

Parental Care in Reptiles

An Open Education Resource by Worcester Polytechnic Institute Students

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Abstract:

This open educational resource is a fun and engaging high school-level lecture including lecture notes on animal parental care highlighting reptile behaviors. We use survivorship curves to frame the lesson, having the class brainstorm on what animals fit in each survivorship curve, along with different species of reptiles that exhibit interesting parenting behaviors. At the end of the lecture, we highlight diverse scientists in the field to make the lecture more inclusive and welcoming.

Objective:

The purpose of this OER is to teach students (high school level) about animal parental care behaviors using various species of reptiles and survivorship curves.

Link to Slides:

<https://docs.google.com/presentation/d/1iSkx3XIQTXecSvZc8JFNvVMcmwUrMF4XeMa6wLsPIBQ/edit?usp=sharing>

Lecture Notes:

- **Slide 3- Survivorship Curves**
 - Survivorship curves are measures of when individuals in a population die (at what age) (Rauschert 2010). They show the percent of surviving organisms in a population over time. Ecologists use survivorship curves to visualize how the numbers in a population change over time (Rauschert 2010). Survivorship follows three major trends- types 1, 2, and 3.
- **Slide 4- Type 1 Care**
 - In Type 1 survivorship, a lot of energy is put into an individual at a young age. This results in high survivorship throughout its life (Rauschert 2010).
 - Most die from old age and are able to reproduce (Rauschert 2010).
 - “Heavy parental investment improves competitive ability” (Rauschert 2010)
 - This is why the type 1 line on the graph stays high over time and drops rapidly (old age).
- **Slide 5- Type 2 Care**
 - In Type 2 survivorship, an individual’s survivorship does not depend on its age. They are equally likely to die throughout their life (Rauschert 2010).
 - There can be some parental care but it is not as prominent as type 1 (Rauschert 2010).
 - This is why the type 2 line is linear on the graph (equal chance to die throughout its life)
- **Slide 6- Type 3 Care**
 - In Type 3 survivorship, most individuals die at a young age (Rauschert 2010).
 - Species will produce many offspring and invest no parental care (Rauschert 2010).
 - Those that do survive infancy have a relatively constant survivorship (Rauschert 2010).
 - This is why the type 3 line on the graph drops rapidly in the beginning and then stays relatively constant (most die early and those that survive have constant survivorship).
- **Slide 7- ACTIVITY- Brainstorm (see slides)**
- **Slide 8- Types of Parental Care General for Reptiles**
 - Reptiles have been around so long and have developed many types of parental care behaviors (Gans 1996)
 - “egg guarding, moisture and heat provision, and antipredator devices” (Gans 1996)
 - Lots of variation in reproductive strategies ie. eggs vs live births (Gans 1996)

- Protect in water after hatching for 2-3 years
- **Slide 10 & 11 Type 2- Pythons and Crocodile Skinks**
 - Southern African pythons (Alexander 2018)
 - Females coil around eggs to protect, keep the eggs warm, control, and maintain the moisture levels
 - Stay with hatched babies for two weeks and continue coiling to protect young
 - Video of python parental care: *Accessed on Youtube, cannot find copyright info, okay to share in classroom lecture*
 - <https://youtu.be/0XW34PZINqo>

Crocodile skinks

- A brief overview of Parenting
 - Protect eggs (Hartdegen et al. 2002)
 - Protects young for 2 weeks (Hartdegen et al. 2002)
 - Video on crocodile skink breeding ****NOT OPEN RESOURCE, cannot find copyright, okay to share in classroom lecture****
 - <https://youtu.be/AXPGtQJGOV8>
 - Important Concepts:
 - These two species exhibit less parental care
 - Only stay with young for two weeks
 - Similar parenting styles
- **Slide 12- Type 3- Sea Turtles**
 - Takeaway: Type 3 parental care is the most uninvolved form of parental care. An example species of type 3 care is sea turtles.
 - Sea turtles abandon young (NOAA n. d.).
 - Some pre-parental care with nest building
 - In summer, pregnant female sea turtles return to beaches where they were hatched (NOAA n. d.)
 - The sea turtle will use her back flippers to dig a nest in the sand (NOAA n. d.)
 - She will then lay up to 100 eggs and bury them in the hole (NOAA n. d.).
 - The mother turtle will then return to the ocean and never come back to check on the success of the nest (NOAA n. d.).
 - Leave nest, no check-in, no protection from predators (NOAA n. d.)
 - Babies are left to hatch and get themselves to the safety of the ocean on their own (NOAA n. d.)

- When the baby sea turtles are ready to hatch (approximately 60 days after the eggs are laid), they will hatch in unison (NOAA n. d.)
 - This increases their chances of survival (moving in a group). Some predators can easily snatch baby turtles off of the beach.
 - They then have to navigate to the ocean using the reflection of the moon and stars (NOAA n.d.)
 - If they successfully get to the ocean, they spend their early years hiding and growing up without help from any parent (NOAA n. d.)
 - Important Concepts:
 - Sea turtles perform no parental care
 - Type 3 survivorship
- **Slide 13- Scientist Highlight**
 - Dr. Earyn McGee (McGee n. d.)
 - Dr. Earyn McGee is a modern, black female herpetologist
 - Her graduate studies focused on the impact of stream drying on lizard populations
 - She got her bachelors at Harvard and her masters and PhD at the University of Arizona
 - She is known for engaging the public in conversations about conservation and social issues through her social media game- #FindThatLizard. Participants have to try to find a lizard that is camouflaged into its environment
 - She is committed to diversity and inclusion in science and exploring ways to get more black women into natural resources and conservation careers
 - Joan Beauchamp Procter (The Linnean Society n. d.)
 - Famous female herpetologist (reptilian scientist)
 - In 1923 she was appointed as the curator of reptiles at the Zoological Society of London (ZSL)
 - She is known for her renovations to the reptile house of the ZSL as well as her publications on the east African tortoise
 - She accomplished all of this while struggling with a chronic illness all her life, leading to her premature death at the age of 34.
 - Important Concepts:
 - There is some diversity in the herpetology field
 - More work needs to be done to improve diversity
 - Diversity makes science more inclusive

At the end of the lesson, engage your students and test their comprehension. Some ways we have seen this done are with kahoots, jeopardy games, or a group quiz where students can work together to answer questions on the material!

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Authorship:

Anna: researched and wrote scientist highlight and found pictures, edited speaker notes and lecture slides, found video on python parental care, added info to general reptile parental care

Stephanie: edited speaker notes and lecture slides

Haohao: team leader of the week, edited speaker notes and lecture slides

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