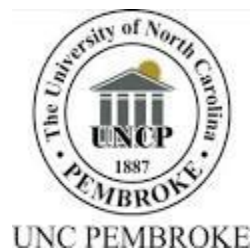




The HERP Project, Herpetology Education in Rural Places & Spaces,  
Presents:

## The Lizard Project



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Before starting a project similar to the one described in this curriculum, contact your state wildlife resources commission or state division of fish and game to see what kinds of permits you need to work with animals.

## **I. Introduction**

This curriculum focuses on lizard project that we conduct with high school participants and teachers as a part of The HERP (Herpetology Education in Rural Places and Spaces) Project's Herpetological Research Experience (HRE). HREs are residential summer programs that provide opportunities for high school students and teachers to participate in studies of frogs, turtles, snakes, lizards and salamanders. This curriculum provides ideas for conducting your own educational program on lizards. In it, we provide information about lizards, describe how we conduct mark/recapture studies of anoles, and explain how we catch anoles and other lizard species that live in the North Carolina Piedmont and the North Carolina Inner Coastal Plain. Sampling methods and techniques and data collection and reporting procedures are also described.

## **II. Learning Objectives**

After completing this project, participants will be able to:

1. List the characteristics of lizards
2. Use their field guide to identify local species of lizards
3. Catch lizards like anoles and fence lizards (which have a large head and smaller neck) using a lizard lasso
4. Explain that lizards can be found in nearly every state, are a critical creature in food webs and serve, like all animals, an important role in ecosystems where they are abundant

5. Describe threats that lizards face in general (e.g. loss of habitat) and locally (e.g. in NC green anoles may face a threat of invasive brown anoles which are moving up the eastern seaboard from Florida)
6. Demonstrate safe techniques for catching, handling and housing lizards

### III. Participant Safety in the Field

While doing fieldwork in North Carolina, participants may encounter insects and other arthropods including chiggers, yellow jackets, ticks and spiders. Using insect repellent (but not on your hands if you plan to collect herps) and wearing a hat and long pants are useful ways of preventing these animals from biting you, stinging you or attaching to you. Pulling one's socks over the bottoms of pants legs is an especially good way of preventing ticks, chiggers, and spiders from crawling up your legs. Participants should also wear sunscreen and carry water; sturdy boots are useful when hiking in rough terrain. If you are in an area where you may encounter snakes, know that feet and ankles are the most common bite locations, followed by hands. Wear protective footwear and long pants or gaiters and look before you place your hands down or around a tree. Always hike with a partner and let someone else know your itinerary.

When looking for lizards, there are only two venomous lizard species in the US, the Gila monster and Mexican beaded lizard, both in the Southwest.



The photo to the left is of a Gila monster. These lizards are found in the Southwest US, as depicted by the range map on the right.



Photo and range map: <http://animals.nationalgeographic.com/animals/reptiles/gila-monster/>



The photo to the right is of a Mexican beaded lizard. These lizards are found in the Southwest US, as depicted by the range map on the left.

Photo and range map:

<http://nylearns.org/module/content/search/item/1004/viewdetail.ashx#sthash.MK0Igwuj.dpbs>

#### IV. Animal Handling Guidelines

Regardless of the size of the lizard with which you are working, keep in mind that the animal will not feel secure unless all of its limbs are supported. Small lizards can usually be grasped in one hand, with their forelegs resting on your pointer finger, their body lying across your palm, and their hind feet gently gripping your hand. Calm individuals will usually be content to rest in this position with little or no restraint.



More feisty lizards may require you to use your thumb to apply gentle pressure across the animal's back. In most cases, you are not even holding the animal. Instead, it is just sitting on your hand. Your thumb may simply be resting on the animal's back exerting no pressure, but this point of contact is generally enough to keep the lizard still. Turning them over gently on your palm and rubbing their undersides can make some lizards, such as the Eastern Fence Lizard lie still.

**Releasing Animals.** Release animals where they were caught and where they can quickly find cover. Allow animals to crawl under rocks, logs or coverboards instead of putting the cover pieces on top of the animal, as this could potentially harm the lizard.

Some material in this section was modified from the following sources:

LLL Reptile. <http://lllreptile.com/info/library/care-and-husbandry-articles/-/handling-reptiles/>

Schall, J.J. Department of Biology, University of Vermont, Burlington, VT 05405  
<http://www.uvm.edu/~jschall/techniques.html>

## **V. Animal Care/Pet Care**

Many captive-bred reptiles, such as Bearded Dragons, live a long time, so owners need to make a long-term commitment to take care of them and keep them healthy. Captive bred anoles only live a couple of years, so they make good starter pets. Never take a lizard from the wild to keep as a pet and never release a captive-bred lizard into the wild. For information on why this is so important consult the [Partners in Amphibian and Reptile brochure called "Don't Turn it Loose"](#).

## **VI. Background for Instructors**

The purposes of our lizard project are to:

- a) Document lizard species at two different sites in North Carolina,
- b) Teach HRE participants about the biology and ecology of lizards,
- c) Study the population and population structure by using temporary mark /recapture methods.

Lizards are the largest group of living reptiles and come in many sizes, shapes, patterns, and colors. There are 155 species of lizards in North America. Lizards are ideal model organisms for study because they are found in many habitats (forests, deserts, marshes, and prairies). Lizards live in all but a few U.S. states, making lizards perfect organisms for scientific investigations. Lizards are generally diurnal, courtship is brief, and fertilization is internal. Most lizards are egg layers, but occasionally young are born alive. All North Carolina native lizards are egg layers (termed oviparous)., Many lizards

are insectivorous and play important roles in food webs, helping to control insect populations.

**Making Connections With Participants.** The Lizard Project Leaders make connections with HRE participants by asking questions such as:

- Does anyone have a pet lizard? (If participants do, the leaders ask them to share about their pet lizard)
- Has anyone ever caught lizards before? (If participants have, the leaders ask them to share about their experience)

**Using Pet Lizards (typically non-native species) to Learn Lizard Anatomy.**

Having a live animal is beneficial to the engagement of students in this project, but realistic models or even lizard cards can be used to teach the content. To teach students the basic anatomy of lizards as well as proper handling methods, the Lizard Project Leaders use a bearded dragon, a large non-native pet lizard. As the leaders introduce the bearded dragon, they ask the students questions. Students' comments and questions are used to teach general information about lizards.

Examples of leading questions include:

- What do you notice?
- Is this the same or different than the salamanders you have seen?
- Does anyone know what it is?

These leading questions move the discussion in many ways, driven by the questions the HRE participants ask and the comments they make.

Examples of student questions about the Bearded Dragon include (answers are in italics):

- Where are these found? (*Bearded Dragons are found in the wild in Australia*)



- Are they more aggressive in the wild? (*Yes: adult bearded dragons are territorial and establish social hierarchies in which aggressive displays are a normal part of their social interactions. The beard is used for both mating and aggression displays.*)
- Are they territorial? (*Yes, Males have a 2-3 meter territory.*)
- What does it eat? (*It eats a 70% vegetarian/30% animal (crickets, mealworms and other small invertebrates) diet.*)
- Is that an eardrum? (*These are external ear holes. This is one way you know it is a lizard. If we see a legless 'snake' with ear holes, we know it is really a lizard; even if someone calls it a 'glass snake.'*)



The photo on the left is of a smooth earth snake; notice there is no ear hole. The photo on the right is of an Eastern glass lizard; notice the ear hole, above the black arrow. Photo on left from: <http://www.fieldherpforum.com/> Photo on right from: [www.herpsofnc.org](http://www.herpsofnc.org)

After several student questions, the leaders guide the participants with more direct questions with the overall goal of understanding the differences between reptiles and amphibians and the differences between snakes and lizards. Examples of the guided questions include (answers are in italics):

- What do we call this rough looking skin? (*Scales, all reptiles have scales. Salamanders do not have scales.*)

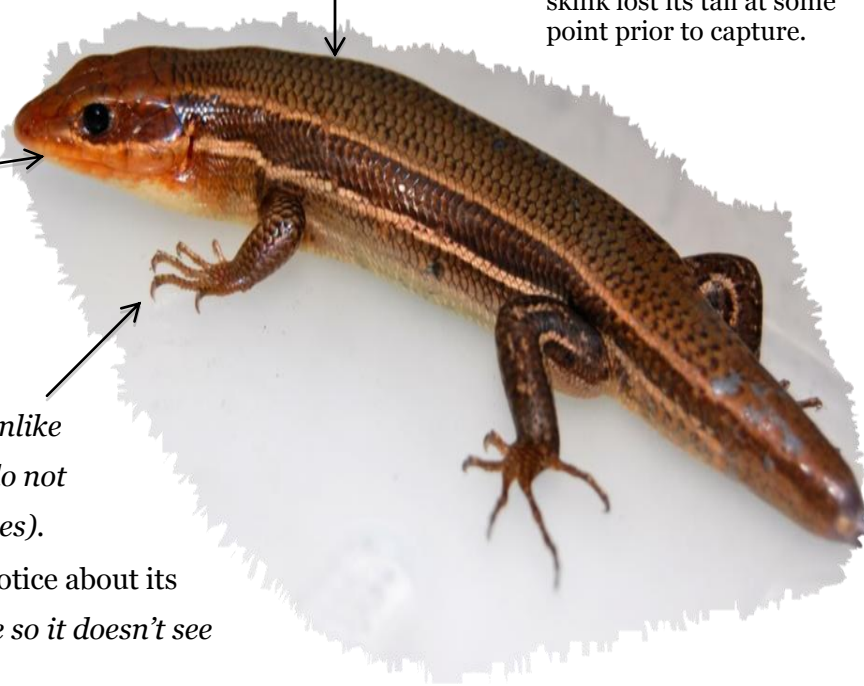
The photo below is of a Broad-head skink. The skink lost its tail at some point prior to capture.

- Do animals

have lips? (*On reptiles, we call them labial scales. Snakes and lizards have these.*)

- What do you notice about its feet? (*Lizards have claws unlike salamanders, which do not have claws on their toes.*)

- What do you notice about its eyes? (*Eyes are to side so it doesn't see straight in front.*)



It is important to know this information because these are distinguishing features of lizards. Knowing the characteristics of lizards helps students learn more about animals that are not lizards that people sometimes identify as lizards, such as snakes and salamanders. These features are also used to distinguish different lizard species from one another as is discussed in the next section.

**Video of HERP Project Leader Holding a Bearded Dragon:**

<http://vimeo.com/109472770>

## **VI. Identifying Lizards**

In order to do lizard identification in the classroom, project leaders catch several different lizard species prior to the HRE and keep them in the classroom throughout the week to use for teaching participants how to identify the different species. These organisms are released at the point of capture at the conclusion of the HRE. Note: Individuals that will not eat or drink in captivity are released and new individuals are



caught. If you choose to keep wild caught lizards for a few days, we recommend you have several different size crickets on hand to feed them as small lizards like ground skinks need smaller crickets than larger lizards like broadhead skinks.

Lizards are first identified in the classroom setting, using the field guide, *Amphibians & Reptiles of the Carolinas and Virginia 10<sup>th</sup> edition*. The field guide provides detailed information about the natural history of each species of lizard as well as range maps. Educators could also create a dichotomous key to use to identify the lizards in their area or there may already be one available online. One activity The Lizard Project uses is lizard identification cards (photographs below),



which the Lizard Project leaders created. They use these cards in the classroom and in the field. Each participant wears a card necklace with a photograph of one lizard on the front and a description of the characteristics of the lizard on the back. This aids in

identification of lizards in the field and helps students familiarize themselves with the local species.

The first lizards students are introduced to are captive-bred green anoles, which are easy to identify and relatively easy to hold. Students are often eager to hold the animals, but they must first identify the animal by using their field guides. Students are instructed not to “just use the pictures” for identification but also to read the descriptions carefully and to look at range maps. To help students do this, the leaders use the “Give me Three” ID rule, which requires students to identify at least 3 characteristics of the organism in order to confirm a positive identification (e.g. size, range, coloration, stripes, spots, and habitat). Following the Carolina anole identification, students are given three different skinks (broadhead, five-lined, and southeastern five-lined) to identify because they are easily confused.

### Common species of lizards in our NC project areas.

The following table should help with the identification of North Carolina lizards that look similar, at first glance. Another excellent resource to use in identifying lizards as well as other herps is [Amphibians and Reptiles of North Carolina](#).

<b>Scientific Name</b>	<b>Common Name</b>	<b>Distinguishing Characteristics</b>
<i>Anolis carolinensis</i>	Green anole or Carolina anole	Green in color but can change to brown. Males have large, red dewlap.
<i>Cnemidophorus sexlineatus</i>	Six-lined race runner	6 lines on body, very fast! Has femoral pores---easy to see---even on juveniles.
<i>Eumeces fasciatus</i>	Five-lined skink	5 to 8 inches long with wider subventral (median subcaudal) scale row. 5 stripes on back, usually 4 labial scales, & dorsal cranium lines usually converge.
<i>Eumeces inexpectatus</i>	Southeastern five-lined skink	5.5 to 8.5 inches long with narrow midventral (median subcaudal) scale row. 7 stripes on back, usually 5 labial scales, & dorsal cranium lines do not converge.
<i>Eumeces laticeps</i>	Broadhead skink	6.5 to 12.75 inches long with wider subventral (median subcaudal) scale row. 7 stripes on back, usually 5 labial scales, dorsal cranium lines do converge, males tend to lose their stripes and have bright

		red/orange heads during mating season.
<i>Sceloporus undulatus</i>	Eastern fence lizard	Has keeled scales, blue on throat and belly indicates male.
<i>Scincella lateralis</i>	Ground skink	3 to 5 inches long, yellow belly and dark stripe on sides, woodland habitat with pines.

## VII. Capturing Lizards

First, learn everything you can about the lizards you are trying to catch by reading about and observing them. Find the most likely places for lizards; these places are usually associated with basking, food supply, or hiding places. Enter the area they frequent in a stealthy manner to get as close as possible.

Lizards will be wary, so use a slow, careful, non-threatening posture and approach. Sudden movements will cause the lizards to seek safety, and it is unlikely you will see them again for some time.

While stalking their prey, lizards move slowly, back and forth as though they were waving in a breeze. If you do this same back and forth motion, in some rare cases you may be able to move right up to them, even touch them with your hand. Keep moving slowly, back and forth, until your hand is positioned where you want it. Then make the grab with a flat hand. This ensures that the lizards are not endangered.

### Methods for various lizard locations.

**Tree trunks.** When a lizard moves to the backside of a tree, memorize where the lizard is and make a flat-handed grab (not too hard) in that spot even if you can't see him/her.

**Under cover.** Turn over anything lizards can hide under, boards, boxes, firewood, or other items in cool, moist places in the yard where they can hide undisturbed. Make sure to flip the items away from you as other animals might also be using this cover as a hiding spot. They will scurry away, but they are not too fast if you are ready for them.

## Methods for lizard capture.

**Using your hands.** Lizards can be caught by hand, such as *anoles* or *fence lizards* on tree trunks or skinks in the leaf litter. Use a quick, flat hand whenever possible to cover the lizard in order to avoid harming your prey. Don't grab the lizard by its tail because it can detach its tail and get away. Don't grab the lizard's head or neck because you might hurt it.

Check out this video: <https://www.youtube.com/watch?v=sKBiy1ReiXs>.

**Using a net.** For the faster varieties of lizards like skinks you may want to use a deep net, which you can fashion yourself. This may be a simple bag sewn with cheesecloth or other open weave fabric, stretched onto a stiff wire loop made from a clothes hanger. Make the shape similar to the letter D, so you have a square edge you can place on the ground. The net will allow you to capture the lizard without harming her when she is grabbed. Deeper nets allow you to shake the lizard into the bottom and grab the middle or top of the net under the hanger so it can't get away.

**Trapping.** You can construct a simple trap and watch as the lizard enters to catch bait (such as small crickets) or enter out of curiosity if the trap is not baited.



Photo from: <http://alpha.cartercole.com/2010/10/how-to-make-simple-lizard-trap.html>

You can also catch lizards (especially skinks) by simply scooping them up with leaf litter into a small plastic trashcan. Sorting through the leaf litter can also yield different terrestrial invertebrates, which can provide material for discussion about food webs and invertebrates' roles in the environment. You can catch some lizards by cutting an 18"

long section of PVC pipe and closing one opening with duct tape (make sure the sticky side does not come in contact with the lizard). Lizards see this as a 'hole' and run right in.

**Using a Lizard Lasso.** Using a lasso (also called a noose) on the end of a bamboo stick is a great strategy for catching lizards with broader heads and thinner necks (such as anoles and fence lizards). Lassos are not very successful with more streamlined lizards (such as skinks). It is very rare for a lizard to be hurt by lassoing. To ensure students are comfortable using their lizard lassos, students practice using their lassos on plastic lizards scattered throughout the classroom. As the students practice, they are instructed on how to safely remove lizards from the lassos.

The best way to lasso is to work the lasso over at least one of the front limbs before tightening, but sometimes this does not work. Take the animal off the lasso as quickly as possible. If the lizard has spun around, allow it to spin back (or spin the pole) so that the line does not get twisted (taking a lizard off before allowing it to spin back will often ruin a lasso). Take a lizard off by simply pulling on the "handle" which opens the lasso. Having two or three people remove a lassoed lizard is helpful. The lizard can rest on the bamboo pole (one person holds the pole) while another person releases the lasso. The third person can gently but securely hold the lizard as described above.

**Video of Lasso Used on Real Lizard:** <http://vimeo.com/109472935>

Check out this video on using a lasso: <https://www.youtube.com/watch?v=dnhh9xx9aB0>.

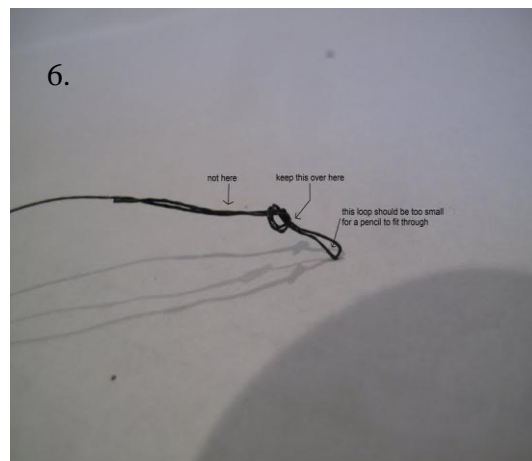
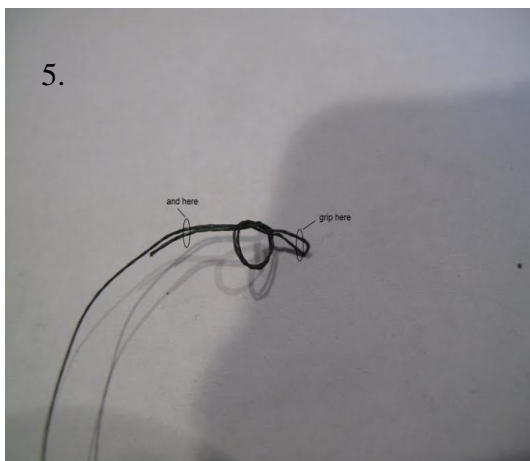
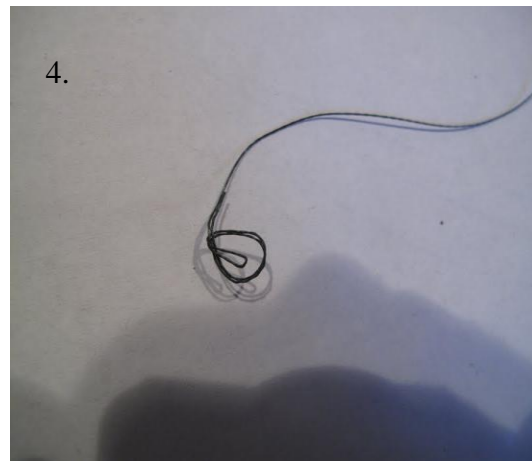
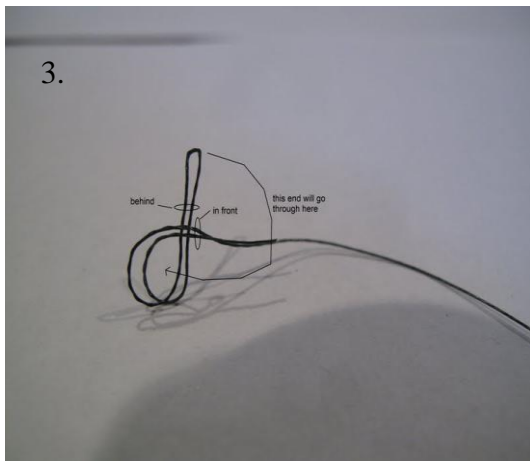
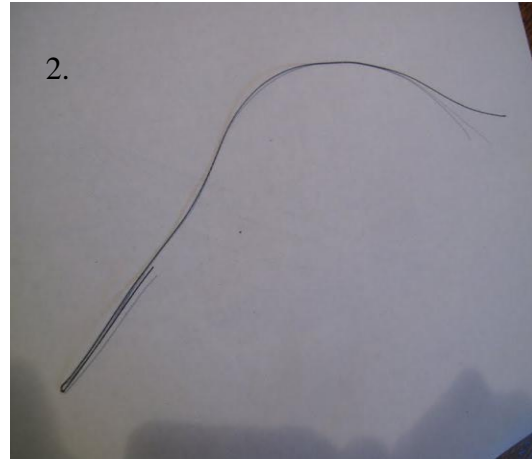
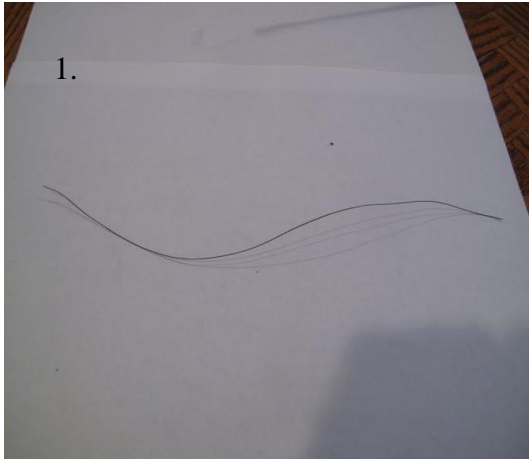
The photo to the right is of a recently lassoed anole, resting on a bamboo pole.



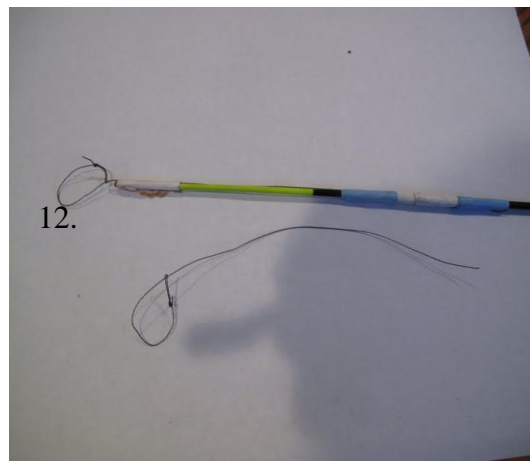
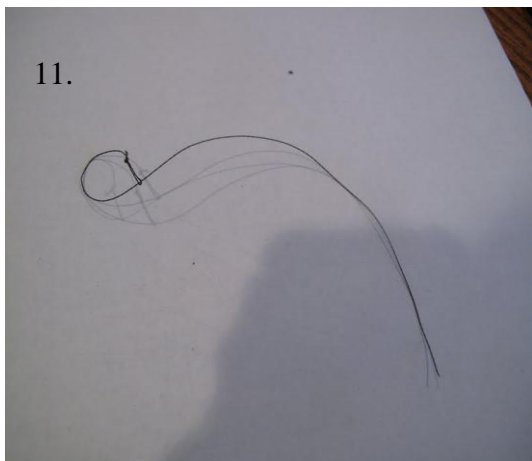
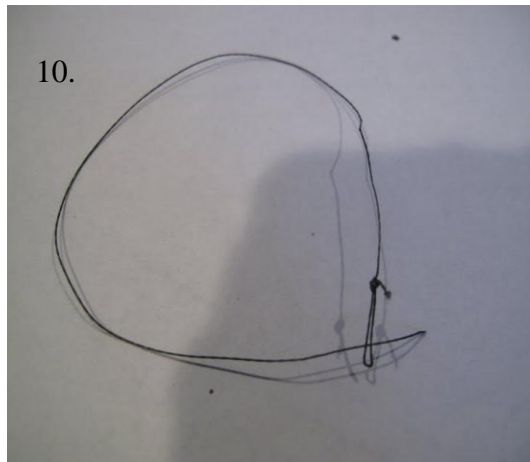
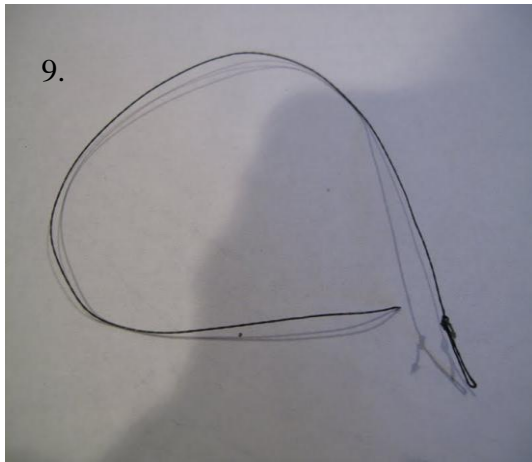
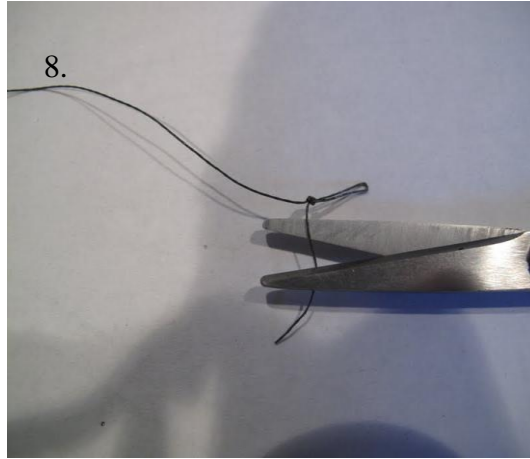
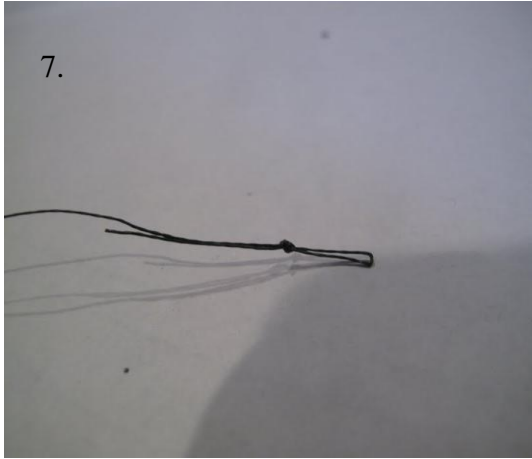
**Video of How To Make a Lizard Lasso:** <http://vimeo.com/109472357>

Making a lasso is easy; all you need to know is how to tie a slipknot. For small lizards, it is recommended to use a 10 or 20 lb. monofilament fishing line.

The pictures below demonstrate one method of construction.







Several questions can be asked about the lizard lassos. Examples include:

- How does length of the bamboo pole affect the rate of lizard capture?
- How does length of the lasso affect the rate of lizard capture?

### VIII. Data Collection

Students are instructed to collect the following data on each lizard:

<b>Data</b>	<b>Sex (F or M)</b>	<b>Total Length (mm)</b>	<b>Snout to Vent Length (SVL) (mm)</b>	<b>Mass (g)</b>
Tips	Size of the femoral pores, which are secretory glands on the inside thighs  Size and color of the dewlap  Dimorphic Color characteristics (e.g. Fence Lizards)	Use calipers to measure.  Measure from the tip of the snout to the end of the tail.	The vent is the opening between the two hind legs that is used for excretion and reproduction.  Use calipers to measure.  Measure from the tip of the snout to the posterior end of the vent.	Place the lizard in a plastic bag.  Use a spring scale to weigh the lizard and the bag.  Once recorded, remove the lizard from the bag gently and reweigh the bag by itself.
		These two lengths are important as lizards can lose and regenerate their tails.  Find the ratio of the two lengths by dividing the SVL by the total length.	Subtract the mass of the bag from the mass with the lizard to get the mass of the lizard.	



The photo to the left is of a student gently pulling the dewlap on an anole to determine the sex of the anole. The large and bright dewlap indicates that the anole is a male. In North Carolina, only anoles have colored dewlaps. However, during mating seasons, coloration variations are also seen in Eastern fence lizards (males will have bright blue

**Video Identifying Eastern Fence Lizard:** <http://vimeo.com/109472550>

**Video Identifying Scales:** <http://vimeo.com/109472178>

**Video Identifying Green Anole:** <http://vimeo.com/109471430>

The photo to the right is of a student measuring a lizard with calipers. A plastic bag keeps the lizard still and straight. The plastic bag also allows the students to obtain the lizard's mass. Using a spring scale, students weigh the plastic bag without the lizard. This provides them with a pre-lizard mass. Then, students weight the plastic bag with the lizard in it, which give them a with-lizard mass. By subtracting the pre-lizard mass from the with-lizard mass, the students can calculate the mass of the lizard.



Collecting these data allows for generalizations about a population of lizards. For example, what could be extrapolated about a population where lots of lizards have lost their tails?

**Mark/Recapture Study of Anoles (*Anolis carolinensis*).** Because we work for short-term periods in many of our study sites we do a small number of mark/recapture studies at our short-term sites. We do conduct a mark/recapture study of anoles caught at our Inner Coastal Plain site. After we complete data collection as described above, we mark the anole on its side with a non-toxic permanent marker with a number. We release the anole exactly where it was captured and then as our program progresses we look for these marked anoles each day as well as new anoles. Anoles shed (but do not eat) their skins about every four weeks so marking these lizards this way does minimal harm to the animal while allowing us to look broadly at habitat use and calculate estimated population numbers of green anoles.



The photo above is of a recently marked anole. The anole had lost its tail prior to being captured.

The photo below is of a student carefully recording the location for the captured anole. The student will record the GPS coordinates on the data sheet and use flagging tape to mark the capture location. GPS coordinates will also be written on the flagging tape.





**Additional data collection possibilities.** Fluorescent tracking powder can be used to analyze the terrestrial movements of lizards at night. Simply dip the lizard's feet in the powder and release it at the point of capture, being careful not to get any of the powder in the lizards' mouth or eyes. Return in the evening with a black light to follow its path. Identifying where the lizard was first spotted and measuring how far up the tree or from a bush the lizard was can provide further data for analysis. Making observations of lizard behavior in a science notebook enhances students' observation skills.

## **IX. Data Reporting: Reporting Data to The HERP Project & The Carolina Herp Atlas.**

Through use of the free Herp Project android application (available for FREE download:<http://theherpproject.uncg.edu/apps-collecting-data/>), HRE participants record data and upload it to an open source database found on the Herp Project website (<http://nc-herps.appspot.com/>). This enables us to compare our data with previous years, and we can download data sets for further analysis. We also report our data to the Carolina Herp Atlas ([www.carolinaherpatlas.org](http://www.carolinaherpatlas.org)), a citizen science database initiated to document the distributions of amphibians and reptiles across North and South Carolina.

## **X. Teaching Points**

One threat to native lizards is invasive species of lizards. Invasive species may have no natural predators, they may destroy habitat, and they exploit the resources of the native species.

One example of an invasive species is the brown anole, *Anolis sagrei*, native of Cuba and the Bahamas, now abundant in Florida and expanding its range up the Eastern seaboard. Where populations of *A. sagrei* and the native green anole, *A. carolinensis*, occur together, individual *A. carolinensis* shift their spatial niche upward to occupy



arboreal perches from trunk to tree canopy, abandoning the ground perches they otherwise utilize when populations occur in the absence of *A. sagrei*. This spatial shift may lead to a change in the number and types of prey available to native *A. carolinensis* populations (Campbell, 2000). Green anoles are common in the Southern Coastal Plain and Piedmont of North Carolina, so scientists are monitoring the northward march of the brown anole very carefully to assess its effect on the native lizards. Since Green Anoles are endemic to North Carolina, students can help closely monitor these populations. The green anole has a pink dewlap while the brown anole has an orange dewlap and is more aggressive, pushing green anoles out of their preferred habitats. North Carolina is host to at least two other invasive species: Mediterranean house geckos, *Hemidactylus turcicus*, and Texas horned lizards, *Phrynosoma cornutum*.

## **XI. NSF Funding:**

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## **XII. The HERP Project Data Sheet**

## **XIII. References and Additional Resources**

### **Books**

Palmer, WM, Braswell AL. 1995. *Reptiles of North Carolina*. University of North Carolina Press. Chapel Hill, NC

### **Web Resources**

- Anole Annals: <http://www.anoleannals.org>
- Carolina Biological Supply: <http://www.carolina.com/>

- Carolina Herp Atlas: <http://www.carolinaherpatlas.org>
- Frog YouTube video: <http://www.youtube.com/watch?v=AbKGrtpgBtA>
- Herpedia: <http://www.Herpedia.com>
- LLL Reptile: <http://www.lllreptile.com/info/library/care-and-husbandry-articles/-/handling-reptiles>
- Partners in Amphibian and Reptile Conservation: <http://www.parcplace.org>
- The HERP Project: <http://theherpproject.uncg.edu>
- The Lizard Lab: <http://whitinglab.com/>
- World Wide Science: <http://www.wideworldscience.blogspot.com>
- Partners in Amphibian and Reptile Conservation brochure "Don't Turn it Loose"  
<http://www.parcplace.org/images/stories/pdfs/DontTurn.pdf>

#### XIV. Especially for Teachers

The Herp Project Curriculum	Next Generation Science Standards	International Society for Technology in Education Student Standards
<p><b>Practices/skills:</b>            Research design            Hypothesis building/testing            Data collection            Measurement skills            Taxonomy            Data analysis            Presentations/videos            Citizen Science digital data upload</p>	<p><b>HS-LS2-1.</b>  <b>ESTS1-1</b>  <b>Science and engineering practices:</b>            -Using mathematical and computational thinking            -Constructing explanations and designing solutions</p>	<p><b>1. Creativity and innovation:</b> a. Apply existing knowledge to generate new ideas and processes in research design.  <b>2. Communication and collaboration:</b> b. Communicate information and ideas effectively to multiple audiences using a variety of media and formats to share findings from scientific investigations.  <b>3. Research and information fluency:</b> a. Plan strategies to guide inquiry using apps in the field for scientific investigations.  <b>4. Critical thinking, problem solving, and decision-making:</b> Use critical thinking skills to solve problems, plan, and conduct research using digital tools. a. Identify and define authentic problems and significant questions for investigation using digital tools in the field.  <b>5. Digital citizenship:</b> a. Advocate and practice safe, legal, and responsible use of information and technology.  <b>6. Technology operations and concepts:</b> Understand technology concepts, systems and operations. a. Understand and use technology systems. b. Select and use applications effectively and productively. Transfer current knowledge to learning of new technologies.</p>

<p><b>Core Ideas:</b>  Adaptation  Biodiversity  Bio indicators  Biomes  Biotic parameters  Carrying capacity  Climate change  Ecosystem dynamics  Energy flows  Food energy pyramids  Food webs  Genetic hybridity  Habitat/Niches  Human impacts  Interdependence  Interactions  Invasive species study  Natural selection  Population studies  Predator/prey  Species diversity  Weather and climate</p>	<p><b>HS-LS1-2</b>  <b>HS-LS2-1, 2, 6, 8</b>  <b>HS-LS3-1, 2, 3</b>  <b>HS-LS4-1, 4, 5, 6*</b>  <b>HS-ESS2-2, 4*, 5, 6, 7</b>  <b>HS-ESS3-1, 3*, 4, 5, 6*</b>  <b>Science and engineering practices:</b>  -Engaging in argument from evidence  -Obtaining, evaluating, and communicating information  <b>Crosscutting Concepts:</b>  -Cause and Effect  -Scale, Proportion, and Quantity  -Stability and Change</p> <p>*Real, not a simulation or model.</p>	<p><b>2. Communication and collaboration:</b>  d. Identify trends and forecast possibilities.  <b>3. Research and information fluency: b.</b>  Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media. c. Evaluate and select information sources and digital tools based on the appropriateness to specific tasks. d. Use apps in the field to process data and report results.  <b>4. Critical thinking, problem solving, and decision-making: b.</b> Plan and manage activities to develop a solution or complete a project. c. Collect and analyze data to identify solutions and /or make informed decisions.  <b>5. Digital citizenship: b.</b> Exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity.  <b>6. Technology operations and concepts:</b>  Understanding technology concepts, systems and operations. b. Select and use applications effectively and productively. c. Troubleshoot systems and application.</p>
<p><b>Extension Activity:</b>  Reduce human impact on the ecosystem.</p>	<p><b>HS-LS2-7</b>  <b>HS-LS4-6</b>  <b>HS-ETS1-2, 3, 4</b>  <b>Science and engineering practices:</b>  -Developing and using models  -Developing possible solutions  -Optimizing design solution  <b>Crosscutting concepts:</b>  Influence of science, engineering and technology on natural world</p>	<p><b>1. Creativity and innovation:</b> a. Apply existing knowledge to generate new ideas, products, or processes. b. Use *models and simulations to explore complex systems and issues.  <b>4. Critical thinking, problem solving, and decision-making:</b> Using technology to help reduce impact. d. Use multiple processes and diverse perspectives to explore alternative solutions.  *Real, not a simulation or model</p>

## XV. Transcripts of Videos

### Transcript of Project Leader Holding Bearded Dragon:

Lacey – See his scales, ok. This guy does have some spikes (motions to sides of lizard) so we gotta be careful how we hold him. He doesn't mean to hurt you but, you know, they do poke.

Ok, he has what?

Participant – Sharp claws

Lacey – So do you guys notice the claws? That's another characteristic, ok? (Points to back feet)

Notice anything else?

Participant – He's tiny but his skin is really big and hanging off. (Motions around his own neck.)

Lacey – (Laughs) Ok.

### Transcript of Lasso Used on Real Lizard:

(Participant holds lasso on the end of a stick over a lizard. He quickly lassos the lizard and picks it up.)

Lacey – Oh nice, there you go.

Participant – Oh it's a stick, I got you with a stick.

Lacey – Good job, yeah, perfect.  
(Lacey removes the lasso from the lizard's neck.)  
Lacey – There you go.

### **Transcript of How to Make a Lizard Lasso:**

Lacey – So, we're going to practice with our big string and then we're going to go to our fishing line because that's what we really use. If you're a Boy Scout or a Girl Scout or have done any type of adventure training, this is really a slip knot that we're making so if you know how to do that...

Participant – I know how to make a slip knot.

Lacey – Good. If you know how to make a slip knot, then you can help teach others after we go through our basic instructions. But I want one end to be short so you see I have my short end here, (holds up string with short end pinched) and see when I put them together it gives me a double string?

### **Transcript of Identifying Eastern Fence Lizard:**

Lacey – So, what do we have here?

Participant – Lizards.

Lacey – Hold on, you're saying these are the same?

Participant – Mm Hmm

Lacey – So what type of lizard is this?

Participant – Eastern Fence

Lacey – Eastern Fence Lizard, good. Now which one's male and which one's female?

Participant – This one's... this one's male.

Lacey – How do you know that one's a male?

Participant – Black, on the bottom.

Lacey – Ok, so right there? (points to bottom of one lizard) Good! And notice how that one? (points to other lizard) Now if we look, see how her head is also smaller? And her body's smaller?

### **Transcript of Identifying Scales:**

Haley – So the sub-caudal are the ones along the tail and so in the one that you're describing there, the midline, the ones right down the middle, would be a lot thicker than the rows next to them. And so, on these ones, the scales are pretty much the same width across the tail.

Participant – Ok.

Haley – So that kinda helps us rule out the one you were just describing so keep looking.

Participant – Ok, so, this one is not a five-line skink?

Haley – It shouldn't be, if you look at the rows on the tails, probably. But, is there anything else that we could use to rule it out?

### **Transcript of Identifying Green Anole:**

Lacey – So if they don't live here, it's probably not that species.

Participant #1 – She said it's a native to here.

Lacey – These are all caught here. In fact, you guys get to release all of these today except our three that say "captive" on the top. We have to go take these back to their homes.

Participant #2 – (to participant #3) You've got this one, do you want me to pick it up?

Participant #3 – Yeah.

Participant #2 – (Reaches into the carrier) His tail is...

Participant #3 – Oh, I found him! (Points to field guide) He's that one.

Lacey – How do you know?

Participant #3 – Because of the legs.

Lacey – So, explain to me. What do you mean, because of the legs?