

Focused Learning Lesson
Science
Grades 10-12
LS-H-C4

Overview:

This lesson is to be used to help students to understand how to use a dichotomous key in classification. Students will use a dichotomous key to practice classifying aliens. Next, they will classify them into the levels of taxonomy. An extension of this lesson is to have students classify a group of vertebrate specimens by phyla and/or class using a dichotomous key and to have them classify plants using leaf structure and a dichotomous key.

Approximate duration: 45 minutes

Benchmark:

LS-H-C4 classifying organisms

Biology GLE: 18. Classify organisms from different kingdoms at several taxonomic levels using a dichotomous key

Benchmark:

SI-H-A2 designing and conducting scientific investigations

SI GLE: 2. Describe how investigations can be observation, description, literature survey, classification, or experimentation.

Objective:

The learner will classify aliens using a dichotomous key and the levels of taxonomy.

Teacher Preparation:

1. Copy classification worksheet (Attachment 1) and the classification answer sheet handout (Attachment 2). One for every student.
2. Prepare illustrations and review of traits to explain to students the classification system used by scientists to categorize and identify organisms.
3. Assemble specimens and/or leaves of your choice and dichotomous keys for the extension lesson.

Materials:

- Classification worksheet
- Classification answer sheet
- Specimens of your choice and keys for use in the extension

Lesson Procedures

Set or Opener:

Teacher should exhibit sample specimens and ask students, “Are all organisms related to one another?” Accept all reasonable replies. Teacher should then ask students, “How do we know that all organisms are related to one another?” Accept all reasonable replies. Teacher should tell the students that scientists have devised a way to show how organisms are related by their similar characteristics. One way scientists do this is by classifying the organisms. Review the classification system used today by scientists to classify organisms. The system

flows from broad, general categories to specific: Kingdom, phylum, class, order, family, genus, and species. Write these on the board in a column, starting with kingdom and ending with species. Explain that all organisms are grouped into different kingdoms first. Each Kingdom is very large, and the organisms are classified by general characteristics. Use illustrations and examples to provide an overview of the general traits used to classify organisms by kingdom. Allow student discussion of the traits used for classification. Explain that as one proceeds through the categories used in taxonomy, the traits for organisms become more specific, and the group becomes smaller. To assist students in recall of the taxonomic levels, you may allow them to use the sentence, “**K**ids **p**ut **c**hocolate **o**n **f**ather’s **g**ood **s**hirt.” It is a mnemonic device that assists students in remembering the order for the taxonomic levels using the first letter of each word as a cue.

Body of the Lesson:

1. Handout the classification worksheet (Attachment 1) and classification answer sheet (Attachment 2)
2. Read the instructions on the worksheet to students.
3. Use the dichotomous key and demonstrate how to classify the first alien so that the students understand the use of the dichotomous key and the process for classifying the remainder of the aliens.
4. As students work, the teacher should walk around the room and monitor students for work done correctly, providing guiding questions as needed.
5. Allow 25 minutes for students to complete the worksheet.
6. After time has expired, students should turn in their worksheet.
7. Conduct a brief, general class “wrap-up” discussion, allowing students to explain how they classified their aliens and ask questions for clarification. The teacher may use a transparency of the alien illustrations for this discussion and provide correct responses if students disagree on a particular classification.

Closure:

Ask the class, “Is classifying organisms an easy thing to do?” Accept all reasonable responses. Explain that classifying organisms is not easy for scientists and that using a dichotomous key was designed to help the scientist classify organisms. It is used as a guide for all scientists. Ask students if they understand how the categories of the classification system progressively get more specific. Accept all reasonable responses.

Attachments:

- Attachment 1: Classification Worksheet (for students)
- Attachment 2: Classifying Aliens (for students)
- Attachment 3: Classifying Aliens Key (diagrams)
- Attachment 4: Classification Worksheet Key (questions)

Assessment:

The worksheet will be used to assess student understanding and for performance points. Assessment of the extension, classifying plants and animals, can be more summative and evaluate accuracy of student performance.

Reference Links and Technology Connections:

Briggs, A, Lundegren, L. & Kapicka, C. (1992). *Biology*. Ohio: Glencoe/McGraw-Hill.

Attachment 1: Classification of Aliens

Objective: The learner will classify aliens using a dichotomous key and the levels of taxonomy.

Directions:

1. Use the dichotomous key below to classify the aliens.
2. Look at an alien, read number one on the dichotomous key and answer the question, continuing until the alien has a name. For example: “Does the first alien have feet?” Yes, he does. The statement tells you to go to statement two. Number two asks, “Does he have socks?” Yes, he does. The statement tells you to go to statement three. Number three asks, “Does he have antennae?” No, he does not. His life form is **K**. Write the letter **K** in the blank under the first alien.
3. Do this for each alien until all have been classified.

Alien Dichotomous Key

1. A. Does the alien have feet?.....Go to statement 2
B. Does the alien have no feet?.....Go to statement 7
2. A. Does the alien have socks?.....Go to statement 3
B. Does the alien have no socks?.....Go to statement 5
3. A. Does the alien have antennae?.....Go to statement 4
B. Does the alien have no antennae?.....It is alien K
4. A. Does the alien have two eyes?.....It is alien R
B. Does the alien have less than two eyes?.....It is alien M
5. A. Does the alien have toes?.....Go to statement 6
B. Does the alien have no toes?.....It is alien T
6. A. Does the alien have long hair?.....It is alien Z
B. Does the alien have no long hair?.....It is alien N
7. A. Does the alien have eyes on stalks?.....Go to statement 8
B. Does the alien have eyes not on stalks?.....Go to statement 9
8. A. Does the alien have a nose?.....It is alien X
B. Does the alien have no nose?.....It is alien Y
9. A. Does the alien have arms?.....It is alien V
B. Does the alien have no arms.....It is alien W

4. When all aliens are named, classify the aliens into the classification system by listing the alien's letters into the groups below.

Kingdom Feet _____ Kingdom No-Feet _____

Phylum Socks _____ Phylum No-Socks _____

Class Eyes-on-Stalks _____ Class Eyes-not-on-Stalks _____

Order Antennae _____ Order No-Antennae _____

Family Hair _____ Family No-Hair _____

Genus Nose _____ Genus No-Nose _____

Species Arms _____ Species No-Arms _____

5. When classifying organisms, kingdom is very general grouping. You will find this group to be the largest group of organisms. Species will be very specific. This group will be the smallest group. Keeping this in mind, use the data above and fill in Kingdom Feet. Using just the aliens from Kingdom Feet, finish this classification. Which alien ended up in species?

Kingdom Feet _____

Phylum Socks _____

Class Eyes not-on-Stalks _____

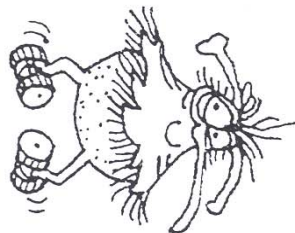
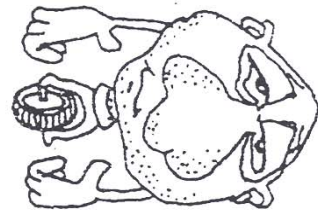
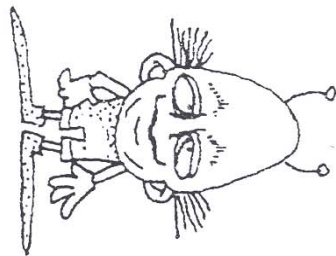
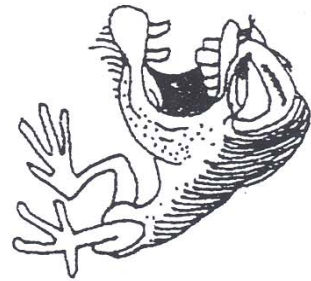
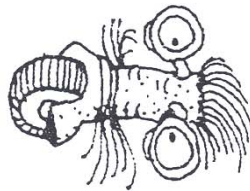
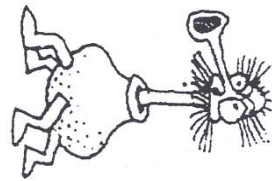
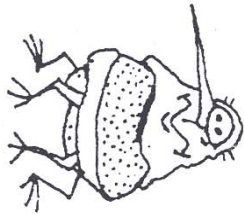
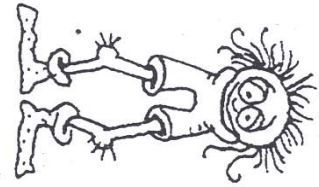
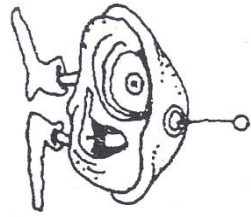
Order Antennae _____

Family Hair _____

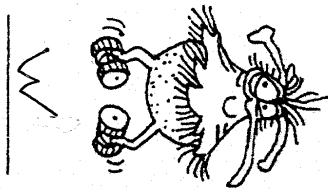
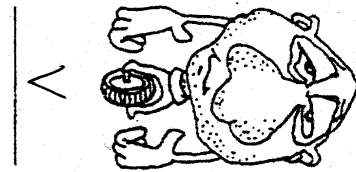
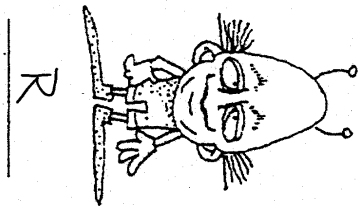
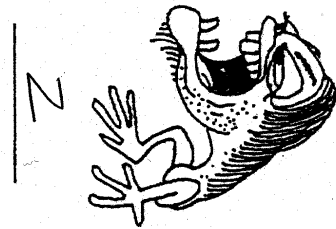
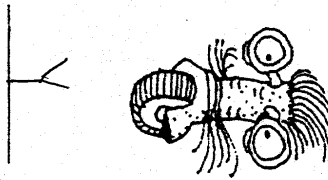
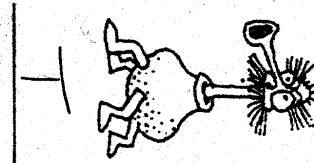
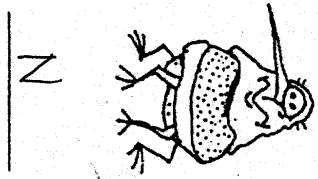
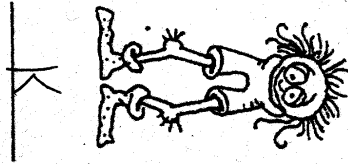
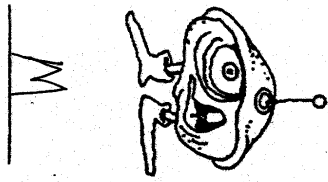
Genus Nose _____

Species Arms _____

Attachment 2: Classifying Aliens



Attachment 3: Classifying Aliens Key



Answer Key

Attachment 4

Attachment 1: Key

4. When all aliens are named, the students are to classify the aliens into the classification system by listing the alien's letters into the groups below.

Kingdom Feet K, T, Z, M, N, R

Kingdom No-Feet V, X, Y, W

Phylum Socks K, M, R

Phylum No-Socks T, Z, V, X, N, Y, W

Class Eyes-on-Stalks X, Y

Class Eyes-not-on-Stalks K, T, Z, V, M, N, R, W

Order Antennae M, R, W

Order No-Antennae K, T, Z, V, X, N, Y

Family Hair K, T, Z, X, N, Y, W

Family No-Hair V, M, R

Genus Nose T, V, X, N, W

Genus No-Nose K, Z, M, Y, R

Species Arms V, R

Species No-Arms K, T, Z, X, M, N, Y, W

5. When classifying organisms, Kingdom is very general. You will find this group to be the largest group of organisms. Species will be very specific. This group will be the smallest group. While keeping this in mind, use the data above and fill in Kingdom Feet. Using just the aliens from Kingdom Feet, finish this classification. Which alien ended up in species?

Kingdom Feet K, T, Z, M, N, R

Phylum Socks K, M, R

Class Eyes not-on-Stalks K, M, R

Order Antennae M, R

Family Hair M, R

Genus Nose M, R

Species Arms R

