

## GPS and Geocaching Lesson Plan

- Lesson Title: Using GPS units to help in Tree Identification
- Created by: Dennis Tabor
- School: Wichita eSchool
- Grade Level(s): 7-12 (may need to adjust lesson to fit grade level.)
- Subject Area: General Science, Biology, Botany, Environmental Science
- State Standards:
- The student will develop the abilities necessary to do scientific inquiry and develop an understanding of scientific inquiry.
  - The student will develop understandings about the relationship between science and technology.
- Prior Knowledge Needed: Before starting this lesson, the instructor will need an intermediate background in working with GPS units as well as giving the students an introduction to GPS units.
- This lesson will require the following:
1. The teacher will need to be able to make waypoints at certain tree locations.
  2. The students will need to be able to make waypoints on their GPS units of certain tree locations.
  3. The teacher will need to make their own identification sheet answer key depending on the trees they choose for identification (template provided).
  4. I would suggest purchasing some tree identification books specifically for your region just in case a tree is found on your campus that is not found in the interactive website provided in the activity instructions.
- Activity Instructions:
1. **Introduce the students to tree identification by having them go to the following website:**  
<http://www.arboday.org/trees/treeID.cfm>
  2. **Have them click on the “Tree ID Animation” link.**
  3. **Next, have them click on the “Click Here to Launch the Animation” link.**
    - *This is a flash animation that will not only give them a basic overview of how to identify trees by their leaves, but will also lead them through*

*real-life examples of identification.*

4. After the students have spent some time with this interactive animation/tutorial, the instructor needs to hand out the Tree Identification Glossary, Tree Identification Sheet (located at the end of this lesson plan), and some tape.
5. You will explain to the class that they will mainly use the Tree Identification Glossary hand-out when they come back inside from gathering leaf data, but they can use it while they are outside.
6. Next, handout the GPS units and explain that the 1<sup>st</sup> 5 Trees that the students need to identify are on the Tree Identification Sheet, and that the waypoints for these 1<sup>st</sup> 5 are already loaded into their GPS units.
7. At this point, inform the students that they will need to locate 5 different types of trees on campus and put in their longitude and latitude into the Tree Identification Sheet.
  - *The students will need prior knowledge on how to perform this task before starting this lesson plan.*
8. Attached to the Tree Identification Sheet are pages that have a tree number and a space to tape a leaf. Explain to the students that they need to take a sample leaf from each tree and tape it in the space provided in order to identify that tree when returning to the classroom.
9. Once you have explained the procedure, send the students out for leaf data collection.
10. When the students are finished and gather back in the classroom (preferably a computer lab), have the students return to the following website:  
<http://www.arboday.org/trees/treelD.cfm>
11. This time, have the students use the website to help them identify the samples that they collected during their outing. To do this, they will need to click on the “Eastern and Central Tree Identification” link. From here they can go through the dichotomous key on the site in order to identify each tree that they took a leaf from.
12. The students need to put the name of the tree in the spreadsheet on the Tree Identification Sheet.
13. Once the students have identified all 10 trees, they need to turn the spreadsheet into the instructor.

**Alternative Ideas:**

- 1. The instructor could have the students not only turn in the spreadsheet, but could also have the students turn in a booklet of their leaf samples and a description of each using the glossary provided.**
- 2. During the next class meeting, could use the GPS units to go back out to the same trees, but this time have a podcast that explains each type of tree that you had them identify explaining their characteristics.**
- 3. The instructor could also have the students create a podcast over the characteristics of the trees that they chose on campus (could use this for future classes).**

**Tree Identification Glossary**

ALTERNATE

leaves that are staggered, not placed directly across from each other on the twig.

BLADE

the flat part of a leaf or leaflet, characteristic of broadleaf trees.

BRACT

a modified leaf that bears a flower.

BROADLEAF

a tree with leaves that are flat and thin, and generally shed annually.

**BUD SCAR**  
the marks remaining after bud scales drop in spring.

**COMPOUND LEAF**  
a leaf with more than one blade. All blades are attached to a single leafstem. Where the leaf stem attaches to the twig there is a bud.

**CONIFER**  
a cone-bearing tree.

**DECIDUOUS**  
shedding all leaves annually.

**ENTIRE**  
a leaf margin with smooth, untoothed edges.

**EVERGREEN**  
trees with needles or leaves that remain alive and on the tree through the winter and into the next growing season.

**LEAF SCAR**  
the mark left on the twig where the leaf was previously attached.

**LOBES**  
projections that shape a leaf.

**MARGIN**  
the edge of a leaf.

**MIDRIB**  
the primary rib or central vein of a leaf.

**OPPOSITE**  
2 or 3 leaves that are directly across from each other on the same twig.

**PALMATE**  
blades or lobes or veins of the leaf arranged like fingers on the palm of a hand.

**PERSISTENT**  
deciduous leaf blades that remain on the tree for more than one year.

**PETIOLE**  
the leafstalk that connects the blade(s) to the twig.

**PINNATE**  
blades or lobes or veins of the leaf arranged like the vanes of a feather.

**SAMARA**  
winged fruit.

**SIMPLE LEAF**  
a single leaf blade with a bud at the base of the leafstem.

**SINUS**  
indentation between lobes on a leaf.

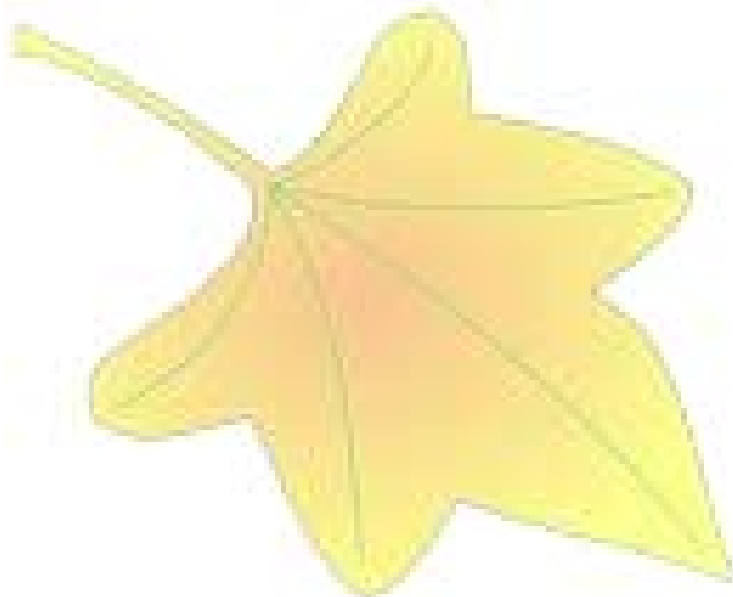
**SPURS**  
stubby, often sharp twigs.

**TEETH**  
notches on the outer edge of a leaf.

## Tree Identification Sheet

<b>Tree #</b>	<b>Latitude</b>	<b>Longitude</b>	<b>Waypoint #</b>	<b>Tree Name</b>

Tree #1			Waypoint #1	
Tree #2			Waypoint #2	
Tree #3			Waypoint #3	
Tree #4			Waypoint #4	
Tree #5			Waypoint #5	
Tree #6				
Tree #7				
Tree #8				
Tree #9				
Tree #10				



**Tree #1**

Tape Leaf Sample Here

**Tree #2**

Tape Leaf Sample Here

**Tree #3**

Tape Leaf Sample Here

**Tree #4**

Tape Leaf Sample Here

**Tree #5**

Tape Leaf Sample Here

**Tree #6**

Tape Leaf Sample Here

**Tree #7**

Tape Leaf Sample Here

**Tree #8**

Tape Leaf Sample Here

**Tree #9**

Tape Leaf Sample Here

**Tree #10**

Tape Leaf Sample Here