

The Importance of Georgia's Gopher Tortoise

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Subject/Course: Life Science
Suggested Grade Level: 4th
Duration: 2 weeks

Materials: Internet connection, tablets, science journals, poster board, markers, pencils, glue sticks, scissors, white construction paper for brochure creation or use Publisher to create brochure.

Science Standards:

S4L1. Obtain, evaluate, and communicate information about the roles of organisms and the flow of energy within an ecosystem.
 c. Design a scenario to demonstrate the effect of a change on an ecosystem. (Clarification statement: Include living and non-living factors in the scenario.)
 d. Use printed and digital data to develop a model illustrating and describing changes to the flow of energy in an ecosystem when plants or animals become scarce, extinct or overabundant.

Visual Art

VA4.CN.2 Integrate information from other disciplines to enhance the understanding and production of works of art. b. Apply art skills and knowledge to improve understanding in other disciplines.

Connection to Literacy standards

ELAGSE4W2: Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
 ELAGSE4W4: Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience
 ELAGSE4W7: Conduct short research projects that build knowledge through investigation of different aspects of a topic.
 ELAGSE4SL1: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.
 ELAGSE4SL4: Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

Cross-Cutting Concept:

7. Stability and change. For both designed and natural systems, conditions that affect stability and factors that control rates of change are critical elements to consider and understand.

Career Connection:

- **Ecologists** study the interactions between organisms and their environments. For example, they may research how the creatures in forests, deserts, wetlands, or other ecosystems interact with each other, as well as their environments. Some ecologists may study how the removal or return of top predators like wolves affect other species in the area, or the strengths and weaknesses of invasive species compared with native species.
- **Environmental scientists** are problem solvers who research environmental and health problems to figure out their causes and come up with solutions. They conduct research to identify the causes of these types of problems, and how to minimize or eliminate them, then use what they learn to make recommendations and develop strategies for managing environmental problems. Environmental scientists use biological, physical and earth sciences to do their job. They also use their knowledge of how the earth works to protect the environment and human health.

Resource: https://learn.org/articles/What_Does_An_Environmental_Scientist_Do.html

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Teacher Background:

The forest is a complex ecosystem where trees, plants, and animals interact. Its health and productivity are vital to the community in the area of production of raw wood materials, which is Georgia's largest manufacturing industry. Additionally, the forest ecosystem nurtures animals that are becoming endangered because of habitat loss. The endangered gopher tortoise is Georgia's official state reptile and protection efforts to save the tortoise will not only benefit the tortoise, but many other species and the health of the longleaf pine forest ecosystem where the gopher tortoise lives. The gopher tortoise can dig burrows up to 40 feet long and 10 feet deep. These burrows provide year-round shelter from predators, inclement weather, and forest fires (prescribed or not) for over 100 other animal species. The decline of the gopher tortoise as a result of human activities, may lead to their extinction. Georgia listed the gopher tortoise as a threatened species. Prior to starting the lesson, contact your local environmental agency's (i.e. forestry, conservation, nature centers, 4-H, etc.) outreach program, inform them of your gopher tortoise lesson, and request a guest speaker(s) who will discuss the organization's role in conservation practices for animals and forests.

Resources:

- www.gfc.state.ga.us/resources/publications/GeorgiasForestStewardshipProgram.pdf
- <https://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/georgia/can-we-save-the-gopher-tortoise.xml>
- <https://statesymbolsusa.org/symbol-official-item/georgia/state-reptile/gopher-tortoise>
- <http://gophertortoiseCouncil.org/gt/>

Lesson Objective: Students will use the knowledge they gained throughout this lesson to justify the conservation efforts for saving the gopher tortoise that lives in Georgia's pine forests. Students will communicate information about the role of the gopher tortoise and its importance to Georgia's pine forest based on their research, demonstrate the effect of change on Georgia's pine forest if the gopher tortoise becomes extinct, and create a poster and brochure that will illustrate and describe the changes to the flow of energy in an ecosystem if the gopher tortoise becomes extinct. Groups will present their brochure on ways to protect and preserve the gopher tortoise to an organization for distribution to the community.

Driving Question: How can we as stewards of our local forests advocate for and help protect the biodiversity in the forest ecosystem?

Engagement (1-2 days):

- Phenomenon: How does saving the endangered gopher tortoise benefit hundreds of other animal species and the pine forest ecology?
- View phenomenon video at <http://bit.ly/2HDZ7bl> (stop at 2:00) and discuss how saving the gopher tortoise is beneficial to the pine forest ecosystem. Do not validate students' answers, but let them know that they will be investigating their claim throughout the STEAM lesson.
- Tell students to cut and paste the [Claim-Evidence-Reasoning graphic organizer](#) (CER) in their science journal and complete the claim section of the organizer. Question for CER graphic organizer: How does saving the endangered gopher tortoise benefit other animal species and the pine forest ecosystem?
- Inspire students to think about ways they can get involved in saving threatened and endangered animals by reading sections of *Can We Save Them? Endangered Species of North America* by Dobson, David. (1997). Watertown, MA: Charlesbridge Publishing.
- Take students on a field trip outside to observe their schoolyard and tell students to record their observations in their science journal (dirt, plants, animals, rocks, air, trees, etc.). Based on their knowledge of habitats from last year and their observations of the school yard, ask students to answer the inquiry questions (below) in their science journal:
- Inquiry questions: What is an ecosystem? What things (plants, animals, rocks, etc.) exist in an ecosystem?
- The teacher will ask students what they would like to know about ecosystems and have each student write down a question they would like answered in their science journal, then have a class discussion based on their responses.

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Exploration (2-3 weeks):

- Invite a representative from the Gopher Tortoise Council via a communication platform (i.e. Skype, Google Hangout, etc.) or invite a representative from the Georgia Department of Natural Resources, the Environmental Protection Division, to discuss the importance of the gopher tortoise and the importance of the pine forest ecosystem in Georgia.
- Encourage students to engage with the guest speaker(s) by asking questions about the information presented.
- Based on the students' response on what they would like to further research about ecosystems (from engagement section), the teacher will group students according their questions about ecosystems.
- Teacher will guide the research to focus specifically on a forest ecosystem with an emphasis on the gopher tortoise.
- Employ the help of the school's media specialist to teach students how to conduct proper research using age-appropriate websites and how to use Publisher to create a brochure.
- Guided research questions: What is an ecosystem? Specifically, how does Georgia's pine forest function as an ecosystem? What act occurs naturally or is prescribed that allows the pine forest to remain healthy? How is the gopher tortoise's role essential to the pine forest ecosystem? Why is saving the gopher tortoise key to the pine forest ecosystem and the hundreds of other animals within that ecosystem? Students should use their group's research question as the main focus and the guiding questions as the supporting details.
- Students will use tablets or desktop computers to engage in research based on their research question(s).
- This is a student-led activity, allow students to independently conduct their own research and gather information.
- Using the information gathered, groups will create a brochure for a local environmental organization detailing the need for conservation efforts to save the gopher tortoises that live in Georgia's pine forest.
- At the end of their research, students will refer back to their science journal and answer the "evidence" section on their CER model. Guide students to answer their evidence: Did your claim match your evidence, why or why not? What evidence did you discover to prove or disprove your claim?

Explanation (1 day):

- Students will present their gopher tortoise brochure and poster (see below) to a member(s) of the Gopher Tortoise Council, the Georgia Department of Natural Resources Environmental Protection Division, the Joseph W. Jones Ecological Research Center in Newton, Ga (www.jonesctr.org) or any local environmental organization for feedback and possible community distribution.

Elaboration:

- To generate a greater knowledge and appreciation of Georgia's diverse and increasingly threatened wildlife and their habitats, student will create a poster with the gopher tortoise as the main theme and enter the annual Give Wildlife a Chance Poster Contest hosted by The Georgia Department of Natural Resources (DNR), The State Botanical Garden of Georgia and The Environmental Resources Network (TERN), Inc. As part of DNR and TERN's "Kids For Conservation" initiative, this art contest provides a unique opportunity for kindergarten through fifth-grade students to explore the wonders of Georgia's native plants and nongame animal species. For more information on this art contest, visit: <http://georgiawildlife.com/sites/default/files/vrpd/pdf/contests/2018GWACbrochure.pdf>

Evaluation (throughout the lesson):

- Science journal check (CER)
- Teacher will monitor the research work of students and assist when necessary.
- Representatives from the audience will provide feedback on group's brochure and poster.
- Teacher will evaluate group's presentation using the Gopher Tortoise Presentation rubric: <http://bit.ly/2tfcNqc>