Brief Synopsis

Identifying tree species can be a difficult thing to do on your own. Students will learn how a dichotomous key helps unlock the mysteries of complex identification. Practicing with a worksheet to decode the "alien" names for common household items will help students get comfortable with using a dichotomous key. As an extension, students may go on-line to try their hand at identifying trees by their leaves, or creating their own dichotomous key.

Ages: Designed for 5th–8th grade

Time Considerations: 20-30 minutes

Materials:
- Chalkboard
- Worksheets (photocopies)
- Pencils
- Internet access (Extension Option)

Vocabulary (for the Extension Option): Alternate, Broadleaf, Conifer, Deciduous, Dichotomous, Entire, Lobe, Margin, Midrib, Opposite, Palmate, Petiole, Pinnate, Serrate, Simple leaf, Toothed, Whorled

Outcomes:
1. Students will accurately use a dichotomous key to differentiate 12 "alien" objects.
2. Students will use sound decision making to correctly identify objects.
3. Students will apply the skills they practiced to an on-line dichotomous tree key.

Minnesota Academic Standards:
Science: 7.IV.B.4
Math: 4.V.B.1
Language Arts: 4.I.A.1&2, 4.I.B.1, 4.III.A.1&2, 5.I.A.1&2, 5.III.A.1, 6.III.A.3, 7.I.A.1, 7.III.A.1, 8.III.A.1&7
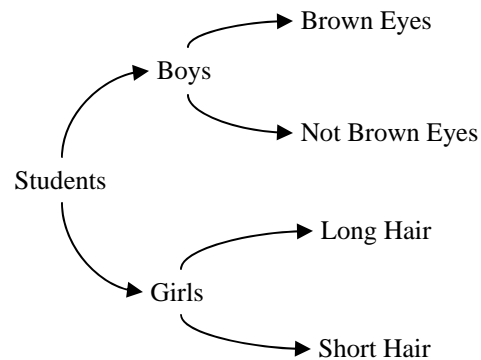
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Set-up

During the *Trees and Keys* class at Eagle Bluff, your students will be working in pairs to identify as many as 15 of Southeastern Minnesota's most common trees. Their main tool will be using a dichotomous key specifically designs for Eagle Bluff's *Tree Course*. To help prepare your students for understanding dichotomous keys, photocopy the attached **worksheet**, one for each student (or each pair if preferred), and each student will need their own **pencil**.

Activity 1: Practicing with a Dichotomous Key

Background: The identification of complex or unknown items (like trees, insects, flowers) can be made easier by using tools such as dichotomous keys. A dichotomous key is an organized set of couplets (two statements) of mutually exclusive characteristics. A dichotomous key will begin with general characteristics and move on to progressively more specific characteristics. By following a key and making the correct choices, anyone should be able to identify the items they are learning about, as long as they have the proper vocabulary.

Procedures:
1. Explain how a dichotomous key is made, using your students as an example: a group of students my first be divided into "boys" and "girls", then into "brown eyes" and "not brown eyes", or "long hair" and "short hair" and so on.
2. Draw out the above example visually on the board like this:

Because drawing a key in this way takes up a lot of room, and would require a huge piece of paper to illustrate something more complex, dichotomous keys are usually written out in words. To have success with this kind of key, it is important to use them correctly.

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3. Explain that the two most important things to remember are:
    - Always start at number 1.
    - Read both statements ("a" and "b") before making the best choice and moving on to the next set of statements.

4. Hand out the dichotomous key to *Alien Office Supplies* worksheets.
5. The goal for your students is to identify the common office items by their alien names. There is space provided below each image to write down the alien name for them.
6. As students are working through their keys, wander around and check on their progress. Are students beginning at number one for each item? Are they reading both statements before making a choice? Are students thinking critically about their choices before continuing on?
7. When the class has had enough time to key out all their items, check answers as a class. Ask, why are dichotomous keys useful? What kind of real-life situation would a person use a dichotomous key?

Activity 2: Create a Dichotomous Key
Have students make their own key using everyday objects with made-up names, or something they are interested in that others may not know a lot about, such as horse breeds, trading cards, ballet moves, dinosaur species, airplane models, etc.

Dichotomous keys that you construct will be easier to use if you follow some general rules of thumb.
  A. **Start with the most general characteristics and progress to increasingly more specific characteristics.**
  B. **Leave a space between each couplet to make the key easier to read.**
  C. **Use measurements when possible, avoiding descriptors like large or small.**
  D. **Choices are more effective if they are positive ("this characteristic is"…. rather than "this characteristic is not"). This is not always possible.**
  E. **Precede the description with the part that is being described (leaves are red…instead of red leaves present).**

Activity 3: Intro to Tree Identification
Have your students log on to the following web page and complete the interactive tree identification of four trees.

   http://nationalzoo.si.edu/education/conservationcentral/walk/

   They will have to click on the "I.D. A Tree Walk : No Narration"

When they have successfully identified all four trees they can exit the exercise. This will give them a taste for identifying trees by their leaves. Students coming to Eagle Bluff in the winter time will be using twig and bud characteristics to identify tree, although the technique of using the key is the same and some of the same vocabulary applies.

Teacher Tips
- Before having the students try the key on their own, have them read through the entire key to see if they have any questions.
- Choose one item to do as an example with the whole class before having students work on their own.
- If a student is struggling with an item, go through the key with them slowly. Have them read both statements out loud at each number before they make their choice for moving on.

Answer Key
   A. Blurtsrider (Pen)
   B. Linjobber (Ruler)
   C. Mistcobbler (Pencil)
   D. Goomblaster (Staple)
   E. Sift-nub (Thumbtack)
   F. Kerkersrita (Marker)
   G. Sudotagger (Crayon)
   H. Happylocker (Safety Pin)
   I. Nau-ha (Roll of Tape)
   J. Snodblat (Binder Clip)
   K. Reeperbloo (Paper Clip)
   L. Skorkursax (Scissors)

Additional Resources

http://www.arborday.org/trees/wtit/
For a more complex on-line tree identification key. You will have to scroll down to the bottom of the page and click on "Click here to launch the animation."

http://www.treesaregood.com/funfacts/funfacts.aspx
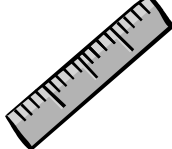Basic tree facts and information about the importance of trees from the International Society of Arboriculture.

Eagle Bluff Environmental Learning Center   **Lanesboro, Minnesota www.eagle-bluff.org**

Alien Office Supplies

Dichotomous Key

An alien ship has landed in the schoolyard! Fortunately, the aliens are a friendly bunch and they want to communicate with you. They are hoping to re-supply their ship with some important items, critical for continuing their journey. Unfortunately they do not speak English. Use the dichotomous key below to translate the names for the items the aliens are in need of, so you can help them on their interstellar journey!

When you follow a dichotomous key, your task becomes simpler if you follow a few simple rules:

- Each time you try to identify an item, always begin at the top at number 1.
- Read both choices in a couplet carefully (both the "a" and "b" statement in any number). Although the first description may seem to describe your item, the second may describe it even better.

1a.	Item is used to attach things together	Go to 2
1b.	Item used for other purpose	Go to 3
2a.	Item made mostly of metal	Go to 4
2b.	Item made mostly of plastic	Go to 5
3a.	Item used to write of draw	Go to 6
3b.	Item used for other purpose	Go to 7
4a.	Item is re-usable	Go to 8
4b.	Item can only be used once	**Goomblaster**
5a.	Item is round with a hole in the center	**Nau-ha**
5b.	Item has no hole, but one end very pointy	**Sift-nubb**
6a.	Writing or drawing can be erased	**Mistcobbler**
6b.	Writing or drawing cannot be erased	Go to 10
7a.	Item used to measure things	**Linjobber**
7b.	Item used to cut things	**Skorkursax**
8a.	Item is used to attach paper together	Go to 9
8b.	Item is use to attach cloth together	**Happylocker**
9a.	Item is bent into a spiral shape	**Reeperbloo**
9b.	Item has two sides that are squeezed to open it	**Snodblat**
10a.	Item has a cap	Go to 11
10b.	Item has no cap	**Sudotagger**
11a.	Item used mostly for writing	**Blurtsrider**
11b.	Item used mostly for drawing	**Kerkersrita**

A. _____

B. _____

C. _____

D. _____

E. _____

F. _____

G. _____

H. _____

I. _____

J. _____

K. _____

L. _____