

BIOL 190 Biodiversity Project

The purpose of this assignment is to provide an opportunity for you to explore the diversity of plants and fungi wherever you call home. Spring is one of the most exciting times of the year for a botanist, but since we aren't able to do this in lab, this activity will give you an opportunity to learn more about plants on your own. (See course learning goal #1)

FORMAT

Complete the following two activities by **May 4, 2020** :

1. A primarily web-based series of **16 iNaturalist "observations"**
2. An **accompanying document** with a list of the observations you made, and some additional information about these species.

Grading

45 points total

- 24 pts – quality of iNaturalist observations (1.5pts x 16 photos)
- 16 pts – Table 1 completed correctly
- 5 pts – Table 2 completed correctly

Up to 15 points of extra credit awarded for completing the Herbarium Specimen activity (separate doc.)

Part 1: Making Observations

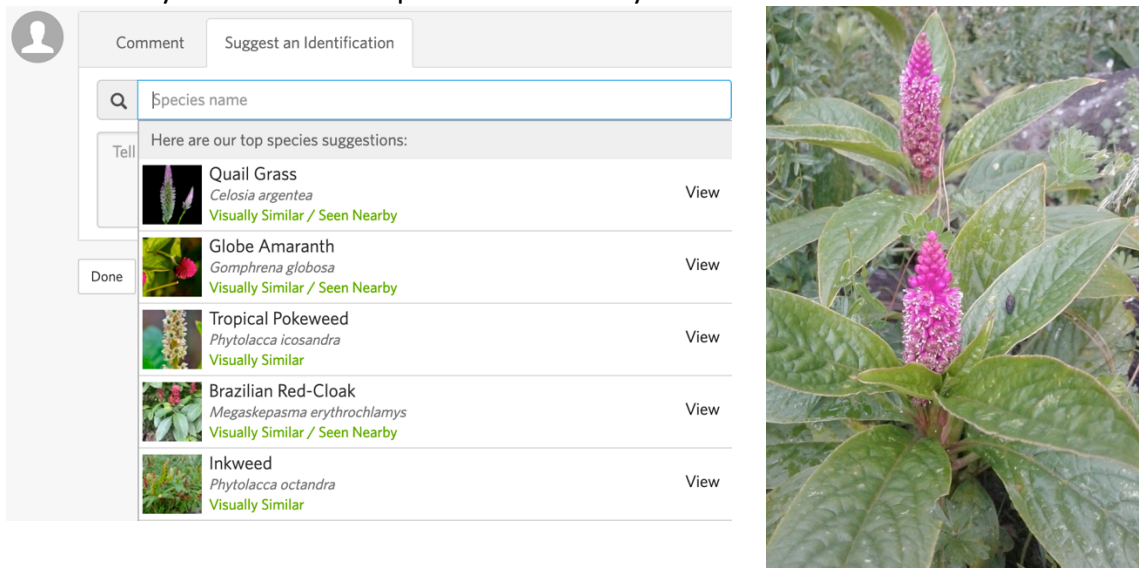
iNaturalist is a citizen science app/website developed by the California Academy of Sciences for observing and documenting biodiversity. It is a great tool to use while on a hike to catalog your observations. I have also used it in my research to determine species range and look for unusual specimens. They have also developed a sister app called Seek, that uses a similar interface for plant identification, but does not allow you to submit your observations to a database.

Getting started with iNaturalist

1. Create an account in iNaturalist, at www.inaturalist.org. iNaturalist can be accessed directly from a smart phone (using the iNaturalist app), or it can be accessed from any computer with an internet connection, via the iNaturalist webpage.
2. Send me your user name using this form: <https://forms.gle/LvLXNsrXNWeoFTKE8>
3. I've created a project for our class called "Hendrix College BIO 190". This will help organize our class observations. Using your username, I will add you to that project. This is also how I will be grading your observations, but you will also be able to see your classmates' observations and comment on or help identify them.
4. More resources–
Getting started: <https://www.inaturalist.org/pages/getting+started>
Video tutorials: <https://www.inaturalist.org/pages/video+tutorials>

Your Observations

1. You must make a total of 16 observations that fit these criteria:
 - Each observation must include at least 2 photographs of the organism (e.g. one close-up of the leaf, and one showing the whole flower). More photos are better!
 - At least seven specimens must be woody plants (trees or shrubs)
 - At least five observations must be of non-woody plants (e.g. wildflowers, non-vascular plants)
 - You must include at least one observation each of a gymnosperm, fungus (including lichen), fern, and bryophyte.
 - Your observation must be georeferenced (i.e. include location data) This is most easily done by using the GPS feature in your phone, but you can also use a map to choose a locality after the fact.
 - Observations must also be linked with a date and time. This is typically added automatically with your photos, but it's good to check.
 - No two observations can have the same identification (e.g. you cannot have two observations of a sugar maple, *Acer saccharum*)
 - Plants must be growing wild– so no garden plants or landscaping shrubs.
2. I don't expect that you will be able to identify your observations, but this is where the app will help you! Using image recognition technology, it suggests an identification. These suggestions are further refined by your locality data, so you can also see which species are similar and found nearby. Here is an example from one of my observations:



3. Being a virtual community, iNaturalist allows other users (including myself) to comment on your observations and make identifications. You are not graded on your ability to perfectly identify the plants; the point of this assignments is for you to pay closer attention to the plants and fungi around you and learn more about them.

Tips on making observations:

- It is preferable that you make your observations at a local natural area (park, nature preserve, etc.) However, if access to these places are difficult, you can still make observations in a town

or city. Explore a weedy lot, or median of a street. Observe plants that are not clearly tended for.

- Make more observations than the minimum number. Later, go through your photos/observations and see which species are more easily identifiable and more interesting. Then you could upload only those photos that are relevant and easier to identify.
- In lecture and lab, I mentioned different features of organisms that are important for identification. For best results, include photos of all of these parts of the plant.

Part 2: Analyzing your Collections

1. Fill out **Table 1** to report all of your observations.
 - a. For any vascular plant determine if the plant is native or introduced to your area. USDA plants is one a good resource for this (Go to <http://plants.usda.gov> and type the species name into the search bar in the upper left)
 - b. Is your plant woody (tree or shrub; does not die back to the ground in the winter) or not?
 - c. Determine the **primary** and *secondary* taxonomic groups for your observation from the following categories:
 - **Fungi**: *Ascomycete, Basidiomycete, or Zygomycete?*
 - **Land Plant**: *Moss, liverwort, hornwort, fern, lycophyte, gymnosperm, angiosperm*
 - **Lichen**: *Crustose, foliose, fruticose* [not taxonomic groups, but still useful in classification]
2. Double check that your observations meet all the criteria listed on page 1 (“Your observations”) and make additional observations if necessary.
3. Choose five woody angiosperm species that you observed to analyze more closely. Report your results in **Table 2**.

Note: For best results, complete this section when you have the live specimen in front of you. But working from your photographs and/or others from the internet is acceptable too. Just **don’t look up the answers**; the purpose of this activity is to sharpen your observation skills.

- a. Copy the observation number and species name from Table 1. Only choose observations that you know to the species level.
- b. Look at where the leaves or young twigs attach to the stem. This point of attachment is called the node. How many leaves are at a node? If one, the pattern is alternate or spiral, if two, it is opposite, and if more than two, it is whorled. Enter this into the first column
- c. Look at the morphology of each leaf. Is the blade of the leaf intact (=simple), or is it divided (=compound). If it is divided, do the segments (=leaflets) radiate from a single point (=palmately compound), or attached to a central axis (=pinnately compound)?
- d. Is the blade of the leaf (the broad photosynthetic part) attached to the stem directly (=sessile), or is there a little stalk connecting the two (=petiolate; the stalk is called the petiole)
- e. Some leaves have jagged or toothed edges (=serrate margins), others have smooth edges (=entire).
- f. Do some research on the species to find an interesting fact about its ecology from a credible, scholarly source. Include your references below the table.

Table 1 – iNaturalist Observations

Obs. #	Species (List family or genus if species name not known)	Native or Introduced?	Woody or not?	Major taxonomic group	Secondary group
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

Table 2– Angiosperm morphology

Obs. #	Species	Branching/Leaf attachment <i>opposite,</i> <i>alternate,</i> <i>whorled?</i>	Leaves <i>simple,</i> <i>pinnately</i> <i>compound,</i> <i>or</i> <i>palmately</i> <i>compound?</i>	Leaves <i>petiolate</i> <i>or sessile</i>	Leaf margins <i>entire</i> or <i>serrate</i>	Interesting fact about this plant’s ecology

Sources for interesting facts: