

# ECOS Inquiry Template

**1. Contributor's Name:** Mike Machura

**2. Name of Inquiry:** Plant Identification in the Schoolyard using a Dichotomous Key

**3. Goals and Objectives:**

**a. Inquiry Questions:** What types of plants are found in the schoolyard?

**b. Ecological Theme(s):** Classification and plant identification

**c. General Goal:** This is an activity to reinforce the concept of using dichotomous keys to identify unknown plants, and give the students practical experience in using dichotomous keys in the “real world.” It is best used after the concept of dichotomous keys has already been introduced.

**d. Specific Objectives:** Students will identify plants in the schoolyard and check their answers with the teacher by comparing their unknown to “known plants”

**e. Grade Level:** 5-6

**f. Duration/Time Required:**

→ **Prep time** One day preparing key, 30 minutes before class setting up the plant identification area

→ **Implementing Exercise During Class** Two 45 minute class periods

→ **Assessment** Included in implementation (this activity is essentially an assessment of students' understanding of dichotomous keys)

**4. Ecological and Science Context:**

**a. Background (for Teachers):** One way of classifying and identifying objects is to use a dichotomous key. Dichotomous keys consist of paired statements that describe contrasting characteristics, such as “straight” and “bent”. Choosing one statement as correct, the user then proceeds to a second dichotomous decision, and so on, until a final identification is achieved. It is important to note that there can be no alternative possibilities at each point in the key, hence the “dichotomous” term. Scientists use keys made by others to identify everything from insects to plants and other animals. Many keys are difficult to use because they require discrimination between very subtle differences. The key made for the students will be very basic, allowing them to go through the process without getting frustrated with an actual key.

**b. Background (to present to Students):** Scientists use dichotomous keys to identify things they observe in nature. Keys are made by other scientists and are usually specific to one type of organism: there are plant keys, insect keys, spider keys, amphibian keys . . . there are even keys to types of insects like beetles and butterflies. Keys can also be used to identify non-living things such as types of soil! (A follow-up lesson “Determining Soil Texture Using a Dichotomous Key” has been written to identify soil types and determine if different plants grow in different types of soil).

**5. Motivation and Incentive for Learning:** STUDENTS GET TO GO OUTSIDE AND IDENTIFY PLANTS. IT CAN BECOME A GAME TO SEE WHICH GROUP CAN IDENTIFY THEIR PLANT FIRST, OR WHO CAN IDENTIFY THE MOST PLANTS. FOR THE TEACHER, THIS IS ALSO AN EXCELLENT OPPORTUNITY TO LEARN HOW TO CONSTRUCT A KEY.

## 6. Vocabulary:

**TAXONOMY-** THE SCIENCE DEALING WITH THE DESCRIPTION, IDENTIFICATION, NAMING AND CLASSIFICATION OF ORGANISMS

**DICHOTOMOUS-** DIVIDED INTO TWO PARTS OR CLASSIFICATIONS

**“KEYING OUT”-** THE PROCESS OF USING A KEY TO IDENTIFY SOMETHING

**7. Safety Information:** Students will be outside, so the only safety concerns are monitoring them in the schoolyard.

## 8. Materials List (including any handouts or transparency masters):

- 1) Classroom key (can be a transparency)
- 2) 3-page plant key (one set for each group of students)
- 3) Flags or markers to identify “answer plants”

## 9. Methods/Procedure for students:

**a. Pre-investigation work:** This inquiry is ideally used as an assessment after other inquiries on dichotomous keys. The teacher will have to make two keys, or modify those included here. The first is a simple key to the people in the classroom, where the class will use the key to identify someone (a student, teacher, teacher’s aid, etc.)

The second key should be made by collecting plants in the schoolyard. Depending on the teacher’s knowledge of plants, this can be as specific as keying plants out to family or genus, or as basic as using broad common names such as “oak tree,” “grass,” and “daisy.”

Select an area of the schoolyard where students will search for plants to identify. This should be an area with relatively few types of plants, because students should be able to determine which plant they wish to identify on their own. A lawn with some weeds, a few trees and a few types of flowers would work great.

Gather one of each type of plant (or a leaf from a tree) and divide everything into two basic groups. This forms the first node on the key. In the attached example, we divided out plants into “flexible and alive” and “dried out and dead”. You can also use terms such as “long and narrow vs. round” or “green vs. not green”. Be sure that there is a clear distinction between the two groups and that it is clear to which category each group belongs.

Continue to break each group into two separate groups until you are left with only one item. The final choice should either lead to that one item (label it with a number) or a question mark, indicating that the student has potentially discovered a “new” species. Do this for each type of plant you have collected.

A similar key should be made for the people in the classroom (see the attached “Classroom Dichotomous Key”).

If possible, select one area of the schoolyard that is “off limits” for the students search yet contains all of the plants in the key. Place a flag or marker next to each plant, labeled with a number corresponding to the answer on the key and the name of that plant. Once students believe they have identified their plant, they can go to this area and check their answer. If a separate area is unavailable, you can set up a table with a collection of your specimens, appropriately numbered and labeled. Designing the key with numbers rather than actual plant names prevents students who already know the name of their plant from “looking ahead” to end point of the key to derive the correct pathway. In other words, using the numbering method, they will be forced to go through the entire key before arriving at an answer.

## b. Investigation work:

Begin by reviewing what students know about dichotomous keys. Tell them that they will use a key to identify a person in the classroom. Select a student, student teacher's aid, or other person who is described on the key. Show students the "Classroom Key. Ask if the person is a kid or an adult, and then walk them through the process of following the correct arrows and ignoring everything else until the end of the key is reached. Was the person identified correctly?

Next tell them they will be going outside to the pre-selected area. In groups, they are to find one plant growing in that area and use their new key to identify it. Pass out the plant keys to each group and go through the terminology, making sure they understand what everything means. Tell them that once they have identified their plant and have a number, they should come to the "answer area," find their plant and check to see if the number on the plant matches the number they have keyed out. Check their answers to see that they were correct, and if not, work with them to identify their mistakes. Remind them that a question mark does not necessarily mean they are wrong, but may have identified a new species.

**10. Assessment:** No further assessment.

**11. Extension Ideas:** Students can work in groups to create their own keys and then exchange them with each other.

**12. Scalability:** More complicated keys can be constructed for older students. High school students can attempt to use actual keys published in books or on-line.

**13. Science Standards Accomplished:**

Content standard C: Diversity and adaptations of organisms  
Structure and function in living systems

**14. References:**

<http://www.usoe.k12.ut.us/curr/science/sciber00/7th/classify/sciber/taxokey.htm>

<http://score.kings.k12.ca.us/lessons/spiders.html>

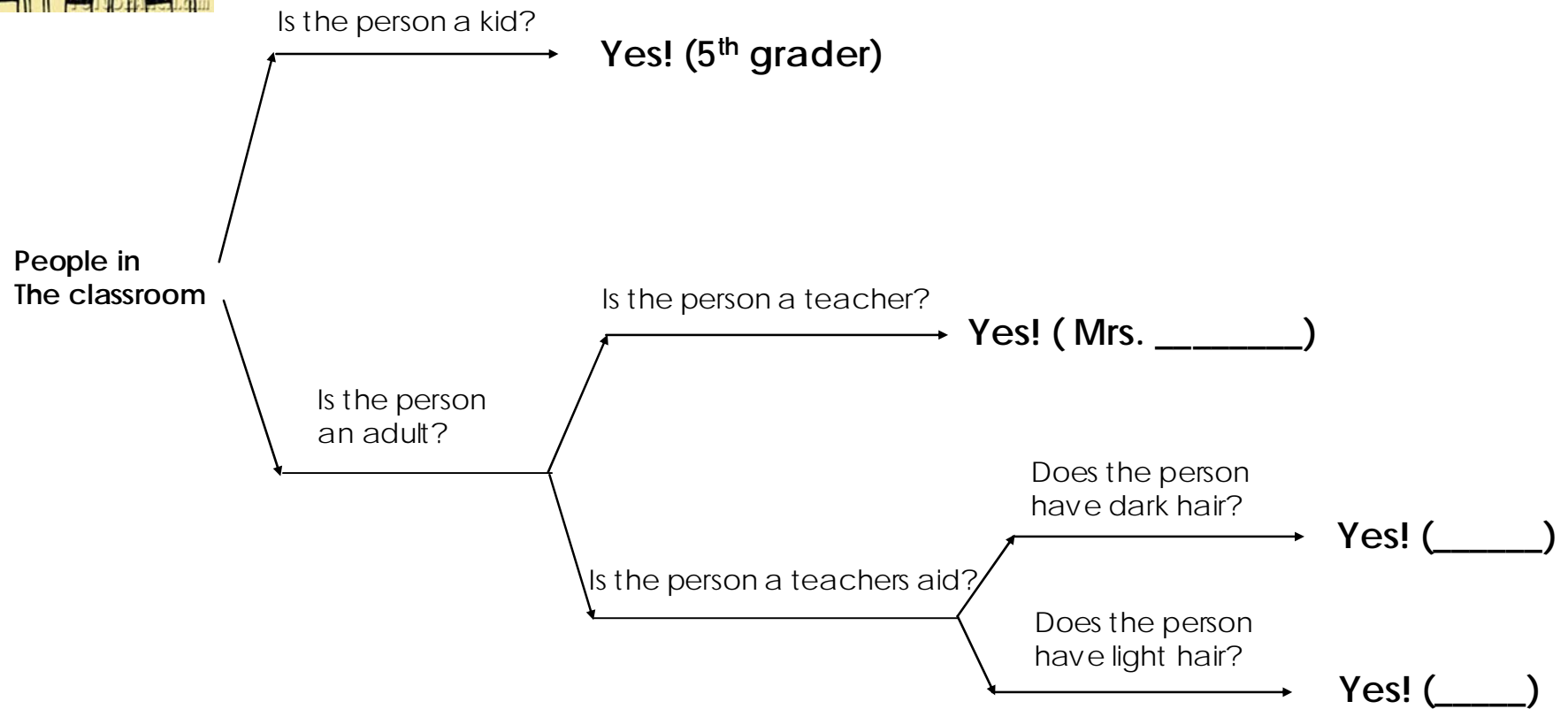
**15. List of Experts and Consultants:**

**16. Evaluation/Reflection by Fellows and Teachers of how it went:**

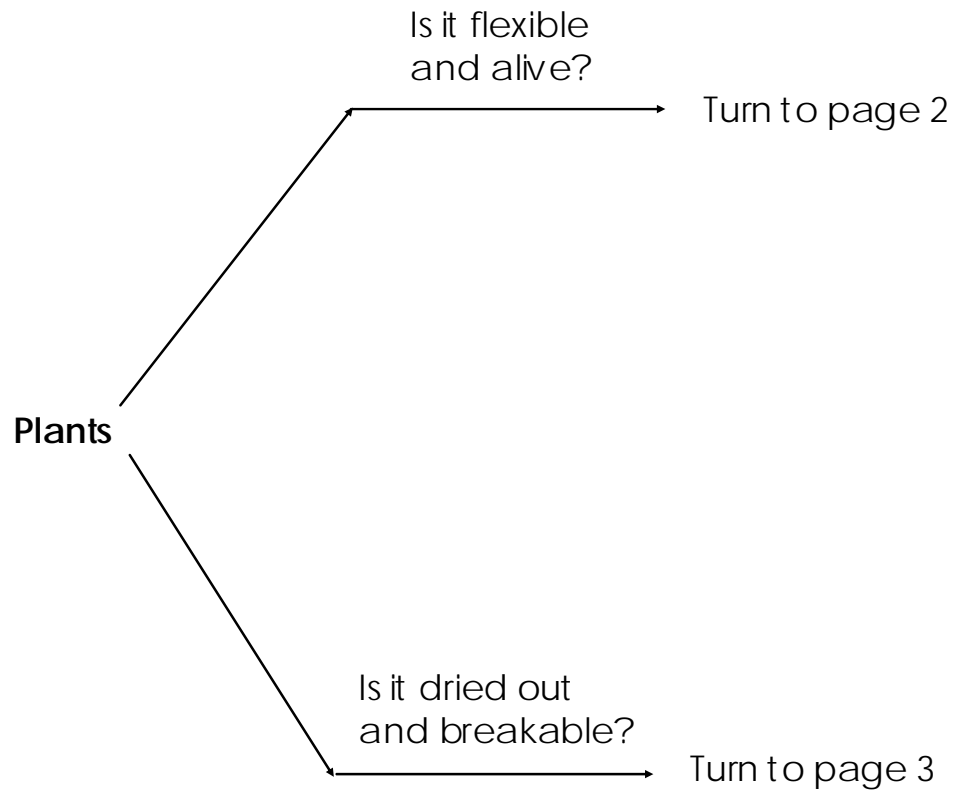
Students were able to correctly identify all plants on the key. Most groups continued to identify other plants after correctly keying out their first specimen.



## Classroom Dichotomous Key

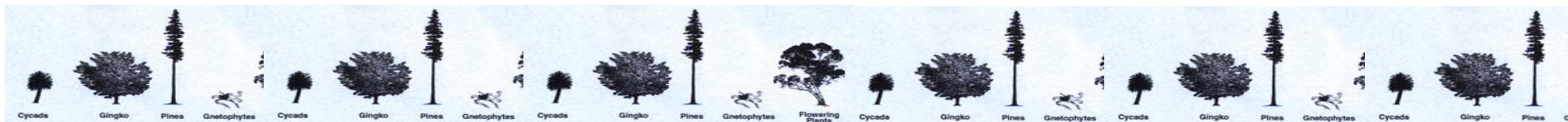
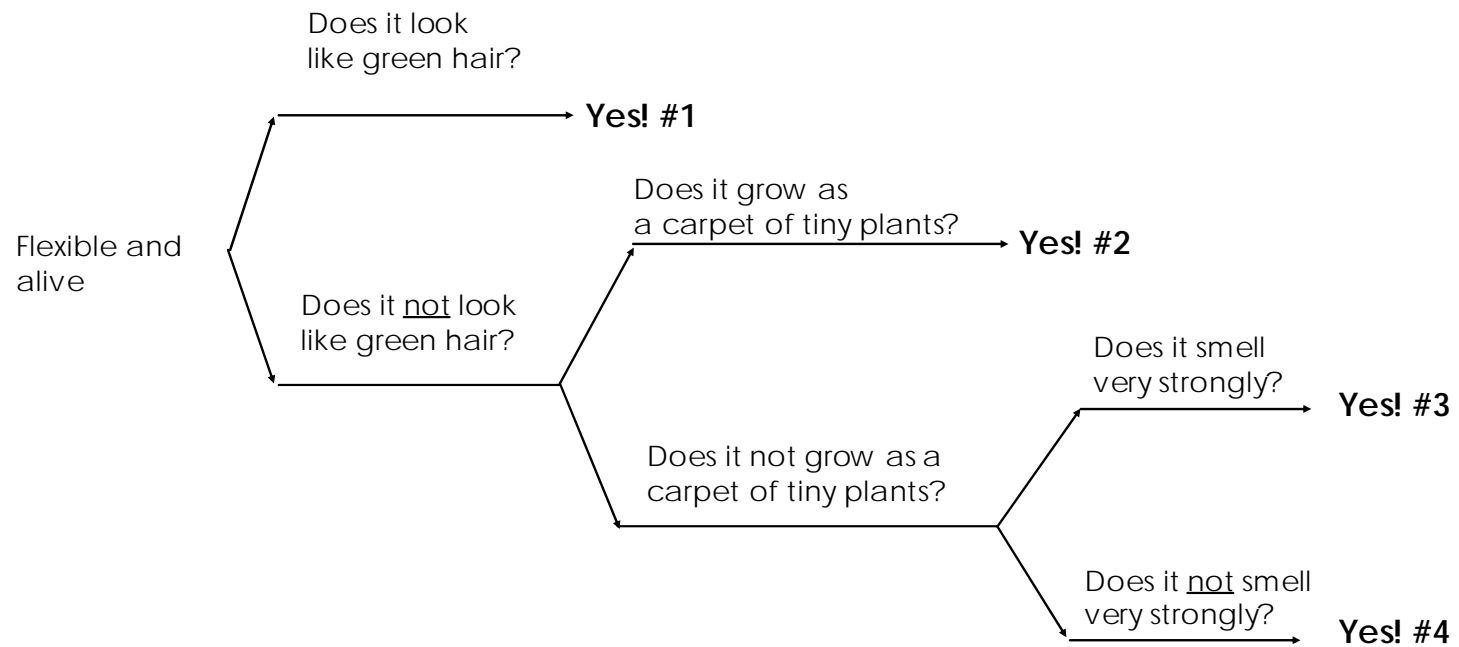


# Plant Dichotomous Key Page 1



# Plant Dichotomous Key

## Page 2



# Plant Dichotomous Key

## Page 3

