

# A Dichotomous What?

## Sneak Peek

Students will be introduced to concepts and issues surrounding Invasive Species. Florida has a large number of invaders, and some are harder to identify than others. Students will learn about different invaders and ways they can distinguish them from native species. This activity incorporates a dichotomous key and environmental investigations.

Aligned with the following Sunshine State Standards and FCAT Benchmarks for grades 6-8:

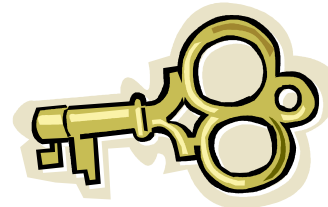
SC.D.1.3.3 CS    SC.F.2.3.3 CS  
SC.D.1.3.4 AA    SC.G.1.3.2 CS  
SC.F.1.3.1 AA    SC.G.1.3.4 AA  
SC.F.1.3.7 CS

AA = annually assessed  
CS = content sampled

## Objectives:

Students will...

- Learn how to use a dichotomous key.
- Collect information on specific Florida invasive species.
- Demonstrate an understanding of how to use a dichotomous key.
- Be able to identify different Florida invaders.



## Materials:

- Internet access, books or articles on invasive species of Florida.
- Copies of Florida Aquarium invasive species fact sheets.
- Examples of plant and animal dichotomous keys.



## Background:

### *What is an invader?*

An invasive species, or **invader**, is a plant or animal that is not *native* to a particular area. It causes harm, including disrupting natural ecosystems. Today, there are many invasive species thriving in Florida. Invasive species may compete with native species for food and living space. A successful invader can take over space in which a native species would normally live. Eventually, invasive species may cause a loss of *biodiversity* by reducing the number of species found in a given area.

*How can you distinguish invaders from native species?*

At times, it can be difficult to tell different animals or plants apart so scientists have developed a method to identify different *species*. Scientists use *taxonomy* to classify different organisms into groups or taxa. A *dichotomous key* uses a series of questions about visible characteristics to help scientists identify species of plants or animals. By using yes and no questions about the characteristics of an item, you can identify exactly what that item is. In order to understand how a dichotomous key works, complete the attached shoe activity.

**Procedure:**

1. To gain an understanding of how a key like this works, follow the instructions for using the Dichotomous Key of Shoes.
2. In groups, have the students choose one or two invasive species from a list of Florida invasive species.
3. Using the internet, books and other resources, have students gather information about the invaders they chose.
4. After researching different invaders, have the students create their own dichotomous key for the invaders they chose. Make sure to stress the importance of asking yes or no questions and using specific characteristics of that species. Hand out the attached example keys.
5. Have the students provide a short presentation about the main characteristics they used to identify their invader. Allow the students to exchange their dichotomous keys to see if they can identify different species.



## Example of Dichotomous Key for Plants

1. Needles in bundles/groups. ( go to #2)
1. Needles single or flattened & scaly. (go to #6)
  2. Needles in clusters. Tamarack
  2. Needles 2-5 per bundle. (go to #3)
3. Five needles per bundle. White Pine
3. Needles in pairs. (go to #4)
  4. Needles 3-4 inches long. Red or Norway Pine
  4. Needles under 2 inches. (go to #5)
5. Bark dark gray. Jack Pine
5. Bark orange-brown. Scots Pine
  6. Needles square, round or scaly. (go to #7)
  6. Needles flat. (go to #9)
7. Needles scaly, flattened. Northern White Cedar
7. Needles square or round. (go to #8)
  8. Needles 1/3-3/4 inch long, twigs hairless. White Spruce
  8. Needles 1/4-3/4, new twigs with hair. Black Spruce
9. Shrub. Canada Yew
9. Tree. (go to #10)
  10. Needles 1/2 inch long with short stem. Eastern Hemlock
  10. Needles 3/4 -1 1/4 inches long, no stem. Balsam Fir

## Example of a Dichotomous Key for Animals

- 1a. This organism has an exoskeleton (go to question 2)
- 1b. This organism has an endoskeleton or no skeleton (go to question 3)
  
- 2a. This organism has thin black body and a red stripe on it's abdomen (go to question 4a.)
- 2b. This organism has a thick black body and large grey/brown abdomen (go to question 4b).
  
- 3a. Organism dwells on land (go to question 5)
- 3b. Organism dwells in the ocean (go to question 6)
  
- 4a. Organism is *Latrodectus hasselti* (black widow spider)
  
- 4b. Organism is *Atrax infensus* (funnel-web spider)
  
- 5a. Organism is totally covered in smooth scale-like skin (go to question 7)
- 5b. Organism has a textured coat or covering (go to question 8)
  
- 6a. Organism has 8 thick legs or tentacles (go to question 9a.)
- 6b. Has many string-like legs or tentacles (go to question 9b.)
  
- 7a. Scale-like skin is patterned in horizontal stripes over the body (go to question 10a.)
- 7b. Scale-like skin has one block color over most of it's body (go to question 10b.)
  
- 8a. Has fine fur-like covering (go to question 11)
- 8b. Has feather-like covering over most of it's body (go to question 12)
  
- 9a. Organism is *Hapalochlaena lunulata* (blue-ringed octopus)
- 9b. Organism is *Chironex flecken* (sea wasp)
  
- 10a. Organism is *Psuedonaja texilis* (tiger snake)
- 10b. Organism is *Pseudechis porphyricus* (red-bellied black snake)
  
- 11a. Has two opposing thumbs on the front paws (go to question 13a.)
- 11b. Has no opposing thumb on the front paws (go to question 13b.)
  
- 12a. Has large bone-like structure on a bald, blue-skinned head (go to question 14a.)
- 12b. Has feather-like covering over head with no bone-like structure (go to question 14b.)
  
- 13a. Organism is *Phascolatarctos cinerus* (koala)
- 13b. Organism is *Vombatus ursinus* (wombat)
  
- 14a. Organism is *Casuarius casuarius* (cassowary)
- 14b. Organism is *Dromaius novaebollandiae* (emu)

## Dichotomous Key of Shoes

### Procedure:

1. Arrange chairs in a circle.
2. Instructor takes off one shoe (can also be done with shoe laces or watches) and places it in the middle of the circle.
3. Each student will take off one shoe and place it in the circle.
4. The students now have to divide the shoes into two piles. The piles do not have to be equal but everyone must agree on an obvious characteristic to distinguish the two piles. (e.g. all the shoes in one pile have laces)
5. Record the two characteristics on the board.

A) \_\_\_\_\_  
B) \_\_\_\_\_

FIG. 1

6. Return to the pile of shoes. Push one pile aside for the moment and divide the other pile of shoes into two distinct piles. Remember there must be one agreed upon characteristic for the two new piles. Record on the board.

A) \_\_\_\_\_  
C) \_\_\_\_\_ / \_\_\_\_\_  
D) \ \_\_\_\_\_

FIG. 2

7. Continue dividing the shoes into two distinct piles and adding the information to the sketch until there is only one shoe with the identifying characteristics. That one shoe can then be identified and the owners name is added to the sketch.

A) \_\_\_\_\_  
C) \_\_\_\_\_ / \_\_\_\_\_  
D) \ \_\_\_\_\_  
E) \_\_\_\_\_  
F) \ \_\_\_\_\_

FIG. 3

8. Divide the second pile of shoes in the same manner as the first pile until all of the shoes have been identified.

## *Rapping It Up!*

1. What are some of the main characteristics of the invasive species you chose to research at the beginning of this activity?
2. Out of the whole class, which invasive species did you find most interesting? Why?
3. What is a dichotomous key? Why are they important to have?
4. What simple characteristics did you use to begin your dichotomous key?
5. Was it difficult to come up with characteristics? Why or why not?

## **Glossary:**

**Biodiversity** – The variety of plant and animal species present in an ecosystem.

**Dichotomous** – Divided or dividing into two parts or classifications.

**Dichotomous key** – A series of questions that leads to the identification of a species.

**Invader/Invasive species** – A plant or animal that is not native and causes harm, including disrupting natural ecosystems.

**Native species** – A plant or animal species that originated in a certain place. A species occurring in its natural range. Species that were present in Florida at the time the first Spanish settlers arrived.

**Non-native species** – A species introduced to a region intentionally or accidentally.

**Species** – A basic taxonomic group that subdivides a genus; it comprises individuals of common ancestry that strongly resemble each other physiologically and that interbreed to produce fertile offspring.

**Taxonomy** – The science of classifying organisms into groups or taxa.