

## Nature Sleuths Lesson Plan



Grade Level: grades 4-8

**Description:** Using simple field equipment, students will take a close look at a natural, outdoor area to find evidence of or actual objects that represent basic ecologic concepts and relationships. The activity allows students to demonstrate understanding of those concepts in both concrete and abstract ways.

This activity can also be used to illustrate some of the ways in which Texas Parks and Wildlife game wardens and biologists use investigative skills to catch illegal hunters or anglers, to help solve mysterious plant or animal deaths, to formulate regulations or management plans and to explain changes in the environment.

Time Frame: varies, 1-2 hours

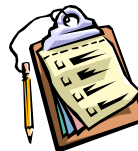
**Objectives:** Students will be able to:

1. identify examples of reproduction in nature, including different life stages
2. identify examples of food webs in nature
3. identify examples of different plant and animal niches in nature
4. identify examples of different adaptations (both physical and behavioral) that allow plants and animals to survive
5. use scientific tools such as hand lenses and rulers to investigate nature
6. document evidence using drawings and/or digital cameras
7. explain how biologists and game wardens use investigative tools and skills to answer questions

**TEKS** (This will vary, depending upon items chosen to find and tools provided for investigation. See attachment.)

**Materials:**

- Clip boards
- Pencils
- Student data sheet
- Hand lenses
- Binoculars (optional)
- Meter sticks/rulers
- Insect nets/containers (optional)
- Tweezers/pipettes (optional)
- Digital cameras (optional)



## Directions:

1. Involve students in a conversation about the word "sleuth" and what it means. Compare a scientist with an investigator of a crime in that both are asking questions and looking for clues to help them answer those questions. Explain that wildlife biologists and game wardens from Texas Parks and Wildlife Department have a basic knowledge of how nature works and an ability to observe and measure natural phenomena. They ask questions and use clues in nature to help them solve mysteries about wildlife, about the environment and about how wildlife and the environment interact. Based on this knowledge, they also make recommendations for hunting and fishing regulations and for other important environmental issues.
2. Divide the students into investigative groups of from 2 to 4, giving a specific job to each student on the team (data recorder, equipment manager, reporter, etc.). Explain that they will be looking in a specific area outdoors for examples of the items listed on the data sheet. With time constraints, you may reduce the number or assign specific items to each group. Ask students to take a measurement of the objects they find if possible. Give students a specific time and specific boundaries for looking.
3. Discuss what should or should not be taken as a sample (nothing may be taken at state or national parks), stressing any rules or safety concerns (poison ivy, fire ants, etc.) for the investigation site.
4. When time is up, ask student groups to gather and report what they have found, discussing each item and supporting their decisions about each item with their knowledge of scientific concepts.
5. In summary, ask student groups to answer the following questions:
  - a. What tools did your group use to examine the habitat to find the listed items? (Did students think of their own eyes and ears as investigative tools? Which tools were most helpful? What other tools would they like to have?)
  - b. How would doing the investigation at a different time of year or a different time of day have made it easier or harder?
  - c. What natural sight or sound did you see or hear today for the first time?



# Nature Sleuths



*Biologists, park rangers and game wardens investigate plants, animals and their habitats.*

**Your challenge is to collect evidence of the items listed below just as a detective collects evidence about a crime.** (Remember, when you are in a state or national park you may not collect anything without permission.)

- When you find evidence of an item listed below, describe it in the space provided and then describe where you found it.
- Make a sketch or take a photo of the evidence or the item.
- If possible, use a scientific tool to make a measurement of the evidence or item, disturbing it as little as possible.

Item	Description	Location
A trap		
A journey		
A cycle		
A baby		
A parent		
A predator		
A home		
A pair		
A worker		
Camouflage		

Bonus items:

A Success		
A Failure		
A Worker		
A Hideout		

What tools did your group use to examine the habitat and find evidence of your assigned items? What other tools could you have used?

How would a different season make your investigation easier or harder?

What did you see or hear today for the first time?

What would you like to know more about?

# Nature Sleuths



Biologists and game wardens must solve mysteries about animal deaths and natural events through the clues left by plants, animals and natural processes. They have learned to take time to look, listen, measure and think about what they find.

**Your challenge is to find examples or evidence in the natural world of the items listed below.**

- You will have a specific area to examine and a certain time period to complete the challenge.
- You may use any or all of the equipment provided to help you get a better look.
- Unless you are in a state or national park, you may take samples of the items if you know it will do no harm (like fallen leaves, etc.).
- Document your finds on this data sheet, take a measurement if possible, and make drawings or take digital images of the items.
- Remember, you must actually see and document the find, not just imagine it.

Item to find	Where found	Description
An advertisement		
A trap		
A journey		
A cycle		
A baby		
A parent		
A juvenile		
Soundless communication		
A filter		
A recycler		
A predator		
Food		

A home		
A builder		
A success		
A failure		
A secret		
A lie		
A hideout		
A record		
Waste		
A pair		
An octet		
A quartet		
A prediction		
A sleeper		
A worker		
Teamwork		
Camouflage		

## Science and Social Studies TEKS Correlations for *Nature Sleuths*

### Scientific Process Skills

- (1) Participates in classroom and field investigations following home and school safety procedures
- (2) Develops scientific inquiry skills for field and classroom investigations
- (3) Develops critical thinking, problem solving and decision-making skills
- (4) Uses appropriate tools (including eyes and ears) and models to verify that organisms and objects and parts of organisms and objects can be observed described, and measured

### Systems

#### Grade 4

- (5) Complex Systems and Parts
  - a. identify and describe roles of organisms in living systems and parts in nonliving objects
  - b. predict and draw conclusions when part of a system is removed
- (8) Adaptations Increase Survival of Members of a Species
  - a. identify characteristics that allow members of a species to survive and reproduce
  - b. compare adaptive characteristics of species

#### Grade 5

- (9) Adaptations Increase Survival of Members of a Species
  - a. compare adaptive characteristics of species that improve survival & reproduction
  - b. analyze and describe adaptive characteristics that result in organism's niche
  - c. predict adaptive characteristics required for survival and reproduction in an ecosystem

#### Grade 6

- (8) Matter & Energy: Interactions
  - c. describe energy flow in living systems—food chains, food webs
- (12) Internal & External Stimuli: Organism Response
  - b. identify responses to external stimuli

#### Grade 7

- (12) Organisms & Environment
  - a. identify components of ecosystem
  - b. observe and describe how producers, consumers, decomposers live together
  - c. describe how environments support varieties of organisms
- (14) Natural Events & Human Activity Alter Earth Systems
  - c. make inferences and draw conclusions about effects of humans on resources

#### Grade 8

- (6) Interdependence Among Living Systems
  - c. describe interactions in ecosystems
- (14) Natural Events & Human Activity Alter Earth Systems
  - c. describe how human activities have modified soil, water, air quality

### Properties, Patterns, and Models

#### Grade 4

- (8) Adaptations Increase Survival of Members of a Species
  - a. identify characteristics that allow members of a species to survive and reproduce
- (11) Natural World: Earth Materials and Objects in the Sky
  - c. identify Sun as major energy source

#### Grade 5

- (6) Change Occurs in Cycles
  - c. describe and compare life cycles of plants and animals
- (9) Adaptations Increase Survival of Members of a Species

- a. compare adaptive characteristics of species that improve survival & reproduction
- b. analyze and describe adaptive characteristics that result in organism's niche
- c. predict adaptive characteristics required for survival and reproduction in an ecosystem

## **Constancy and Change**

### Grade 4

#### (8) Adaptations Increase Survival of Members of a Species

- a. identify characteristics that allow members of a species to survive and reproduce

### Grade 5

#### (6) Change Occurs in Cycles

- c. describe and compare life cycles of plants and animals

### Grade 6

#### (12) Internal & External Stimuli: Organism Response

- b. identify responses to external stimuli
- c. identify components of ecosystems to which organisms respond

### Grade 7

#### (10) Species Change Through Generations

- b. compare traits of organisms that enhance survival and reproduction

### Grade 8

#### (14) Natural Events & Human Activity Alter Earth Systems

- c. describe how human activities have modified soil, water, air quality

## **Form and Function**

### Grade 4

#### (5) Complex Systems & Parts

- a. identify and describe roles of organisms in living systems and parts in nonliving objects
- b. predict and draw conclusions when part of a system is removed

#### (8) Adaptations Increase Survival of Members of a Species

- a. identify characteristics that allow members of a species to survive and reproduce

### Grade 8

#### (6) Interdependence Among Living Species

- c. describe interactions in ecosystems

#### (11) Species Change Through Generations

- a. identify that change in environment can affect survival of species

## **Social Studies**

### **Geography**

#### Grade 4

Describe ways people adapt to and modify the Texas environment, past and present; identify reasons; analyze consequences.

#### Grade 5

Describe the reasons and ways people adapt to and modify the environment; analyze the consequences of environmental modification.

#### Grade 6

Analyze the ways people adapt to and modify the physical environment; describe the role of technology in the process.

#### Grade 7

Analyze ways in which Texas and the environment interact.

#### Grade 8

Analyze the impact of human adaptations and modifications on the environment.