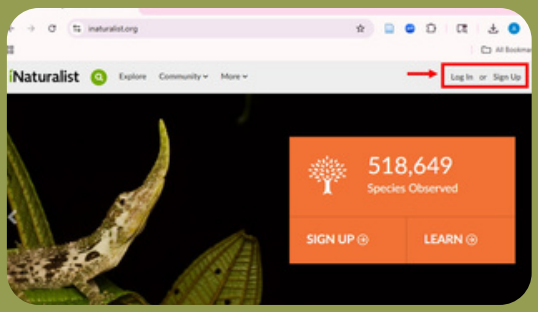
INTEGRATING STEM FROM
INATURALIST DATA

iNaturalist is a crowdsourced species identification system and an organism occurrence recording tool. You can use it in a variety of ways. Today, we are going to use iNaturalist to access the observational data collected by its users.

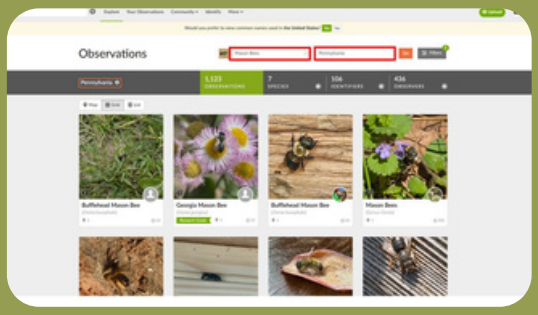
1 LOG IN TO INATURALIST

- Go to inaturalist.org
- You will need an account to access the data, so log in if you already have one or sign up.
- We recommend signing up with a google account.
- Once logged in, click the Explore tab.



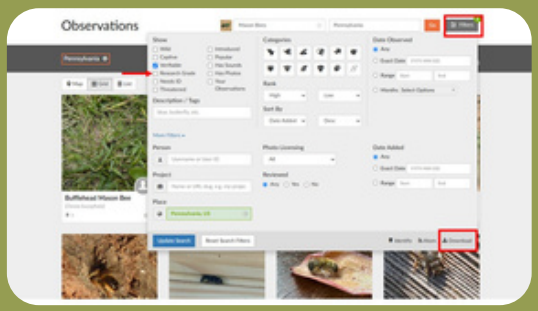
2 ENTER TAXA AND LOCATION

- Enter taxa (species) and location at the top of the page. EX: I entered mason bees & Pennsylvania.
- Press enter or hit go.
- *Please note that this activity works best for taxa that are between ~200 and 10,000 observations.*



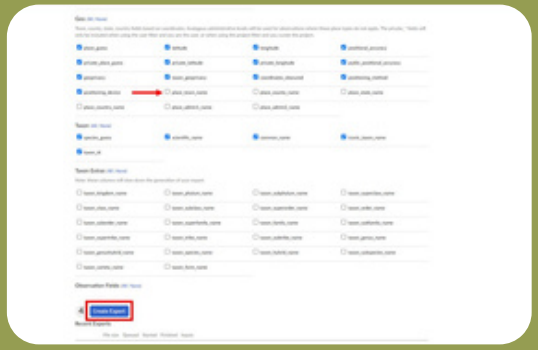
3 FILTER DATA

- Click Filters.
- Check Research Grade.
- Click Download.



4 DOWNLOAD DATA

- Scroll down to section 3. Choose columns and the subsection Geo.
- Keep the already selected items
- Select place_county_name.
- Select create export.
- Download file and save as [taxaname].csv. For example, this file would be masonbees.csv. **Do not use spaces in your file name.**



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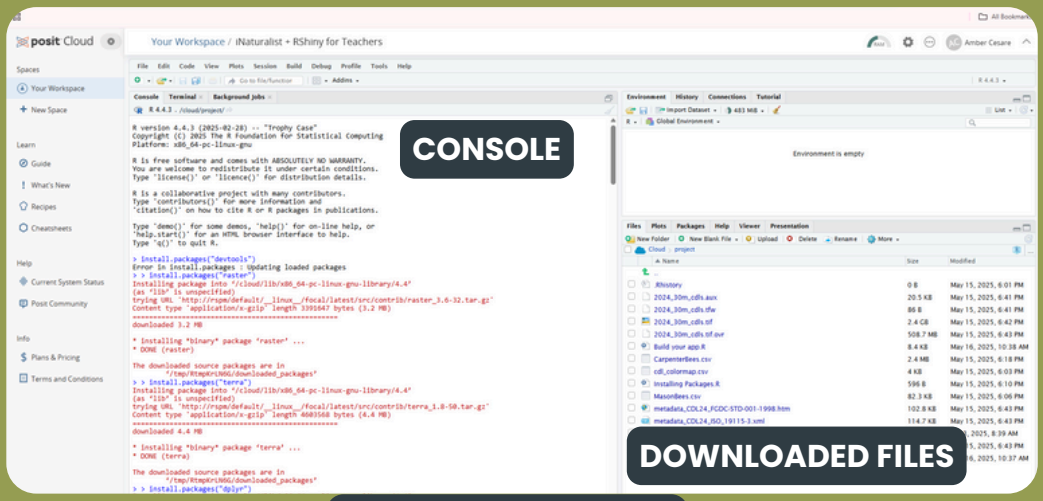
VISUALIZING DATA FROM INATURALIST

We are going to use Posit Cloud, a cloud-based platform that allows users to perform data analysis using R directly in their web browser!

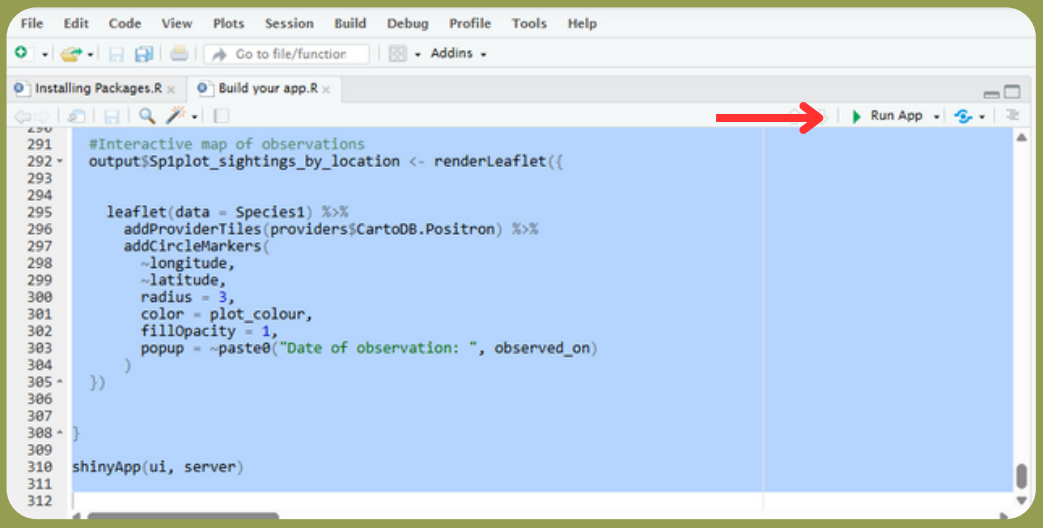
LOGGING INTO POSIT CLOUD

- Go to https://posit.cloud/content/10368197
- Log in with your google account.
- Once logged in under Your content click iNaturalist + Rshiny for Teachers
- Your screen will look like below with a console on the left and downloaded files on the bottom right.



BUILD YOUR APP.R

- In the downloaded files click **Build your app.R**
- Highlight all of the packages in code in the Console window.
- Hit Run.



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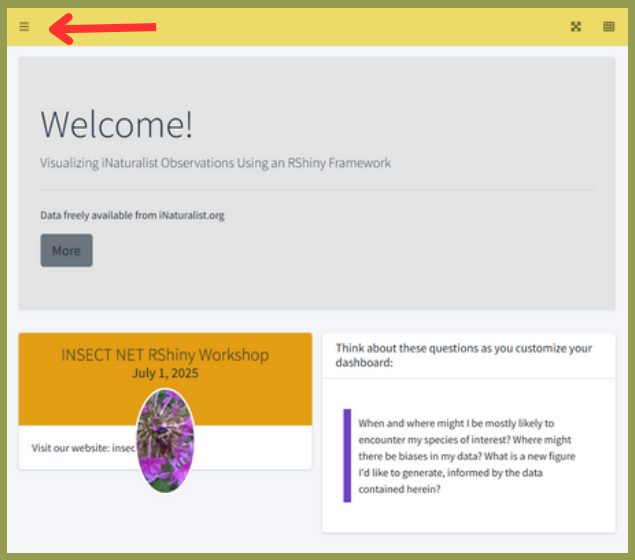
APP

- The app will open in a pop up window.
- Click the three lines in the top left of screen.
- Then, click species one.
- Explore the information on the page to see what you are looking at.



What species is the data associated with? How many total observations?

Take a look at the graph **Observations by Landscape**. What does this graph tell you?

Take a look at the graph **Observations by Landscape**. What are the potential limits of this data? Why?

Take a look at the graph **Histogram of Sp1month.** What does this graph tell you?

Take a look at the graph **Histogram of Sp1month.** Is this what you would expect compared to the life cycle? Why or why not?

Take a look at the graph **Histogram of Sp1year** by clicking on the "By Year Tab".
What does this graph tell you?

Looking at the graph **Histogram of Sp1year** and knowing this data came from the app iNaturalist, how do you explain the trend observed in the data?

Take a look at the graph **Observations by Location.** What does this graph tell you?

After looking at the data, what scientific questions do you now know have?

Choose one of the questions you have from above, how could you go about exploring that question?

USING DATA FROM INATURALIST TO ANSWER A QUESTION

Now that you have used posit cloud and iNaturalist, let's ask and answer your own scientific question that can be answered using iNaturalist data!

SCIENTIFIC QUESTION

Scientific questions are **specific**, **testable**, and **measurable**.
In iNaturalist we have data available to us by taxa and location.

What taxa do you want to look at?

What location do you want to look at?

What scientific question are you trying to answer?

DISPLAYING YOUR DATA

- You will need to download your data from iNaturalist. Use the instructions on page 1 to help you.
- Once you have downloaded your data, use the posit cloud link (https://posit.cloud/content/10368197) to log in to posit cloud.
- You will need to upload the downloaded .csv file from iNaturalist to posit cloud.
- Look at the code we used to build the app using R in the console.

You will need to change a few lines of code in order to use the data you downloaded. Look at the code and identify the lines of code that need to be adjusted. What will you change them to?

Original code →	Line Code # →	New code

USING DATA FROM INATURALIST
TO ANSWER A QUESTION

Now that you have used posit cloud and iNaturalist let's ask and answer our own scientific question that can be answered using iNaturalist data!

ANALYZING YOUR DATA

Run the app in posit cloud and look at the data visualizations. What does your data tell you?

CONCLUSIONS

What conclusions can you draw?

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