

## Alien Classification

6<sup>th</sup> Grade

**Summary:** students will learn how to use a dichotomy key to classify alien organisms (made up aliens from a made up planet).

### Objectives

Students will:

1. Learn of a few major scientists who have made important contributions to taxonomy.
2. Understand why and how organisms are classified.

### Background Information

**Taxonomy** is the naming and classifying of all living organisms (plants, animals, fungi and bacteria) by their characteristics and common ancestry.

The first classification system of living organisms was created by Aristotle over 2,000 years ago. His system was basic as plants and animals were classified based on their appearance. As new living things were identified, the system of classification continued expanding using additional words to separate similar organisms.

Carolus Linnaeus, a Swedish naturalist, proposed a more precise system of classification—grouping organisms into hierarchical categories based on form and structure. He devised 7 levels of organization in this hierarchy, the largest being Kingdom to the smaller groups of Genus and Species. This is a binomial or a two-name system which entails the first name of the genus and a second name for the species. The first letter of the genus is capitalized and the species name is written in lower case letters. Both the genus and species are written in italics or underlined. For example, the genus and species of a chimpanzee is written as: *Pan troglodytes* or Pan troglodytes.

Major Taxonomic Levels:

**Kingdom**

**Phylum**

**Class**

**Order**

**Family**

**Genus**

**Species**

**Kingdom:** 6 kingdoms: Animal, Plant, Protista, Fungi, Bacteria, Archaeobacteria

**Phylum:** The animal kingdom has more than 30 phyla. The Phylum Chordata, for example, includes all animals with a backbone such as mammals, birds, reptiles, amphibians and fish.

**Class:** Phyla are divided into classes. For example, Fish is divided into the following classes: Class Myxini, Cephalaspidomorphi, Chondrichthytes, and Osteichthytes

**Order:** Another taxonomic sequence. For example, Order Primates

**Family:** Organizes similar genera together.

**Genus:** A group of organisms that share unique body structures or other characteristics and are considered closely related.

**Species:** Related individuals that resemble one another and are able to breed with each other to produce fertile offspring.

For example: Humans and African Wild Dogs would be classified as follows:

**Kingdom:** Animalia  
**Phylum:** Chordata  
**Class:** Mammalia  
**Order:** Primata  
**Family:** Hominidae  
**Genus:** *Homo*  
**Species:** *H. sapiens*



Animalia  
 Chordata  
 Mammalia  
 Carnivora  
 Canidae  
*Lycaon*  
*L. pictus*



### Domains

What is the concept of *Domains*? The concept of *Domains* was introduced in 1990 by Carl Woese. It is a three-domain system of classification for all living organisms—*Archae*, *Bacteria*, and *Eukarya*. A domain being the highest order of biological classification, even higher than *Kingdom*.

1. Archae: Archaeobacteria-Prokaryotes that survive in extreme conditions.
2. Bacteria: Eubacteria-Prokaryotes that include the most disease producing bacteria and lives in symbiotic relationships with plants and animals.
3. Eukarya: Protists, fungi, plants and animals -Organisms with membrane bound organelles and nucleus.

Taxonomic Hierarchy including Domain:

**Common Name:** African Wild Dog  
**Domain:** Eukarya  
**Kingdom:** Animalia  
**Phylum:** Chordata  
**Class:** Mammal  
**Order:** Carnivora  
**Family:** Canidae  
**Genus:** *Lycaon*  
**Species:** *L. pictus*



## Dichotomous Key

A dichotomy key is helpful in trying to identify individual characteristics for an organism. It is different from the Linnean classification in that it only looks at the physical characteristics. A dichotomous key uses paired contrasting statements to lead to the identification of an organism as each choice narrows the path toward a final answer.

## Materials

- ✓ Copies of **Nadir Alien Dichotomy Key Activity Sheet**(one per each group of 4-5 students)
- ✓ Copies of **Nadir Aliens Cards** (one set per each group of 4-5 students, cut apart)

## Activity Procedure

1. Review and discuss the background information included with your students.
2. Divide the students into groups of 4-5 students.
3. Give each group a **Nadir Alien Dichotomy Key Activity Sheet** and a complete set of **Nadir Alien Cards** (20 aliens per set).
4. Students are going to follow the Dichotomy Key to identify each alien's genus and species, the aliens are from the made up planet of Nadir.
5. Have students begin by selecting any one of the twenty aliens.
6. Starting with step one in the dichotomy activity sheet, the students will categorize the alien in hand under the description that matches either "a" or "b". Next, the students will follow the directions indicated by their letter choice, continuing in this fashion until the alien is classified and indentified.
7. Once identified, have the students write the scientific name of the alien on the back of the card.
8. Students will repeat this process with each alien until all Nadir aliens have been classified.
9. Once students have finished identifying their aliens, review with class to be sure all the aliens were classified correctly.

## Florida's Next Generation State Standard

SC.6.L.15.1 Analyze and describe how and why organisms are classified according to shared characteristics with emphasis on the Linnaean system combined with the concept of Domains.

## Nadir Alien Dichotomy Key Activity Sheet

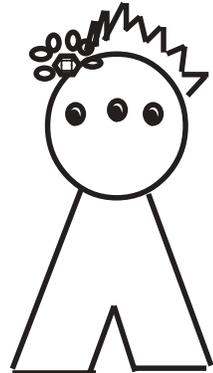
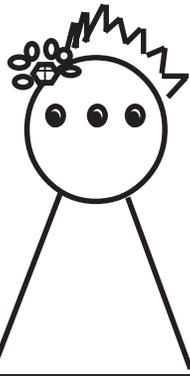
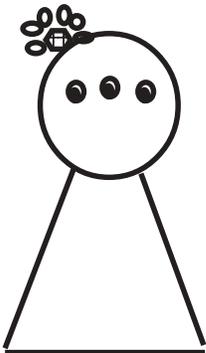
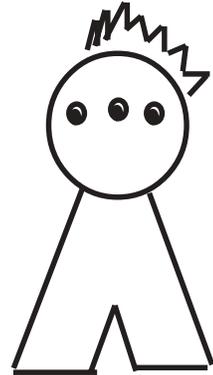
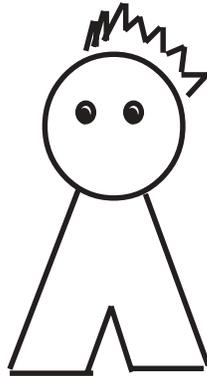
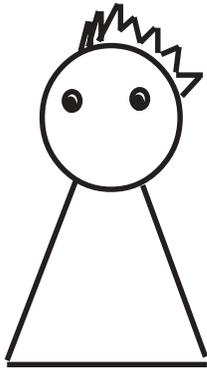
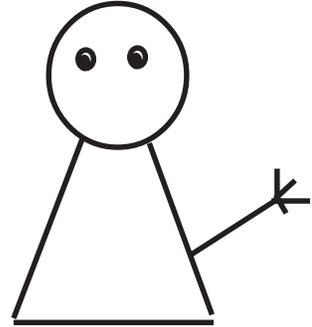
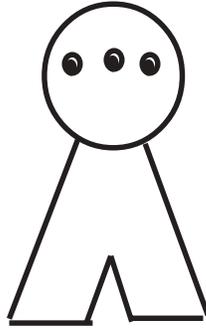
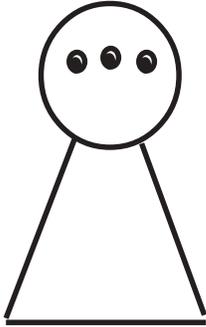
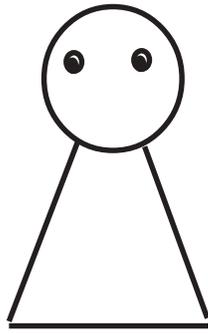
### Instructions:

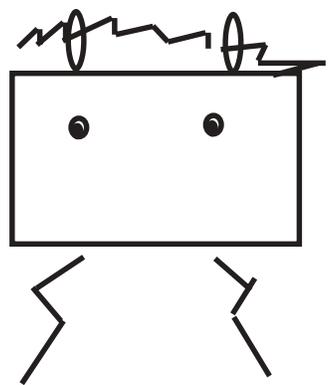
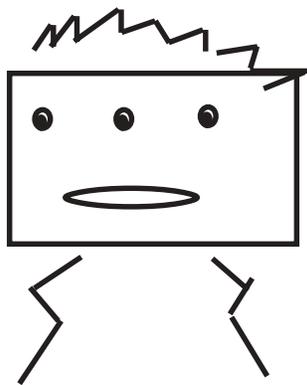
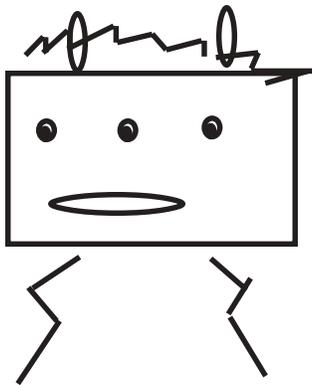
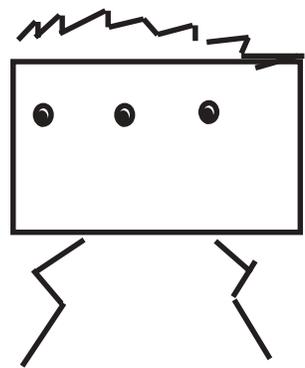
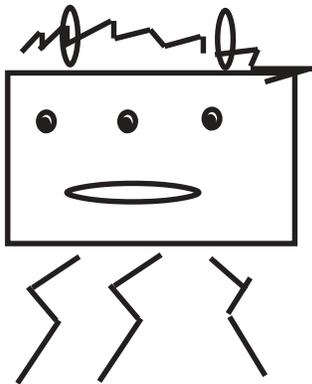
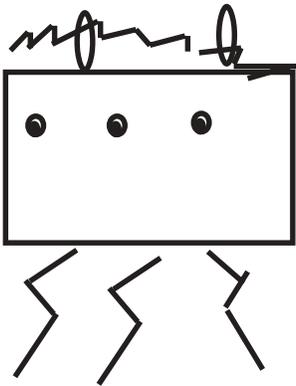
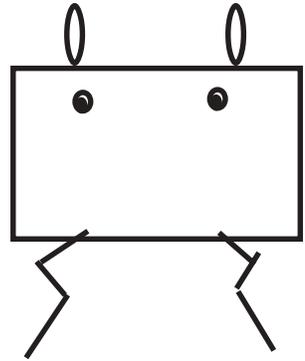
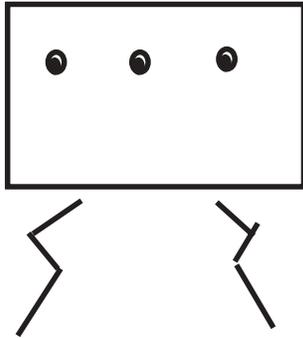
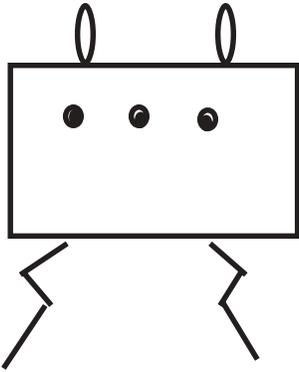
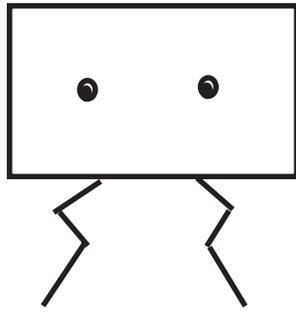
- A. Choose a single alien.
- B. Start at step one, distinguish if alien matches description “a.” or “b.”
- C. Follow the steps corresponding with that letter, until alien is classified. Once identified, write on the back of each alien its scientific name.
- D. Repeat all steps until each alien is classified.

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1. a. The alien has a square head.....Go to 2  
b. The alien has a round head.....Go to 11
  2. a. The alien has no hair.....Go to 3  
b. The alien has hair.....Go to 6
  3. a. The alien has 2 eyes.....Go to 4  
b. The alien has 3 eyes.....Go to 5
  4. a. The alien has antennae.....*Nadirus cornus*  
b. The alien has no antennae.....*Nadirus octus*
  5. a. The alien has antennae.....*Nadirus tertius*  
b. The alien has no antennae.....*Nadirus cadus*
  6. a. The alien has 2 eyes.....*Nadirus nullacadus*  
b. The alien has 3 eyes.....Go to 7
  7. a. The alien has antennae.....Go to 8  
b. The alien has no antennae.....Go to 10
  8. a. The alien has a mouth.....Go to 9  
b. The alien has no mouth.....*Nadirus nonoris*
  9. a. The alien has 3 legs..... *Nadirus rotondensis*

- b. The alien has 2 legs.....*Nadirus cylindrus*
- 10. a. The alien has a mouth.....*Nadirus oris*
  - b. The alien has no mouth.....*Nadirus breviscapillus*
- 11. a. The alien has 2 eyes.....Go to 12
  - b. The alien has 3 eyes.....Go to 15
- 12. a. The alien has hair.....Go to 13
  - b. The alien has no hair .....Go to 14
- 13. a. The alien has no legs.....*Rotundus trigonumus*
  - b. The alien has legs.....*Rotundus geminos*
- 14. a. The alien has a tail.....*Rotundus caudus*
  - b. The alien has no tail.....*Rotundus cumexcaudus*
- 15. a. The alien has a flower on its head.....Go to 16
  - b. The alien has no flower on its head.....Go to 18
- 16. a. The alien has no hair.....*Rotundus flosis*
  - b. The alien has hair.....Go to 17
- 17. a. The alien has no legs.....*Rotundus illculos*
  - b. The alien has legs.....*Rotundus paxillumis*
- 18. a. The alien has no legs.....*Rotundus impedimentumis*
  - b. The alien has legs.....Go to 19
- 19. a. The alien has hair..... *Rotundus crinitumus*
  - b. The alien has no hair.....*Rotundus cortinais*

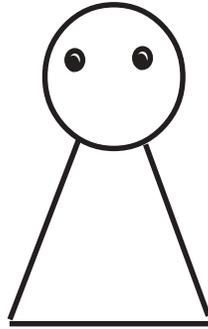
NADIR ALIEN CARDS (sheet 1 of 2)



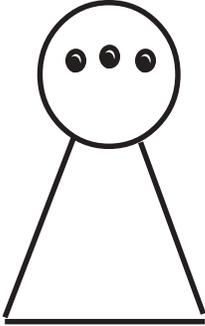


NADIR ALIEN ANSWER KEY

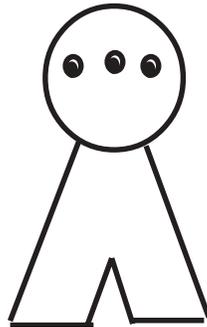
*Rotundus cumexcaudus*



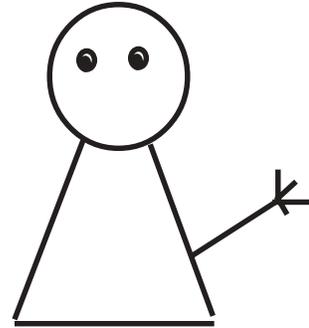
*Rotundus impedimentum*



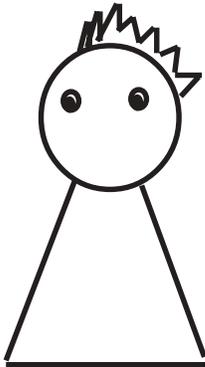
*Rotundus cortinais*



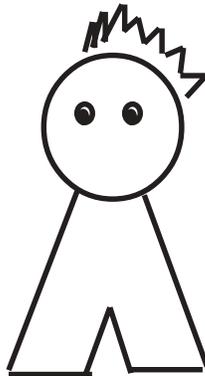
*Rotundus caudus*



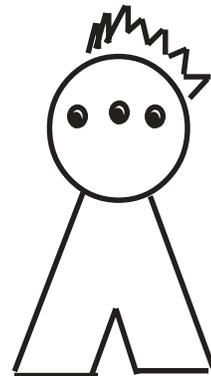
*Rotundus trigonum*



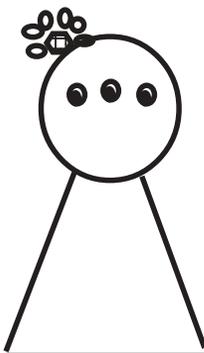
*Rotundus geminos*



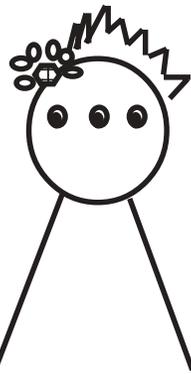
*Rotundus crinitum*



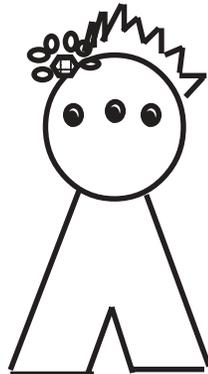
*Rotundus flosis*



*Rotundus illculos*

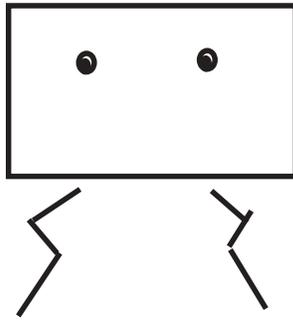


*Rotundus paxillum*

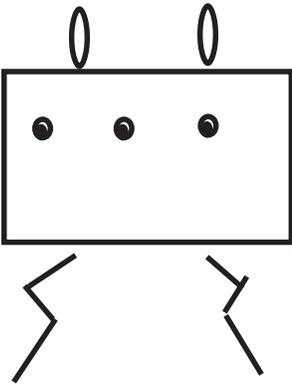


NADIR ALIEN ANSWER KEY

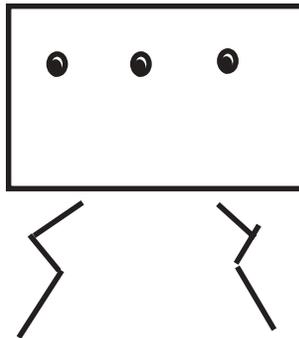
*Nadirus octus*



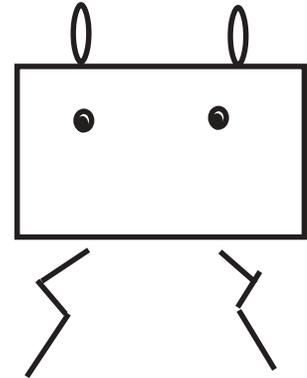
*Nadirus tertius*



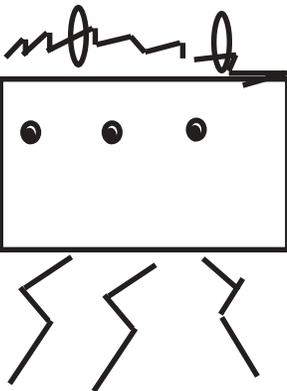
*Nadirus cadus*



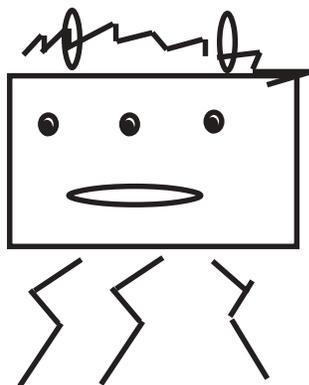
*Nadirus cornus*



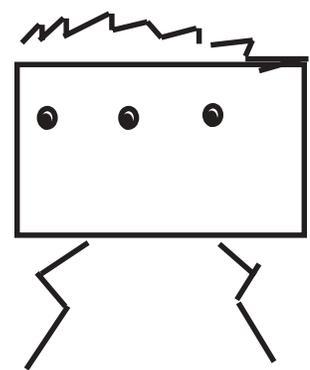
*Nadirus nonoris*



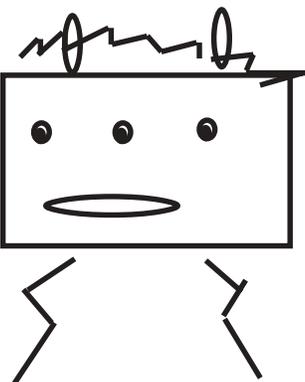
*Nadirus rotondensis*



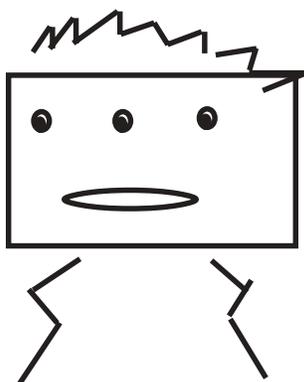
*Nadirus breviscapillus*



*Nadirus cylindrus*



*Nadirus oris*



*Nadirus nullcadus*

