

Land Cover Classification

Teacher's Guide

Subject: Integrated Science (Life Science) & Geography

Topic: Land use/land cover, ecosystems, plant classification, mapping

Summary: Students will locate a 90m x 90m site that is homogeneous and determine its land cover classification based on the MUC (Modified UNESCO Classification). This system uses ecological terminology and international standards to identify specific land cover classes. Students will also use the densitometer and common plant identification chart to determine canopy cover and type.

Objective(s): After completing the field lab, students will be able to:

1. Identify distinguishing characteristics of land cover types
2. Determine distinguishing characteristics
3. Use dichotomous key

Ecosystem(s): Hardwood forest; Mixed Upland Forest; Floodplain Swamp

Equipment:

- | | | |
|-------------------------|-----------------------------|-----------------------------|
| • GPS Receiver | • Compass (4) | • Surveying flags or stakes |
| • GLOBE MUC Field Guide | • Densitometer | • Calculators |
| • 50m tape measure | • Digital Camera (optional) | • 4-meter Leveling Rod |

Background:

- **Reference Material:**
- **Vocabulary:**

Procedure (Engage; Explore; Explain)

1. Engage the students by asking specific questions that get to the heart of the activity: How do you think we name the type of land we are on? What is the difference between developed and natural land? What is the difference between cultivated and urban land?
2. Ask them to formulate their own hypothesis relating to their own expectations of the outcome of the lab. Explain to them that the classification of land types is based on a number of important characteristics such as amount of water present, tree type, tree structure, density, etc.
3. Explain that a dichotomous key is used to help scientists determine what an organism is and that we will be using something similar to determine land cover type. Ask the students if they know what a distinguishing characteristic is. We will identify distinguishing characteristics; then, answer yes/no questions to determine what the land cover type is.
4. The first step is to determine what the length of each student's pace. A pace is one step forward with each foot. Lay out a tape measure at least 30m on the ground. Then, have students walk a comfortable stride for ten paces (20 steps) and record where they stop. Repeat two other times and get an average. Divide this number by ten and that is the length of one pace. Students must also measure how many paces it takes to reach 21.2m, rounding to the nearest half pace.
5. Next, a canopy and ground cover assessment is completed using the data sheet, leveling rod and densitometer. The students will walk the diagonals from the center point of the site in four directions (NE, NW, SE, SW) and take readings every pace. Shrubs are 4 meters or shorter, and canopy species are the tallest trees seen in the densitometer. The ground cover is measured by any plants touching the student's feet. If a green leaf is touching, mark "G", if the woody stem of a living plant, mark "B", all leaf litter and bare ground is recorded as "-".
6. After completing the lab, allow the students to answer the discussion questions as a group and explain their answers relating them to the concepts, processes and skills associated with the activity. Students should record their answers individually. At this time, facilitators can introduce/explain the specific concepts and explanations in a formal manner.

Sunshine State Standards:

Science: SC.F.1.3.1; SC.G.1.3.2, 3; SC.H.1.3.4; SC.H.2.3.1

Language Arts: LA.A.1.3.3

Social Studies: SS.B.2.3.9

Mathematics:

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General Information

Student Data Sheet

Full Name:		Date:		My Pace:
Science Teacher:		Time:		Paces to 21.2m:

Hypothesis:

If a site can be classified by its dominant plant type, then I think the land type in this area will be called _____ because _____.

Field Observations/Measurements/Data

Latitude:				Longitude:	
	Canopy Observations + = Tree Canopy - = Shrub or Sky	Canopy Species or Common Name	Canopy Type E = Evergreen D = Deciduous - = Sky	Ground Observations G = Green Cover B = Brown Cover - = No Cover	Ground Species or Common Name
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
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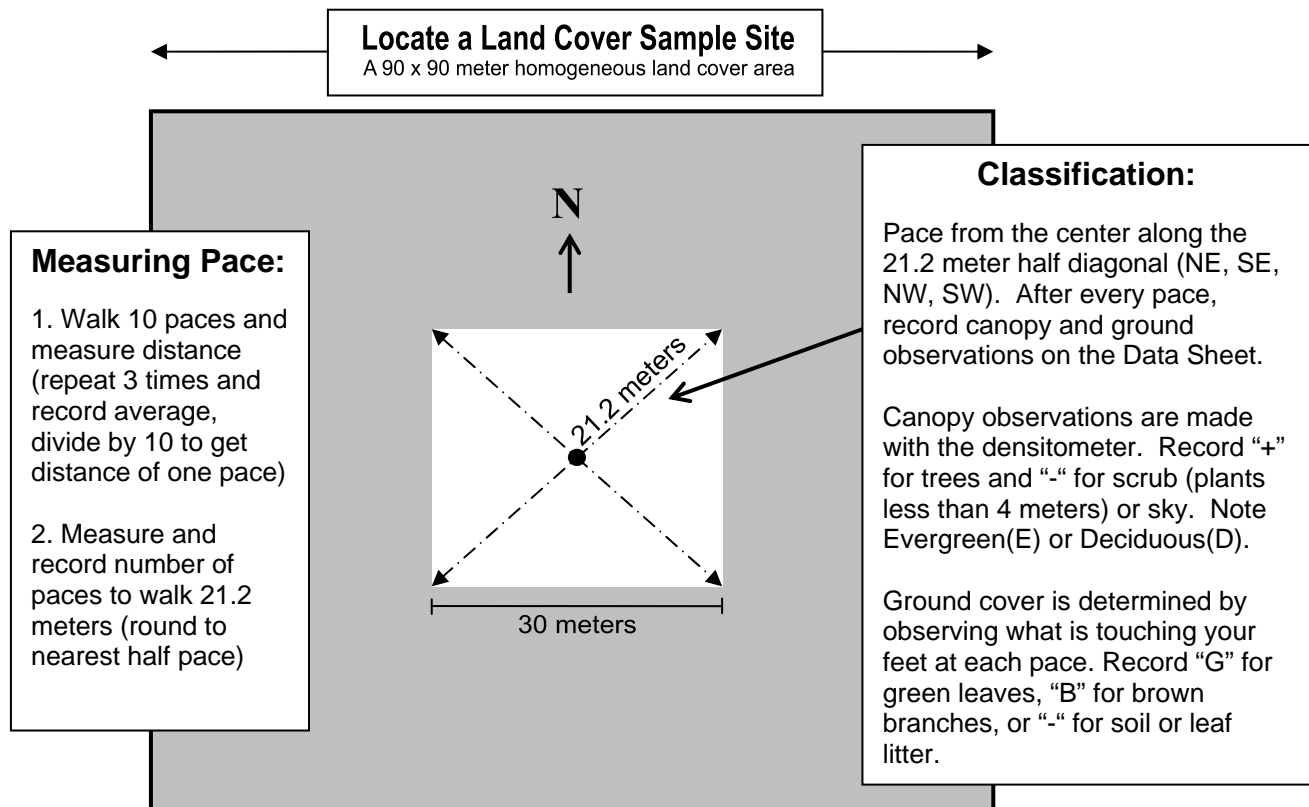
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Student Data Sheet

Direction from Center:					
Summary of Canopy Observations		Summary of Canopy Type		Summary of Ground Observations	
Total "+"		Total "E"		Total "G"	
Total "-"		Total "D"		Total "B"	
				Total "-"	
Total Canopy Observations		Total Canopy Type Observations		Total Ground Observations	
		% Evergreen (E)			
% Tree Canopy		% Deciduous (D)		% Ground	

Combined Results:

	% Tree Canopy	% Evergreen	% Deciduous	% Ground
NE				
NW				
SE				
SW				
Total				
Average				



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Assessment Questions

1. What is the MUC Class code and Land Cover Type name for this site?

2. What was the most dominant canopy plant in this site? What was the most common ground cover plant at this site?

3. Does your data support your hypothesis? Whether your hypothesis is supported or not, what can you infer from your observations?

4. What changes could take place that would alter the land type of this site (think of one naturally-occurring change and one human-induced change)?

5. If there was a different land type in this area, how might it effect the spring and river?

6. Think about what you learned in this lab. Has it generated any new questions? Write a new question about something you want to learn more about.

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Plant Type Reference Chart

Common Evergreen Species	Common Deciduous Species	Common Ground Cover Species
 <p>Loblolly Pine (<i>Pinus taeda</i>)</p>	 <p>Sweetgum Tree (<i>Liquidambar barbata</i>)</p>	 <p>Red Buckeye (<i>Aesculus pavia</i>)</p>
 <p>American Holly (<i>Ilex opaca</i>)</p>	 <p>Southern Red Oak (<i>Quercus falcata</i>)</p>	 <p>Palmetto (<i>Serenoa repens</i>)</p>
 <p>Southern Red Cedar (<i>Juniperus silicicola</i>)</p>	 <p>Live Oak (<i>Quercus virginiana</i>)</p>	 <p>Switch Cane (<i>Arundinaria gigantea</i>)</p>
 <p>Pond Cypress (<i>Taxodium ascendens</i>)</p>	 <p>Water Oak (<i>Quercus alba</i>)</p>	 <p>Coral Ardisia (<i>Ardisia crenata</i>)</p>