Read Me:

**Preparation before lab:**

**You will need a google drive account to conduct the lab.**

**Creating the google sheet:**

**In the google sheet template link, select File and “Make a copy” to download your own version into google drive.**

Instructors will need to either assign names or group numbers to the google sheet before hand. Alternating colors in the sheet are available to quickly delineate assignments between assignees. Hand outs of the student worksheet and Nth day of the year indexes will also assist students.

We found that when we ran this lab, it was easier to have students score images using the physical data sheet and then transfer the records back to the google sheet to avoid flipping back and forth between applications. Students should be instructed to either use drop down menus when scoring or type in “yes” or “no” to ensure that scoring is counted accurately.

During the lab, instructors may want to circulate to assist in scoring. The “Data Used for Graphs” tab also will assist instructors to be on the lookout for outliers and incorrect scoring.

**Changing out taxa samples in the sheet:**

Samples can be replaced in your own version of the google sheet by replacing the media links and relevant data. However, some data cleaning and data manipulation is required and will require the instructor to know some basic excel formulas (i.e. vlookup)

Herbarium images can be downloaded via any biodiversity database (GBIF, Seinet, Arctos) and inserted into the template so long as the column names can be preserved. Queries used in the template (See Data Used for Graphs) are dependent on column names rather than the position of the column.

**Instructions for changing out samples:**

After running a search on either GBIF: https://www.gbif.org/ or Seinet, download the Darwin Core Archive of the data, which will include the “multimedia” and “occurrence” files. To obtain the media links en masse, the multimedia file can be joined to the occurrence file using the gbifID. Add the identifier column from the multimedia file to the occurrence file to reproduce the format shown in the google sheet template and manipulate the columns to match. Adding the identifier column is best done with vlookup.

Decide what to do with records with ambiguous date data. You may want to remove records without dates and ambiguous dates entirely. Many collections use 1900-01-01 as an indicator that the date is unknown. For those that have a range, you may decide to calculate the average or remove them.

Add the “Nth Day of the year” column based on one of the date columns (a begin date or ended date column is typical). This value can be calculated with the following formula:

=B5-[DATE](https://exceljet.net/functions/date-function)([YEAR](https://exceljet.net/functions/year-function)(B5),1,0) where the date column is B5.

To obtain climate data for a large series of records through the Oregon State Prism Explorer: https://prism.oregonstate.edu/explorer/bulk.php instructors may obtain the data set by inputting the coordinates, unique specimen ID and elevation files and downloading the time series. Instructors will have to extract the climate data of the relevant month and years. One way of doing so is by concatenating the specimen ID and date columns in the PRISM file and by creating a reference column in the occurrence file similarly (by manipulating the month and year column) to retrieve the needed data. This step is not absolutely necessary but can help shorten the length of activity if needed.