihood of survival depends upon access to sufficient resources in its habitat, including sunlight, air, water, food, and shelter.
Digital Literacy & Computer Science (2018): R1, R2, R3, R5

Tracking Weather Over Time

Language Arts (2021): See ELA Chart (pg. 7) - R1, R2, R4
Science (2023): 13. Represent data in tables or graphical displays to reveal typical weather patterns during a particular season.
Mathematics (2019): 16. For a given or collected set of data, create a scaled (one-to-many) picture graph and scaled bar graph to represent a data set with several categories.
18. Tell and write time to the nearest minute; measure time intervals in minutes (within 90 minutes.)
Digital Literacy & Computer Science (2018): R1, R2, R3, R5

Dig Into Plants: The Longleaf Pine Habitat

Language Arts (2021): See ELA Chart (pg. 7) - R1, R2, R3, R4, 13, 16, 18, 20, 23
Science (2023): 10. Make a claim from evidence that an organism's likelihood of survival depends upon access to sufficient resources in its habitat, including sunlight, air, water, food, and shelter.
Digital Literacy & Computer Science (2018): R1, R2, R3, R5

Alabama Ecology: Alabama's Forests

Language Arts (2021): See ELA Chart (pg. 7) - R1, R2, R3, R4, 13, 16, 18, 20, 23
Science (2023): 10. Make a claim from evidence that an organism's likelihood of survival depends upon access to sufficient resources in its habitat, including sunlight, air, water, food, and shelter.
Digital Literacy & Computer Science (2018): R1, R2, R3, R5

Wonders of Wildlife: Gray Rat Snake

Language Arts (2021): See ELA Chart (pg. 7) - R1, R2, R3, R4, 13, 16, 18, 20, 23
Science Connection: Obtaining, evaluating, and communicating information
Digital Literacy & Computer Science (2018): R1, R2, R3, R5

Is it a Frog? Is it a Toad?

Language Arts (2021): See ELA Chart (pg. 7) - R1, R2, R3, 13, 16, 18, 20, 23
Science (2023): 6. Construct an explanation from evidence of how variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.
Digital Literacy & Computer Science (2018): R1, R2, R3, R5

STEAM Activity: Build a Frog or Toad

Language Arts (2021): See ELA Chart (pg. 7): R1, R2, R3, 17, 36, 40
Science (2023): 6. Construct an explanation from evidence of how variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

Explore Outdoors: Visit a National Forest

Language Arts (2021): See ELA Chart (pg. 7) - R1, R2, R3, 20

Social Studies (2010): 8. Identify geographic links of land regions, river systems, and interstate highways between Alabama and other states. (Alabama) Examples: Appalachian Mountains, Tennessee-Tombigbee Waterway, Interstate Highway 65 (I-65), Natchez Trace Parkway (Alabama)

Scavenger Hunt: Plant Life Cycles

Language Arts (2021): See ELA Chart (pg. 7): R1, R2, R3, 13

Science (2023): 5. Develop and use models to compare the diverse life cycles of organisms other than humans, including birth, growth, reproduction, and death. Examples: flowering plants, frogs, butterflies

Comparing Lizards and Salamanders and their Habitats

Language Arts (2021): See ELA Chart (pg. 7) - R1, R2, R3, 13, 16, 18, 20, 23

Science (2023): 7. Use evidence to support a claim that traits can be influenced by the environment.

Field Investigation: Comparing Life Cycles of Humans and Frogs

Language Arts (2021): See ELA Chart (pg. 7) - R1, R2, R3, R4, 13, 16, 18, 20, 23 40

Science (2023): 5. Develop and use models to compare the diverse life cycles of organisms other than humans, including birth, growth, reproduction, and death

Digital Literacy & Computer Science (2018): R1, R2, R3, R5

ALSDE Course of Study Standards Chart for English Language Arts

Second Grade ELA Course of Study Standards Correlations for Junior Wildlife Scientist Nature Notebook Activities	What Does a Herpetologist Do?	JWS Pledge	Habitat Search for Young Wildlife	Field Investigation: How to Provide Wildlife Habitat	Tracking Weather Over Time	Dig Into Plants: The Longleaf Pine Habitat	AL Ecology: Alabamas Forests	Wonders of Wildlife: Gray Rat Snake	Is it a Frog? Is it a Toad?	STEAM Activity: Build a Frog or Toad	Explore Outdoors: Visit a National	Scavenger Hunt: Plant Life Cycle Stages	Comparing Lizards & Salamanders and their Habitats	Field Investigation: Comparing Life Cycles of Humans and Frogs
R1. Utilize active listening skills during discussion and conversation in pairs, small groups, or whole-class settings, following agreed-upon rules for participation.	X	X	X	X	X	X	X	X	X	X	X	X	X	X
R2. Use knowledge of phoneme-grapheme correspondences and word analysis skills to decode and encode words accurately.	X		X	X	X	X	X	X	X	X	X	X	X	X
R3. Expand background knowledge and build vocabulary through discussion, reading and writing.	X		X	X		X	X	X	X	X	X	X	X	X
R4. Use digital and electronic tools appropriately, safely, and ethically for research and writing, both individually and collaboratively.				X	X	X	X	X	X					X
1. Contribute meaningful ideas to discussions with groups and peers utilizing agreed upon rules.		X												
13. Utilize new academic, content-specific, grade-level vocabulary to make connections to previously learned words and relate new words to background knowledge.	X		X	X		X	X	X	X			X	X	X
16. Use knowledge of grade-level academic and domain-specific vocabulary to gain meaningfrom text.	X		X	X		X	X	X	X				X	X
17. Use grade-level academic and domain-specific vocabulary in writing.			X							X				
18. Demonstrate content knowledge built during independent reading of informational and literary texts by participating in content-specific discussions with peers and/or through writing.				X		X	X	X	X				X	X
20. Establish a purpose before reading literary and informational texts to enhance comprehension, including identifying background knowledge and generating questions about the topic or characters.	X			X		X	X	X	X		X		X	X
23. Identify and use text features in informational passages to locate information.				X		X	X	X	X				X	X
32. Apply knowledge of grade-appropriate phoneme-grapheme correspondences, multisyllabic word construction, syllable division rules, and spelling rules (or generalizations) to encode words accurately.			X											
36. Demonstrate knowledge of the rules of standard English grammar including punctuation, capitalization, sentence formation, and spelling appropriate for third grade.			X							X				
37. Compose simple, compound, and complex sentences with correct subject-verb agreement.			X											
40. Use grade-level and domain-appropriate vocabulary in writing.			X							X				X

Digital Literacy & Computer Science (2018) Standards

R1) Identify, demonstrate, and apply personal safe use of digital devices.

R2) Recognize and demonstrate age-appropriate responsible use of digital devices & resources as outlined in school/district rules.

R3) Assess the validity and identify the purpose of digital content.

R5) Locate and curate information from digital sources to answer research questions.

What Does a Herpetologist Do?

(JWS Nature Notebook pg. 2)

Great Intro Activity!

Activity Goal

The purpose of this lesson is to:

- Introduce students to the field of herpetology
- Give students the opportunity to discuss what a herpetologist does
- Get students excited about becoming a JWS Herpetologist

Vocabulary:
Herpetology
Herpetologist
Reptile
Amphibian
Diversity
Indicator Species

Activity Tips

- **When:** This should be the first JWS Nature Notebook activity that you conduct with your students in August. We recommend completing this activity within the last two weeks of August.
- **Where:** This is an indoor discussion.
- **What:** Bring pencils or crayons for students to draw and write their answers.

Learning Objectives

- Students will be able to recognize the term "herpetology" as the study of reptiles and amphibians.
- Students be able to explain what a herpetologist is and the types of jobs a herpetologist might have.
- Students will be able to identify what type of herpetology job is most interesting to them.

AL COS Standards & Correlations

Language Arts (2021)

See ELA Chart (pg. 7): R1, R2, R3, 13, 15, 16, 20

Background Information

Herpetology is the study of reptiles and amphibians, and a **herpetologist** is someone who studies reptiles and amphibians. A **reptile** is a cold-blooded animal with dry, scaly skin such as snakes, turtles, lizards, and alligators. An **amphibian** is a cold-blooded animal with smooth, moist skin such as frogs and salamanders. Some herpetologists work in the field where they study the habitats or diets of specific reptiles or amphibians. Others may study how a group of reptiles or amphibians interacts with other organisms. Some herpetologists work in labs where they may research how reptiles or amphibians can benefit humans medically (ex: how snake venom from some snakes can be used to treat stroke and heart attack victims). Other herpetologists may work in an educational setting. For example, a zoo curator may run the herpetology department at the zoo where they care for and breed educational reptiles and amphibians as well as provide educational programs.

The southeastern United States has more amphibian **diversity** than anywhere in the world! This means that there are more different species of amphibians in the southeastern United States compared to other areas. Amphibians are important because many of them are considered **indicator species**. An indicator species is sensitive to changes in the environment, so if a herpetologist recognized a decrease in the numbers of amphibians in an area, it could be a sign that something is wrong with the soil or water in that area.

Optional Educational Resources

- *Joan Proctor, Dragon Doctor* by Patricia Valdez, illustrated by Felicita Sala (ISBN: 978-0399557255) – if you do not have this book, you can show a read aloud on Youtube by Brightly Storytime (9:19 min) @ https://youtu.be/xRlXsR13uhk?si=HfzAvxXt0y4ZK674

Joan Proctor, Dragon Doctor Read Aloud

- "What do Herpetologists do" by Corrie Navis (2:13min) @ https://www.youtube.com/watch?v=CDmxfrQLDSY
- Alabama's Department of Conservation and Natural Resources "Watchable Wildlife" webpages (@ https://www.outdooralabama.com/watchable-wildlife) provide educational information about Alabama's native animals

"What do Herpetologists Do?"

Watchable Wildlife Webpage

Procedural Instructions

Indoor Discussion

1. Engage students with opening questions. Examples include:
   - Do you like frogs? Do you like snakes? Do you like turtles?
   - What do turtles and lizards have in common? Do you think turtles and snakes have anything in common?
   - Have you ever seen a salamander?
   - What do salamanders and frogs have in common?
2. Introduce the Junior Wildlife Scientist program to your students by explaining that you will be going outside this year to do fun activities in a special place that provides a home or habitat for plants and animals. By the end of the school year, after they complete their Nature Notebook activities, they will become JWS Herpetologists.
3. Pass out the students' Nature Notebooks and explain that they will be studying reptiles and amphibians this year. Read each line on page 2 of the Nature Notebook and follow up each line with a question to engage the students, introduce the topic and vocabulary, and assess the students' prior knowledge.
   - A **herpetologist** (her-pe-tol-o-gist) is a scientist who studies reptiles and amphibians.
     - *Do you know what a reptile is? Do you know what an amphibian is?*
   - **Reptiles** and **amphibians** are animals that are cold-blooded and have a backbone. Reptiles have dry, scaly skin while amphibians have smooth skin.
     - *What is an example of a reptile? (turtle, alligator, lizard). What is an example of an amphibian? (frog, salamander).*
   - Reptiles include snakes, lizards, turtles, and alligators. Amphibians include frogs, toads, and salamanders.
     - *Have you ever seen one of these animals? Where?*
   - Reptiles and amphibians play important roles in their environments and in helping humans survive.
     - *Can you think of a way that one of these animals can help humans?*
     - *Snakes can be helpful because they eat rodents like rats which spread diseases. Amphibians are important because if there are a lot of them in an area, it can be a sign that the surrounding environment is healthy. They are called "indicator species" because they indicate they health of the environment. Venom from some snakes can be used in medications to treat heart attack and stroke victims. Medicine can be produced from some amphibians to treat pain, infections, and heart disease.*
   - A **herpetologist** may study how amphibians or reptiles interact with the surrounding environment, or they may focus on one specific type of amphibian or reptile.
     - *What types of reptiles or amphibians do you think you might want to study or learn more about?*
     - Explain that some scientists study many aspects of one species (or type) of reptile or amphibian while other scientists study many different types of reptiles and/or amphibians and their interactions.
       - **Museum collections manager** – care for, catalog, document, and make preserved specimens available for researchers
       - **Zoo curator** – run a herpetology department at a zoo and provide educational programs. They also care for and breed educational reptiles and amphibians.
       - **Field researcher** – studies wild reptiles and amphibians and their environment. They assess the health of populations and species.
     - Go through the different groups of amphibians and reptiles on page 2 in the student's notebook and discuss some of the characteristics of each group.
       - Frogs and toads are amphibians that go through a complete metamorphosis (physical change from baby to adult). As adults, they have four legs and no tail.
       - Salamanders are amphibians that have four legs and a tail as adults.

- Alligators are large reptiles that have large scales as an outer covering. They have four legs, a large flat head, claws, and a very strong tail.
- Lizards are reptiles with a relatively long, round body that is covered in scales. They usually have a long tail, and those that have legs have claws on their toes. Some lizards do not have legs but have the other characteristics of lizards, so they are still classified as lizards.
- Snakes are reptiles that have a long round body covered in scales. They do not have any legs.
- Turtles are reptiles that have four legs and a bony shell.

4. Ask your students what type of reptile or amphibian they would be interested in learning more about or studying. Instruct them to draw a picture of that animal in the box on page 2 in the student notebook.
5. Have them write the name of the animal they would like to study on the line in the box on page 2 of the student notebook.
6. Evaluate student understanding using closing questions:
   - Do you know anyone who has a job related to herpetology?
   - What type of herpetology job interests you the most? Why?
   - Do you think you will like studying reptiles and amphibians this year?

Activity Answers

Check to make sure students have drawn an animal they would like to study and written its name on the line provided.

Expansion Options

The activities in this Teacher's Guide serve as expansions on this topic. Each one will cover a different topic related to herpetology and what a herpetologist does. The background information in the Teacher's Guide for each activity includes tips for helping your students connect the dots between what they are learning and how it relates to herpetology.

Consider making an anchor chart about herpetology or different types of amphibians and reptiles. This chart can be referred to or built upon throughout your JWS lessons.

Junior Wildlife Scientist Pledge

(JWS Nature Notebook pg. 3)

REQUIRED ACTIVITY!

Vocabulary:
Herpetologist
Amphibian
Reptile
Habitat Needs

Activity Goal

The purpose of this lesson is to:

- Introduce students to or remind students about the concept of respecting and protecting their outdoor learning area
- Introduce students to or remind students about the rules associated with doing lessons in an outdoor setting
- Inspire students to want to learn about herpetology

Activity Tips

- **When:** Conduct this activity after reviewing what a herpetologist does before completing any activities outdoors. We recommend completing this activity within the first two weeks of September.
- **Where:** Use all areas of your outdoor learning area.
- **What:** Bring pencils so students can sign their names and check off the rules as you review them.

Learning Objectives

- Students will be able to listen to and repeat a specified set of rules for the outdoor classroom.
- Students will be able to write their name and the date.

AL COS Standards & Correlations

Language Arts (2021)

See ELA Chart (pg. 7): R1, 1

Background Information

It is important for **herpetologists** to respect to their surroundings when they are studying reptiles and amphibians. They must take care not to harm the environment in which these animals live, and they must be careful not to scare the animals.

Going outdoors to learn provides several opportunities for students to view **amphibians** such as frogs, toads, and salamanders as well as **reptiles** like lizards. They will also have the opportunity to learn about the **habitat needs** (what these animals need to survive in their natural environment) of these animals and practice the skills necessary to become herpetologists. In order to effectively use an outdoor learning area, students must follow some basic rules and respect their outdoor classroom.

Optional Educational Resources

- *Our Animal Neighbors: Compassion for Every Furry, Slimy, Prickly Creature on Earth* by Matthieu Ricard and Jason Gruhl, illustrated by Becca Hall (ISBN: 978-1611807233)
- "Importance of Reptiles and Amphibians | Grades K-6" by Museum of the Rockies (6:55 – specifically 0:31-6:11 min) @ https://youtu.be/0idKd1fOs2c?si=nWxSrlr-wcju_Uxv

Importance of Reptiles and Amphibians

Procedural Instructions

Indoor Discussion

1. Engage students with opening questions. Examples include:
   - What is a rule?
   - What are some rules that we follow in the classroom?
   - Why are rules important?
   - What are some rules that you think we should follow if we go outside?
2. Show students the two JWS badges that they will earn by completing the activities in the notebook (Helpful Habitats Badge and Frog Metamorphosis Badge).
3. Pass out the student notebooks.
4. Explain that in order to become a JWS herpetologist and receive the badges, they must complete the JWS pledge and agree to follow the rules.
5. Read each line of the pledge aloud at the top of page 3 in the student notebook, and have the students recite each line back to you.
   - *"Listen to my teacher"* – You must earn the opportunity to go outdoors to explore nature by following directions.
   - *"Provide food and water for wildlife"* - How can we provide food for wildlife? Flowers provide nectar for bugs that frogs and lizards eat. Plants provide seeds for birds and mammals. We can also provide additional food sources like bird feeders and bird baths.
   - *"Provide shelter and habitat for wildlife"* – Where do turtles live? Where do frogs live? Where do frogs lay their eggs? We should provide places in the outdoor learning area for amphibians like frogs and toads to lay their eggs. We should also provide plants that can provide shelter for them once they are adults. We should also provide habitat for reptiles like turtles and lizards. Providing cracks and crevices where they can escape will allow them to hide from animals that want to eat them.
   - *"Be quiet so we can see wildlife"* – If wildlife hear you, they will be scared and likely hide. Who's bigger? You or them? If we remain quiet, we have a better chance of seeing them.
   - *"Take care of plants and do not pick flowers"* – Why should we take care of the plants? What types of animals use flowers? If we do not take care of plants, some animals will not have food. If we remove plants, animals like frogs and toads will not have shelter or a place to hide. If we remove the flowers, animals like bees and butterflies will not have nectar for food.
   - *"Look at animals but do not touch them"* – Would you approach a dog you didn't know? You shouldn't because if a dog is scared, how will it protect itself? It may bark or possibly bite. What can wild animals do if they are scared? They might try to bite you (squirrel, snake), sting you (bee, centipede), or pee on you (frog, turtle). Frogs and salamanders are also sensitive and can absorb chemicals through their skin. If you have on lotion, perfume, or bug spray and then touch a frog or salamander, those chemicals can be absorbed into their skin. If you are ever given permission to touch or hold a frog or salamander, be sure to wash your hands beforehand so you don't hurt them.
   - *"Appreciate frogs, lizards, snakes, and turtles"* – The outdoor learning area provides habitat for reptiles and amphibians. It is important for us to be respectful of their home. Reptiles and amphibians play an important role for the environment such as eating insects that can harm us and providing information about the health of the environment.
   - *"Throw away trash and do not litter"* – Would you drop trash on the floor at your friend's house? You shouldn't. Leaving trash on the ground outdoors would be like leaving trash on the floor of a friend's home. The habitat nearby is a home for many types of animals, and some trash can harm the animals. For example, animals can get their heads stuck in plastic bags and die, or they may try to eat the garbage and get sick.

Example OC Rules Signs

Outdoor Discovery

6. Explore outdoors by taking the students to the nearby habitat that you use as an outdoor learning area to show them the different learning stations that provide habitat for wildlife. For each learning station, explain its habitat purpose.

7. Visit your Rules Sign (if you have one). Review the rules again to remind them of the importance of following the rules. (For example Rules Sign, visit www.alabamawildlife.org/oc-signs/#oc-rules-signs).
8. Evaluate student understanding using closing questions:
    - Why is it important to follow directions? To not touch wildlife like frogs or squirrels?
    - Why should we not pick flowers or remove plants?
    - Why is it important not to litter?

Activity Answers

Check that students have printed their names and written the date.

Expansion Options

- Have the students come up with some additional rules that they think they should follow.
- Play a game with the class before going outside. Have one half of the classroom represent "yes" and one half of the room represent "no". Say a phrase such as "When I am outdoors, I should touch the frogs". Students should move to the side of the room that represents "no" because that is something that they should not do. Use the following examples, or create your own phrases.
    - I should pick the flowers.
    - I should touch frogs.
    - I should not touch the snakes.
    - I should throw my trash on the ground.
    - I should observe the wildlife without disturbing them.
    - I should make sure our plants are watered.
    - I should make sure our bird bath has water in it.
    - I should pick up trash, even if it isn't mine.
- Allow the students to pick one of the rules to illustrate. Provide paper, pencils, and crayons so that they can draw a picture of a student following one of the rules. Have them write a sentence describing the rule.

Habitat Search for Young Wildlife

(JWS Nature Notebook pg. 4)

Suggested for Helpful Habitats Badge!

Activity Goal

The purpose of this lesson is to:

- Introduce the concept of habitat
- Introduce students to the idea that habitat needs can sometimes be different for young wildlife compared to their parents
- Give students the opportunity to explore outdoors to determine if the nearby area can provide habitat for young wildlife

Activity Tips

- **When:** We recommend completing this activity within the last two weeks of September.
- **Where:** Use any area in the habitat nearby.
- **What:** Bring pencils for students to write their explanations.

Vocabulary:
Habitat
Resources
Trait

Learning Objectives

- Students will be able to explain why an area can provide the habitat needs for young wildlife.
- Students will be able to write in complete sentences to provide their explanation.

AL COS Standards & Correlations

Science (2023)

10. Make a claim from evidence that an organism's likelihood of survival depends upon access to sufficient resources in its habitat, including sunlight, air, water, food, and shelter.

Language Arts (2021)

See ELA Chart (pg. 7): R1, R2, R3, 13, 16, 17, 32, 36, 37, 40

Background Information

A **habitat** is the natural home or ecosystem where an animal lives and grows. It includes both the living and nonliving components of the surrounding environment. An animal's habitat must include specific **resources** in order for the animal to survive and thrive. A habitat must include food, water, shelter/cover, and a place for an animal to raise its young.

The animals in a specific habitat have physical and behavioral **traits** that help them survive in those environments. Some animals and their young share the same habitat needs for food, water, and cover while others have different needs than their young. For example, deer and their young share the same resources and needs. Baby deer rely on their mothers for milk until they are old enough to start eating the same foods as adults (grasses, berries, nuts, and other plant material). Deer and their young use the same sources of water for drinking, and they all live in the same type of habitat (forests and brushy areas). Alternatively, some animals and their young have different habitat needs. For example, adult butterflies live in a variety of habitats including forests, grasslands, and wetlands. As adults, they feed on nectar from flowers. However, their young (caterpillars) live and feed on the host plant on which the female adult deposits her eggs. The young do not leave this specific plant or area until they are ready to go through the next phase of metamorphosis and create the chrysalis.

Baby birds require care from their parents and remain in their nest or cavity until they are able to fly and gather their own food. Adult frogs live on land near aquatic habitats and eat insects and other **invertebrates** (animals without a backbone). Their young (tadpoles) live in ponds and feed on algae, decaying material in the water, and some small invertebrates that also live in the water.

This activity is designed to highlight some different habitat types and to get students thinking about what adult animals need to survive compared to what their young need to survive.

If Animals Built Your Home Read Aloud

What Is a Habitat?

Optional Educational Resources

- *If Animals Built Your House* by Bill Wise, illustrated by Rebecca Evans (ISBN: 978-1584696773) – if you do not have this book, you can show a read aloud on Youtube by PixieLin's Storytime (5:31 min) @ https://youtu.be/y18IX7ovgRI?si=cVcD8avVD1tYN_0w
- "What Is a Habitat?" by The Ranger Zak Show (6:55 – specifically through 10:19 min) @ https://youtu.be/VO-wM1A4lZ8?si=wWXtDH-hnM6kkl1K

Procedural Instructions

Indoor Discussion

1. Engage students with opening questions. Examples include:
   - What types of things do all animals need to survive? (food, water, shelter, places to raise young)
   - Do human babies eat the same foods as adult humans?
   - Do you think baby animals always have the same habitat needs as their parents?
2. Pass out student notebooks and explain that they will be learning about the habitat needs for young wildlife.
3. As a class, read the paragraph at the top of page 4 in the student notebook. Explain that all living things need food, water, shelter, and a place to raise their young. However, sometimes offspring (or young) have different needs than their parents. For example, tadpoles live in water, and adult frogs live on land. Caterpillars eat leaves of their host plants while adult butterflies drink nectar.

Outdoor Discovery

4. Explore outdoors by taking the students to nearby habitat that you use as an outdoor learning area to evaluate whether or not it has food, water, and shelter for young wildlife. Review the rules discussed during the JWS Pledge before going outside.
5. Have the students make observations about possible sources of food, water, and shelter for young animals. On the lines provided on page 4 in the student notebook, have the students write two reasons that the outdoor area either does or does not provide the habitat needs for young wildlife. Instruct the students to write their reasons in complete sentences.
6. In the box at the bottom of page 4, have the students draw and label any of the habitat resources they found in the outdoor learning area.
7. Evaluate student understanding with closing questions:
   - What types of resources do young animals need to survive? (food, water, a nest or a place to stay protected from harm)
   - Did you find the necessary resources for young wildlife in your outdoor learning area?
   - Is there anything that you would add to your outdoor learning area to improve the resources needed for young wildlife?

Activity Answers

Check to make sure that students have written in complete sentences.

"Nearby habitat does provide food, water, and shelter for young wildlife" should include similar explanations:

- We found bushes that young animals could use as shelter.
- We found a pond that young animals could use as a source of water.
- We found leaves that caterpillars could eat. (If you have a butterfly garden or caterpillar garden, this would be a great place to find caterpillars eating leaves).

"Nearby habitat does not provide food, water, and shelter for young wildlife" should include similar explanations:

- We did not find any water in the outdoor habitat.
- We did not find any plants in our outdoor habitat that could be used as food.

Note that students may find some of the habitat needs for young wildlife but not all of the needs. For example, they may find plants that could act as sources of food and shelter for young animals but no source of water.

Expansion Options

- Use the Alabama Wildlife Federation's Wonders of Wildlife Webpages @ www.alabamawildlife.org/oc-wonders-of-wildlife/ to pick a specific animal to learn more about. The "Habitat Needs" section of the webpage shows a comparison chart between the resources for the adults and their offspring. Then, have the students explore the habitat nearby to look for those resources to determine if it provides the habitat needs for the adults and/or the offspring.

- Have students select an animal to research. Have them research the habitat needs for the adults and for the young. Then, have them create a Venn Diagram comparing and contrasting the habitat needs of the adults and their young.

Field Investigation: Comparing Life Cycles – Humans and Frogs

(JWS Nature Notebook pgs. 21-22)

REQUIRED for Frog Metamorphosis Badge!

Activity Goal

The purpose of this lesson is to:

- Demonstrate the life cycle stages of a frog
- Allow students to make comparisons between the life cycle stages of a human and the life cycle stages of a frog

Vocabulary:
Life Cycle
Live birth
Metamorphosis
Tadpole

Activity Tips

- **When:** We recommend completing this activity during April or early May.
- **Where:** This activity takes place indoors and outdoors. Internet access is required for the indoor portion. For the outdoor portion of this activity, use a frog and toad habitat if you have one. If you do not have a frog and toad habitat, use any area that has a source of water or a moist environment.
- **What:** Bring pencils or crayons for students to draw and write their observations.

Learning Objectives

- Students will be able to identify the life cycle stages of a frog.
- Students will be able to explain how the life cycle of a human is similar to the life cycle of a frog and how the life cycles are different.
- Students will be able to identify the habitat needs for a frog in order for it to complete its life cycle.

AL COS Standards & Correlations

Science (2023)

5. Develop and use models to compare the diverse life cycles of organisms other than humans, including birth, growth, reproduction, and death. *Examples: flowering plants, frogs, butterflies*

Language Arts (2021)

See ELA Chart (pg. 7): R1, R2, R3, R4, 13, 16, 17, 18, 23, 40

Background Information

All organisms go through a **life cycle**. A life cycle starts with some sort of birth and then continues with growth and development as the organism changes from young to adult. Eventually the life cycle starts over when adults reproduce to produce offspring (young).

The first stage of the life cycle begins with birth. Some animals, like humans and other mammals, have a **live birth** (where the baby does not hatch from an egg). Other animals, like butterflies, frogs, and birds, lay eggs. Eventually the young hatch from these eggs.

After the young are born or hatch from eggs, they begin to grow and develop. Some animals, like humans and other mammals as well as birds, look like their parents when they are young. Other animals, like caterpillars and tadpoles (baby frogs or toads), look completely different from their parents. When an animal goes through a complete physical change in structure and appearance between when it is young and when it is an adult, it is called **metamorphosis**. Some animals grow and develop relatively slowly. For example, humans grow from young to adult over a span of 15-19 years. Other animals, like frogs, change from **tadpole** (young frog) to adult within a few weeks or months. Once an animal becomes an adult, it can reproduce to make more offspring, which starts the life cycle over.

Optional Educational Resources

- *Frogs* By Gail Gibbons (ISBN: 978-0823411344) – if you do not have this book, you can show a read aloud on YouTube by Chris Castellarin (10:31 min) @ https://www.youtube.com/watch?v=StDextj-Q-E
- "Life Cycle Video for Kids – Science Learning from makemegenius.com by makemegenius (4:26 min) @ https://www.youtube.com/watch?v=-pHav-3QZkI
- Use the Alabama Wildlife Federation's Field Investigation: Comparing Life Cycles webpage @ https://www.alabamawildlife.org/oc-field-investigation-comparing-life-cycles/ for additional resources relating to this activity.

Frogs Read Aloud

Life Cycle Video for Kids

Procedural Instructions

Indoor Discussion

1. Engage students with opening questions. Examples include:
   - What is a baby frog called? (tadpole)
   - Have you ever seen a tadpole? Where was it? (in the water)
   - What do tadpoles turn into when they are adults? (toads or frogs)
   - What did you look like as a baby?
2. Pass out student notebooks and explain that they will be learning about the life cycle of a frog and comparing a frog's life cycle to the life cycle of a human.
3. Read through the life cycle stages of a human at the top of page 21 in the student notebook. Allow students to answer questions 1&2.
4. Pull up the Alabama Wildlife Federation's Wonders of Wildlife: Green Tree Frog webpage @ https://www.alabamawildlife.org/wonders-of-wildlife-green-tree-frog/. This can be done as a class, or students can use the webpage on their own electronic devices if they have them.
5. Have students use the "Life Cycle" section of the webpage to allow the students to answer questions 3-5 on page 21 in the student notebook. Then, have them draw and label each phase of the frog's life cycle for question 6.

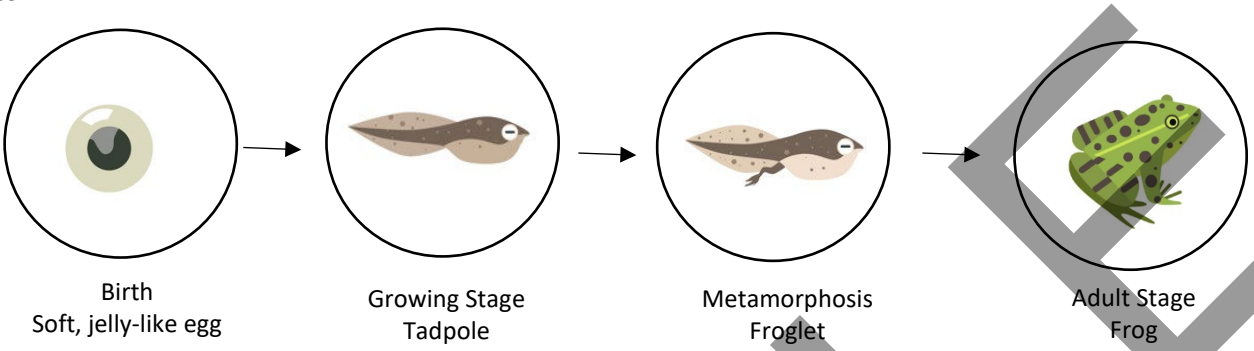
FI: Comparing Life Cycles

WOW: Green Tree Frog

Outdoor Discovery

6. Explore outdoors by taking the students to the nearby habitat that you use as an outdoor learning area to look for a frog. If they cannot find a frog, they can illustrate an area where they might be able to find a frog in any stage of its life cycle (a pond could contain eggs or tadpoles, grasses or plants near water would be a good place to find an adult frog).
7. If the students found a frog in any stage of its life cycle (egg, frog, froglet, or adult), have the students answer question 8 on page 22 in the student notebook. If they did not find a frog in any stage of its life cycle, have them write which stage of the life cycle the habitat in their drawing would support.
8. Have the students answer question 9 in the student notebook to explain how their life cycle (human) is similar to that of a frog.
9. Evaluate student understanding with closing questions:
   - Do humans go through metamorphosis? (no) Do frogs go through metamorphosis? (yes)
   - Do humans go through a growth phase? (yes) Do frogs go through a growth phase? (yes)
   - Do frogs have live birth? (no, they lay eggs) Do humans have live birth? (yes)
   - If we want to have frogs in our outdoor learning area, what things would we need to provide? (a pond or source of shallow water in which the eggs can be deposited and where the young can live; plants and grasses near the pond for adults to use as shelter)

Activity Answers

1. As a live baby
2. Growth (child)
3. As a soft, tiny egg
4. Tadpole
5. Yes
6. 

7. Check student drawing. The drawing should represent a frog in any stage of its life cycle or represent the habitat that a frog could be found in (pond for egg or tadpole, grasses or logs near a water source for adult).
8. Check to make sure answer matches drawing
9. Answers can include: they go through a growth phase and become adults, they have offspring
10. Answers can include: that they do not hatch from an egg like a frog, they do not go through metamorphosis like a frog, or that their life cycle lasts longer than a frog's.
11. Frogs need a pond or a source of shallow water for their eggs and their young (tadpoles). They also need moist or wet areas with plants under which they can take shelter as adults.

Expansion Options

- Pick another animal that could be found in the outdoor learning area and compare its life cycle to that of a human's @ https://www.alabamawildlife.org/oc-wonders-of-wildlife/. These educational webpages provide information about animals that are likely to be seen in an outdoor learning area. Learn more about the life cycles of each animal by using the "Life Cycle" section on each webpage.
- Have students create a Venn diagram comparing the life cycle of a frog to a life cycle of a human.

Wonders of Wildlife