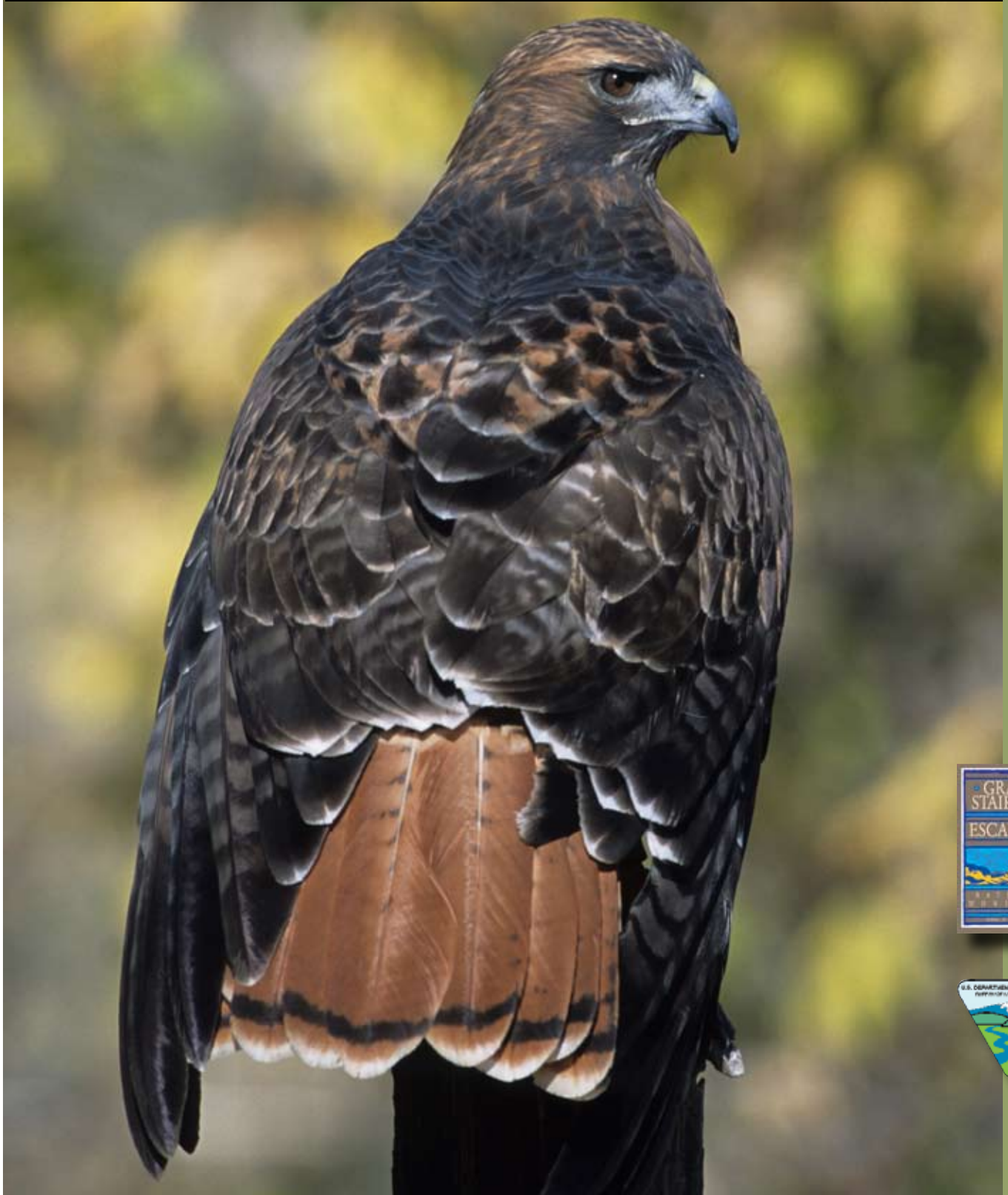


# Identifying Flora and Fauna in Grand Staircase - Escalante National Monument

## Teacher Guide



Grand Staircase-Escalante National Monument



# Identifying Flora and Fauna in Grand Staircase-Escalante National Monument

## Grade Level

9-12

## Duration

90 minutes

## Description

After reviewing methods taxonomists use to classify organisms and the use of taxonomic keys, students create their own keys to identify twelve animals from Grand Staircase-Escalante National Monument.

## Goals

- Review the science of taxonomy and the methods used to classify organisms.
- Use a taxonomic key to identify organisms.
- Create keys to identify animals in GSENM.

## Academic Content Standards

The following standards are drawn from *Content Knowledge*.<sup>1</sup>

### Life Science Standard 7

Understands biological evolution and the diversity of life

#### Level IV (Grades 9-12)

##### Benchmark 7

Knows how organisms are classified into a hierarchy of groups and subgroups based on similarities that reflect their evolutionary relationships (e.g., shared derived characteristics inherited from a common ancestor; and degree of kinship estimated from the similarity of DNA sequences)

### Nature of Science Standard 11

Understands the nature of scientific knowledge

#### Level IV (Grades 9-12)

##### Benchmark 3

Understands how scientific knowledge changes and accumulates over time (e.g., all scientific knowledge is subject to change as new evidence becomes available; some scientific ideas are incomplete and opportunity exists in these areas for new advances; theories are continually tested, revised, and occasionally discarded.)

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<sup>1</sup> *Content Knowledge: A Compendium of Standards and Benchmarks for K-12 Education: 4<sup>th</sup> Edition*, Mid-Continent Research for Education and Learning in Aurora, Colorado. <http://www.mcrel.org/standards-benchmarks/>

Benchmark 4

Knows that from time to time, major shifts occur in the scientific view of how the world works, but usually the changes that take place in the body of scientific knowledge are small modifications of prior knowledge.

Nature of Science Standard 12

Understands the nature of scientific inquiry

Level IV (Grades 9-12)Benchmark 7

Knows that investigations and public communication among scientists must meet certain criteria in order to result in new knowledge and methods (e.g., arguments must be logical and demonstrate connections between natural phenomena, investigations, and the historical body of scientific knowledge; the methods and procedures used to obtain evidence must be clearly reported to enhance opportunities for further investigation.)

Nature of Science Standard 13

Understands the scientific enterprise

Level IV (Grades 9-12)Benchmark 6

Knows that creativity, imagination, and a good knowledge base are all required in the work of science and engineering.

**Materials**

- *Identifying Animals in Grand Staircase-Escalante National Monument – Student Activity*
- Computer with internet access (Optional)
- Video or DVD *Traces in Time*, produced by GSENM

**Objectives**

1. Review the methods taxonomists use to classify organisms.
2. Examine the basics for making classification keys, and use a taxonomic classification key to identify some of the plants and animals in Grand-Staircase-Escalante National Monument.
3. Create a key to identify *Twelve Animals from Grand Staircase-Escalante National Monument*.

**Procedures**

Depending on the amount of time available for this activity, you may want to have students work in small groups or individually. The video or DVD *Traces in Time* is a great way to introduce students to the Grand Staircase-Escalante National Monument.

1. Step 1 – The introduction (pages 1-2), reviews the science of taxonomy and methods used by taxonomists. Individual students can read this section before group work begins.
2. Step 2 – *Using Classification Keys: Flora and Fauna* (pages 2-5), reviews making and using a classification key. Students can complete this on their own or work in small groups.

3. Step 3 – *Create a Classification Key, Question 3* (pages 6-8), is a good small group activity. Internet links can be divided among students in each group and the information they obtain online can be shared with the group to create a classification key.

4. Through classroom discussion evaluate the differences between keys created by the students to one that follows a known taxonomic hierarchy. Discussion about the differences or similarities in the keys should focus on the different uses for keys such as: field guides, scientific hierarchical “trees,” and interrelationships between organisms.

#### Adaptations:

Objectives 1-2 can be used to introduce students to taxonomy and the use of classification keys. Objective 3 can be omitted and organisms collected by students can be keyed out or they can create keys for their collections.

### **Extensions**

Students can use internet links to learn more about the different Classes, Orders, Families, Genera, and species. These links will also lead them to sites that use different Class, Order, Family, Genus, and species names than those used in the activity. How many can they find?

### **References**

Canyon wren - *Catherpes mexicanus*

[http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/Canyon\\_Wren.html](http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/Canyon_Wren.html)

California condor – *Gymnogyps californianus*

[http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/California\\_Condor.html](http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/California_Condor.html)

Collared lizard - *Crotaphytus collaris*

<http://www.reptilesfaz.com/Lizards-Subpages/h-c-collaris.html>

Coyote - *Canis latrans*

[http://www.mnh2.si.edu/education/mna/image\\_info.cfm?species\\_id=29](http://www.mnh2.si.edu/education/mna/image_info.cfm?species_id=29)

Desert bighorn - *Ovis Canadensis*

[http://www.mnh2.si.edu/education/mna/image\\_info.cfm?species\\_id=241](http://www.mnh2.si.edu/education/mna/image_info.cfm?species_id=241)

Mountain lion - *Puma concolor*

[http://www.mnh2.si.edu/education/mna/image\\_info.cfm?species\\_id=287](http://www.mnh2.si.edu/education/mna/image_info.cfm?species_id=287)

Pallid bat - *Antrozous pallidus*

[http://www.mnh2.si.edu/education/mna/image\\_info.cfm?species\\_id=8](http://www.mnh2.si.edu/education/mna/image_info.cfm?species_id=8)

Pronghorn antelope - *Antilocapra Americana*

[http://www.mnh2.si.edu/education/mna/image\\_info.cfm?species\\_id=7](http://www.mnh2.si.edu/education/mna/image_info.cfm?species_id=7)

Rattlesnake - *Crotalus cerastes*

<http://www.reptilesfaz.com/Snakes-Subpages/h-c-cerastes.html>

Red-tailed hawk - *Buteo jamaicensis*

[http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/Red-tailed\\_Hawk.html](http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/Red-tailed_Hawk.html)

Townsend's big-eared bat - *Corynorhinus townsendii*

[http://www.mnh2.si.edu/education/mna/image\\_info.cfm?species\\_id=51](http://www.mnh2.si.edu/education/mna/image_info.cfm?species_id=51)

Rufous hummingbird – *Selasphorus rufus*

[http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/Rufous\\_Hummingbird.html](http://www.birds.cornell.edu/programs/AllAboutBirds/BirdGuide/Rufous_Hummingbird.html)

## Assessment

After students have created their own identification keys in Objective 4 ask them to compare their key to the one used in Objective 3. The point can be made that taxonomic keys are important for researchers but for general field identification they can be difficult. Identification keys, like those found in field guides, are modified taxonomic keys that enable non-scientists to learn about the organisms around them.

## Answer Key

### Question 1

- a) Cliffrose
- b) Pinion Pine
- c) Squabush sumac
- d) Yucca

### Question 2

- a) Canyon wren  
*Catherpes mexicanus*
- b) California condor  
*Gymnogyps californianus*
- c) Collared lizard  
*Crotaphytus collaris*
- d) Coyote  
*Canis latrans*
- e) Desert bighorn  
*Ovis canadensis*
- f) Mountain lion  
*Puma concolor*
- g) Pallid bat  
*Antrozous pallidus*
- h) Pronghorn antelope  
*Antilocapra Americana*
- i) Rattlesnake  
*Crotalus cerastes*
- j) Red-tailed hawk  
*Buteo jamaicensis*
- k) Townsen's big-eared bat  
*Corynorhinus townsenii*
- l) Rufous hummingbird  
*Selasphorus rufus*

Question 3

*Answers will vary*

**Vocabulary**

<b>Characteristic</b>	Trait, type, or attitude
<b>Classification</b>	Categorizing organisms into groups on the basis of specific characteristics.
<b>Diversity</b>	Variety or multiformity.
<b>DNA</b>	Deoxyribonucleic acid; a nucleic acid that consists of two long chains of nucleotides twisted together into a double helix and joined by hydrogen bonds between complementary bases adenine and thymine or cytosine and guanine; it carries the cell's genetic information and hereditary characteristics via its nucleotides and their sequence and is capable of self-replication and RNA synthesis.
<b>RNA</b>	Ribonucleic acid; a long linear polymer of nucleotides found in the nucleus but mainly in the cytoplasm of a cell where it is associated with microsomes; it transmits genetic information from DNA to the cytoplasm and controls certain chemical processes in the cell.
<b>Subspecies</b>	Division or sub-grouping of the species level of classification
<b>Taxonomic hierarchy</b>	System of organizing living things.