# Tiny Earth Database Tutorial

A step-by-step guide for students entering soil, culture, and isolate data into the global database

Tiny Earth website: tinyearth.wisc.edu
Tiny Earth Database website: data.tinyearth.wisc.edu

Questions? Email tinyearth@wid.wisc.edu

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# Welcome to the Tiny Earth network!

This is a guide for students using the Tiny Earth Database. The Database is a resource for students, instructors, and the public, therefore accurate and thorough information is expected. The more we know about your isolates, the further we can chase their antibiotic capabilities.

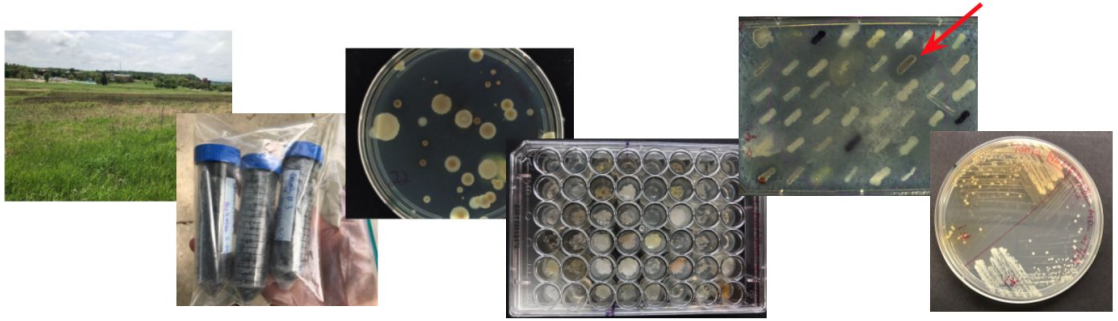
**Some information in this database is required, but some is optional based upon what data you are collecting in your classroom, so don't worry if you are missing information for some fields on the site.** Please fill in all data your instructor had you collect and/or relevant to your particular experiments.

You are encouraged to take photos of your samples--soil, plates, tubes, individual isolates--along the way, as there are several opportunities to upload photos to the Database. Please follow appropriate PPE guidelines for your lab when taking photos.

Once your data is entered into the Database and the Tiny Earth Chemistry Hub (TECH) receives your isolates, data may be updated with further analysis completed at TECH. So stay connected!

# In the Tiny Earth Database, you will submit data about your...

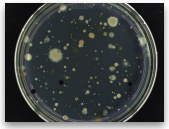
1. Soil sample collection site and soil characteristics
    - Most students will work with one soil sample over their Tiny Earth course
2. Culturing conditions
    - You may have one culture condition or multiple per soil sample. Be sure to record all culture conditions and keep isolates aligned with their culture conditions.
3. Isolate information
    - Once you have found an antibiotic producer against at least one ESKAPE safe-relative, you may have many types of data about the isolate. Isolate ESKAPE screen data is required, but there are options to enter 16S rRNA PCR results, chemical extract screens, and eukaryotic tests.
    - You may have more than one Isolate per culture condition.



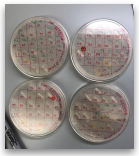
# Data Entry Process

## SOIL SAMPLE 1

### CULTURE CONDITION 1



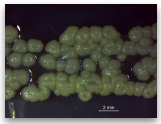
Media: PDA
Temperature: 28C
Incubation time: 24 hours



Create master plate if isolates. Screen against ESKAPE relative. Identify antibiotic producing isolates.

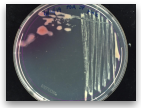
#### ISOLATE 1

Enter relevant data, add photos

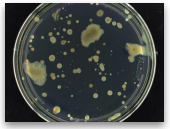


#### ISOLATE 2

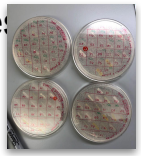
Enter relevant data, add photos



### CULTURE CONDITION 2



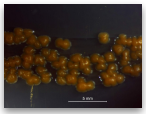
Media: TSA10%
Temperature: 28C
Incubation time: 24 hours



Create master plate if isolates. Screen against ESKAPE relative. Identify antibiotic producing isolates.

#### ISOLATE 3

Enter relevant data, add photos

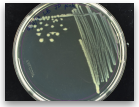


#### ISOLATE 4

Enter relevant data, add photos

#### ISOLATE 5

Enter relevant data, add photos



**1. SOIL DATA**
Soil and environmental characteristics, sample date and location

**2. CULTURE DATA**
Media and other culture conditions, number of bacteria screened against ESKAPE relatives, optional antibiotic resistance testing.

**3. ISOLATE DATA**
ESKAPE screen results, including ESKAPE strains with positive and negative results.

Option to enter 16S rRNA PCR, chemical extraction, and eukaryotic test data.

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**Finished Page**

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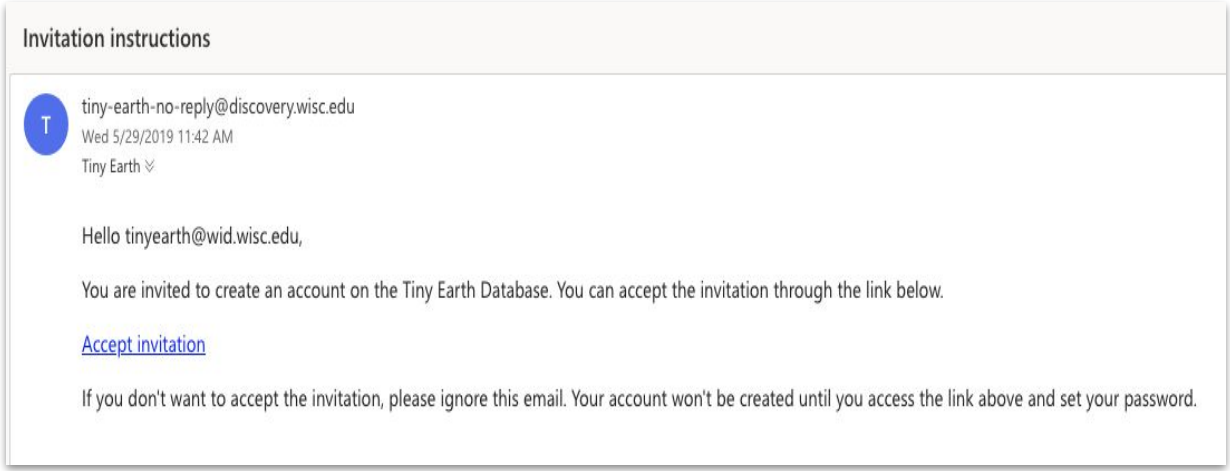
# Make an Account

You should receive an email from tiny-earth-no-reply@discovery.wisc.edu inviting you to create an account on the Tiny Earth database.

Click on the “Accept Invitation” link and you’ll be directed to www.data.tinyearth.wisc.edu to set up your account.

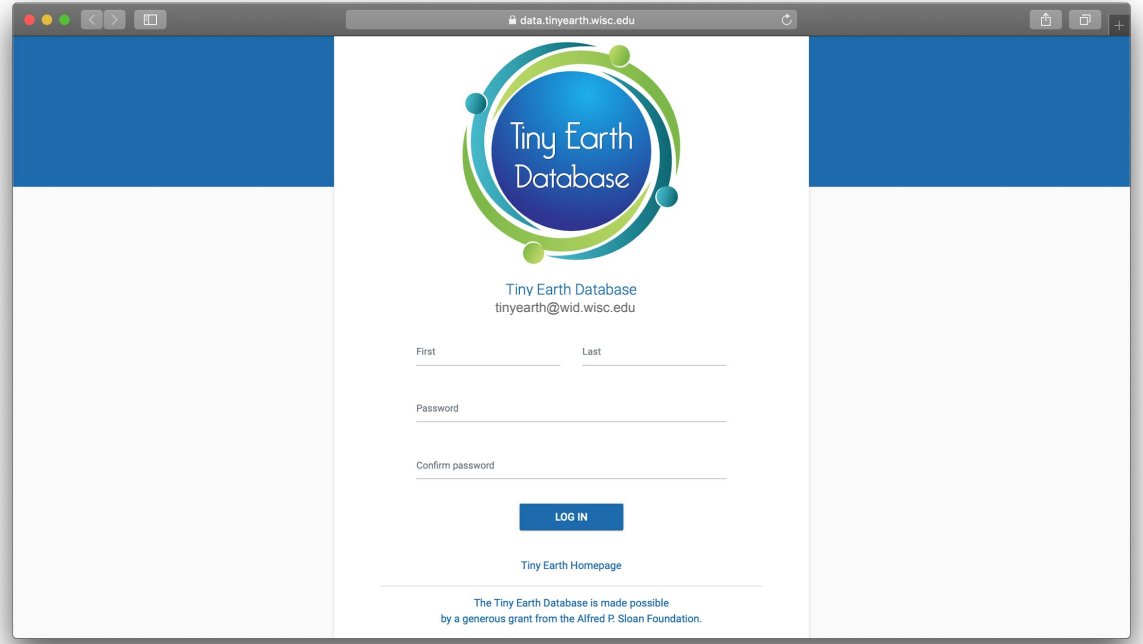
Creating an account and entering your Tiny Earth data will ensure your soil isolates stay in the antibiotic pipeline.



# Make an Account

Enter your name and create a password.

*Password should be at least 8 characters, and contain at least 1 character from 3 of the following categories: Uppercase (A-Z), Lowercase (a-z), Digit (0-9), Special Characters (#?!@$%^&*-)*

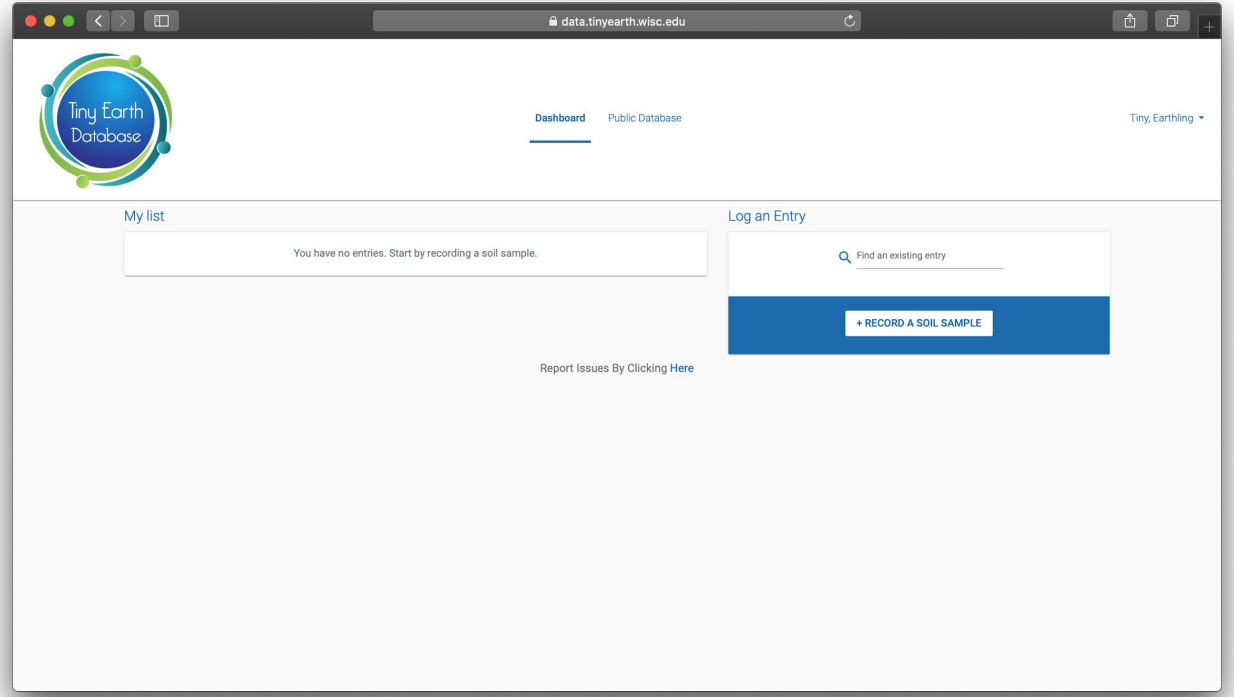


# Enter Soil Data

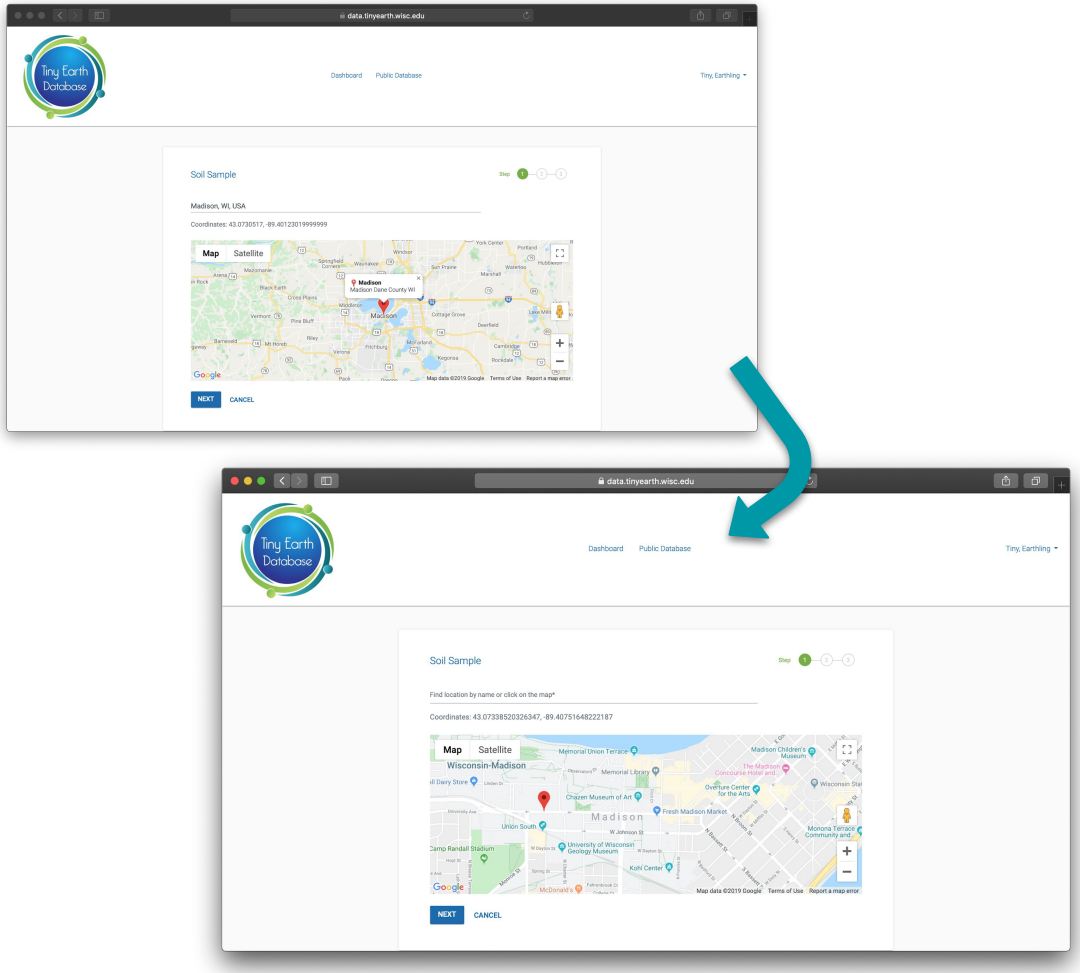
Yay! You have successfully registered for a Tiny Earth Database account. Now it's time to enter your data.

First, you must enter a soil sample.

Click "RECORD A SOIL SAMPLE"



# Enter Soil Data
# **Step 1: Location**

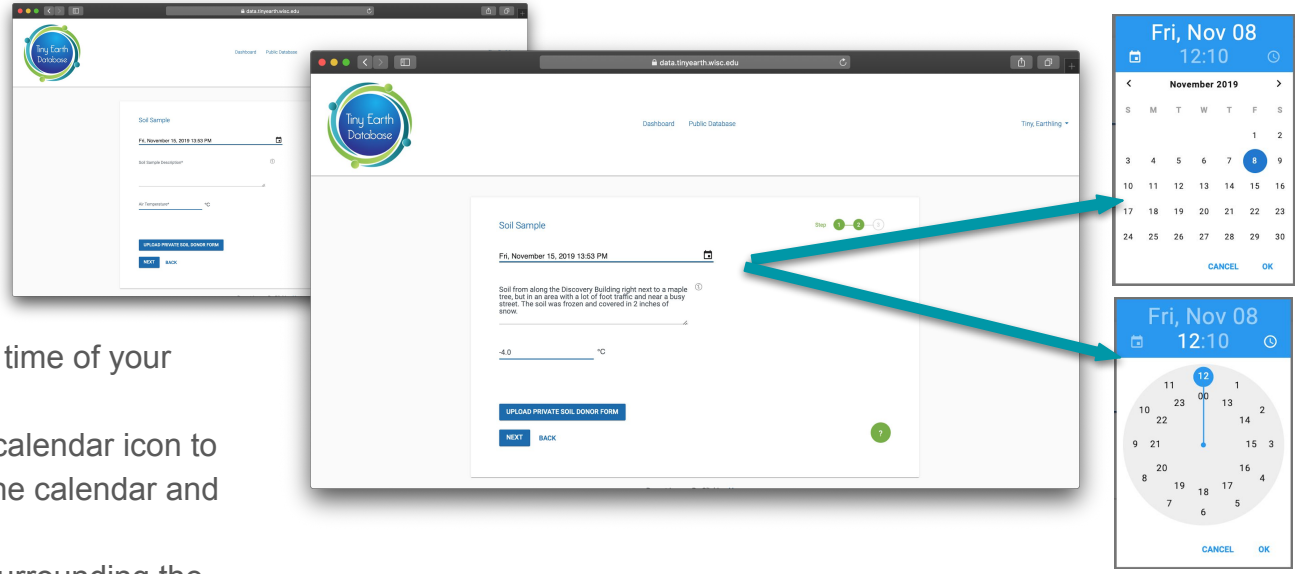



You can enter an address or city in the search bar, or click on the map and drag the pin to the specific soil collection site.

If you move the pin, assure that the coordinates are changing to the appropriate location.

Click “NEXT”

# Enter Soil Data **Step 2: Environmental Characteristics**




1. Select the date and time of your collection
    - Click on the calendar icon to select from the calendar and clock.
2. Describe the area surrounding the soil collection site
    - Provide information regarding vegetation, traffic, weather conditions, etc.
3. Enter air temperature in celsius

Note: clicking on the “i” (on any page) will clue you as to what should be included in that field.

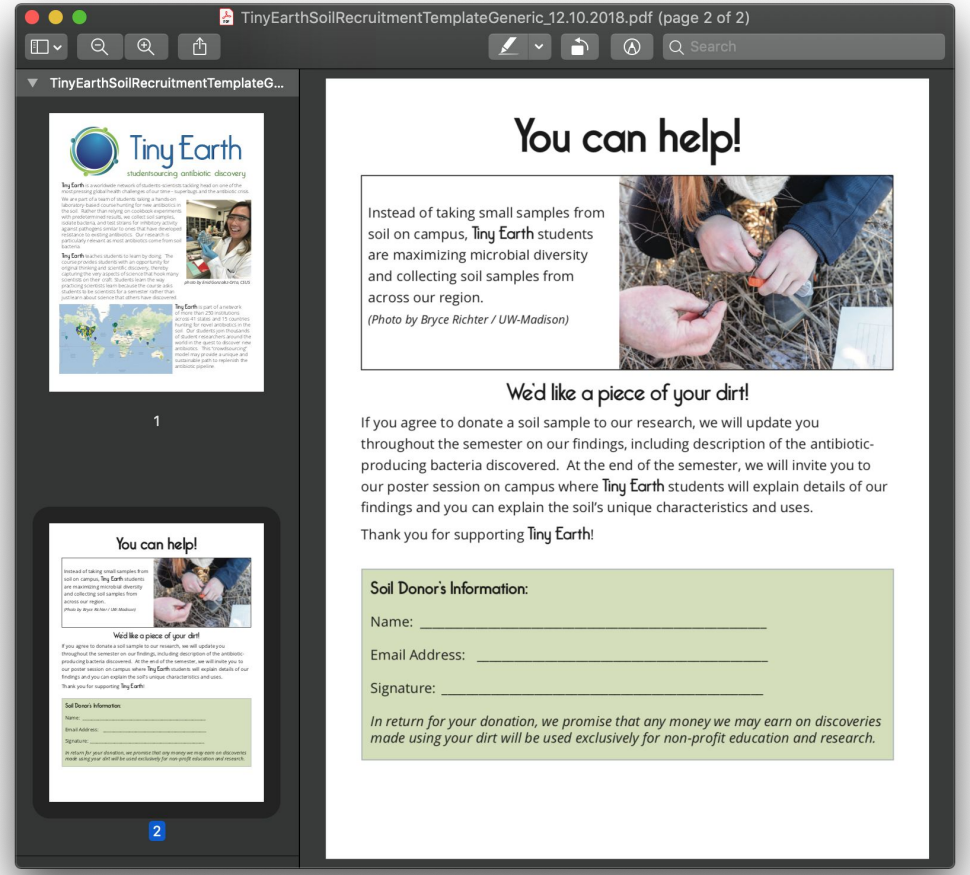
If soil was collected from private land, click “UPLOAD PRIVATE SOIL DONOR FORM” and upload signed soil donor form.

Click on the ? to find a link to download the private soil donor form template.

# Enter Soil Data:
# **Step 2: Private Soil Forms**

If you collected soil from private land, you MUST submit a form with approval from the land owner to use the soil.

If your soil sample is from private land, this form will be provided by your instructor.



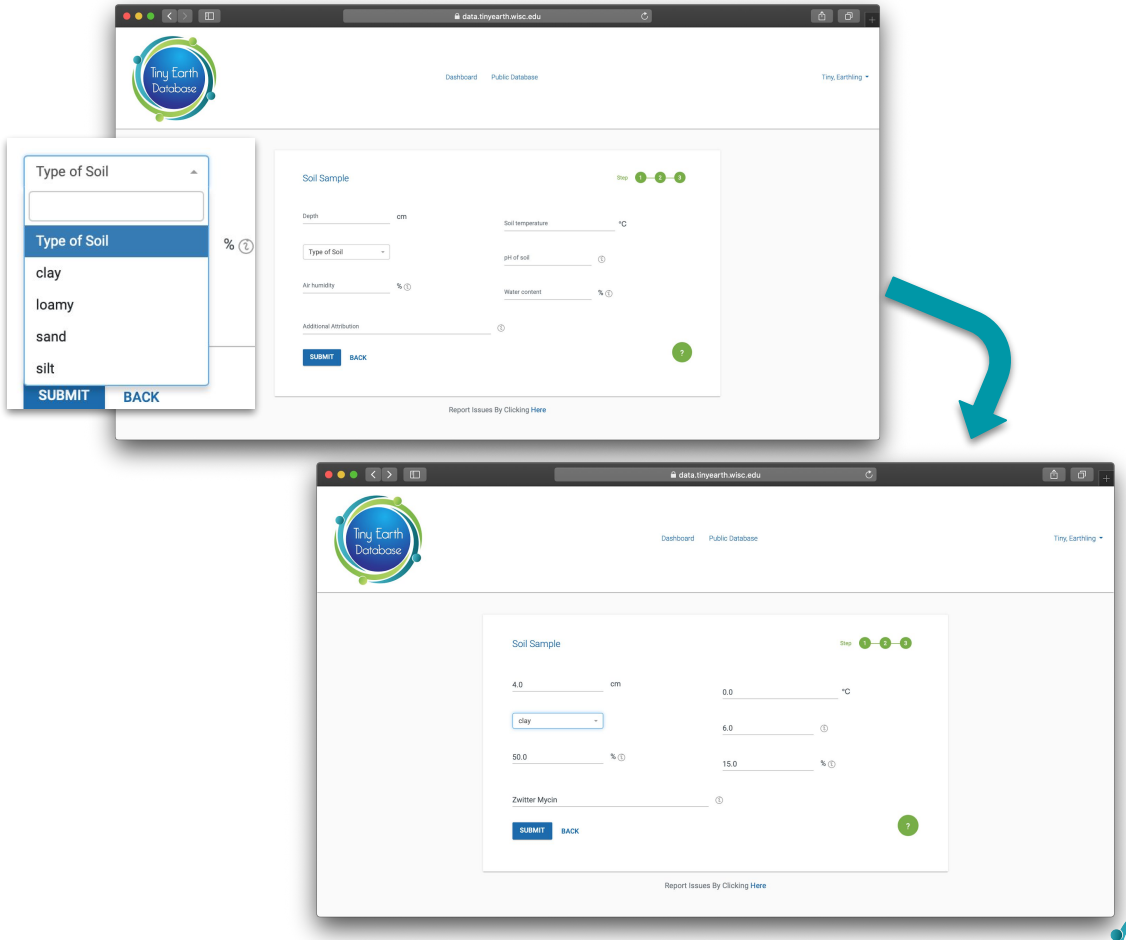
# Enter Soil Data: **Step 3: Soil Characteristics**

Enter

- Depth of sample collection
- Type of soil
  - Choose from the drop-down menu
- Air humidity
- Soil temperature
- pH of soil
- Soil water content

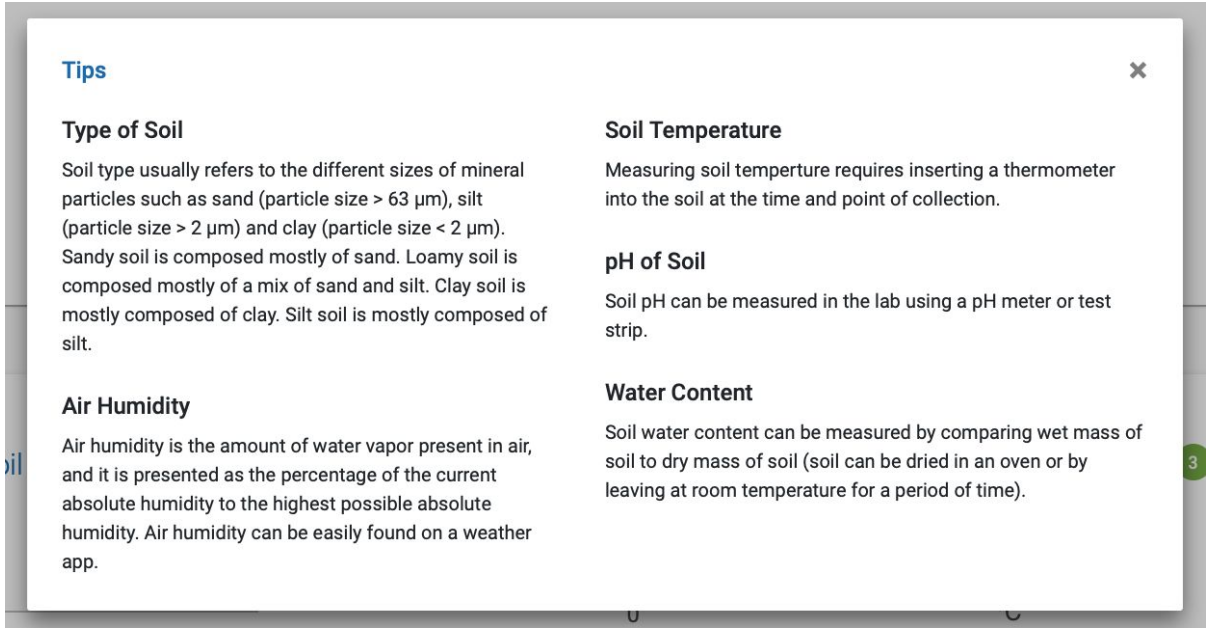
Include your partner's name in “additional attribution” if another person was involved with making or using these isolates

Click “SUBMIT”



# Enter Soil Data: **Step 3: Soil Characteristics**

For extra assistance with entering soil characteristic data, click on ? and more information for each field will appear.

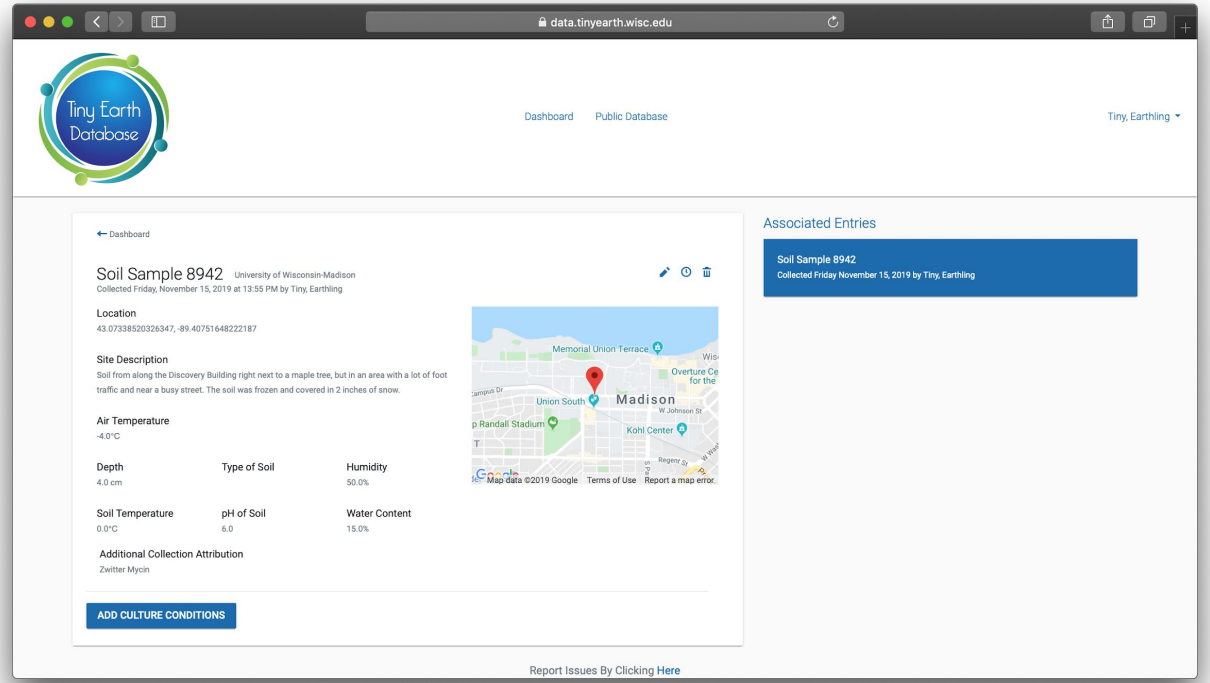


# Enter Soil Data **Finished Page**

Once you have completed all 3 steps for soil sample data entry, you will be directed to a page that looks like this.

You can always go back and edit information for this sample by clicking on the ✎ or deleting the entry by clicking on the 🗑.

The soil sample number, in this case 7636, is specific to your soil sample and can be searched in the database by others in your class.



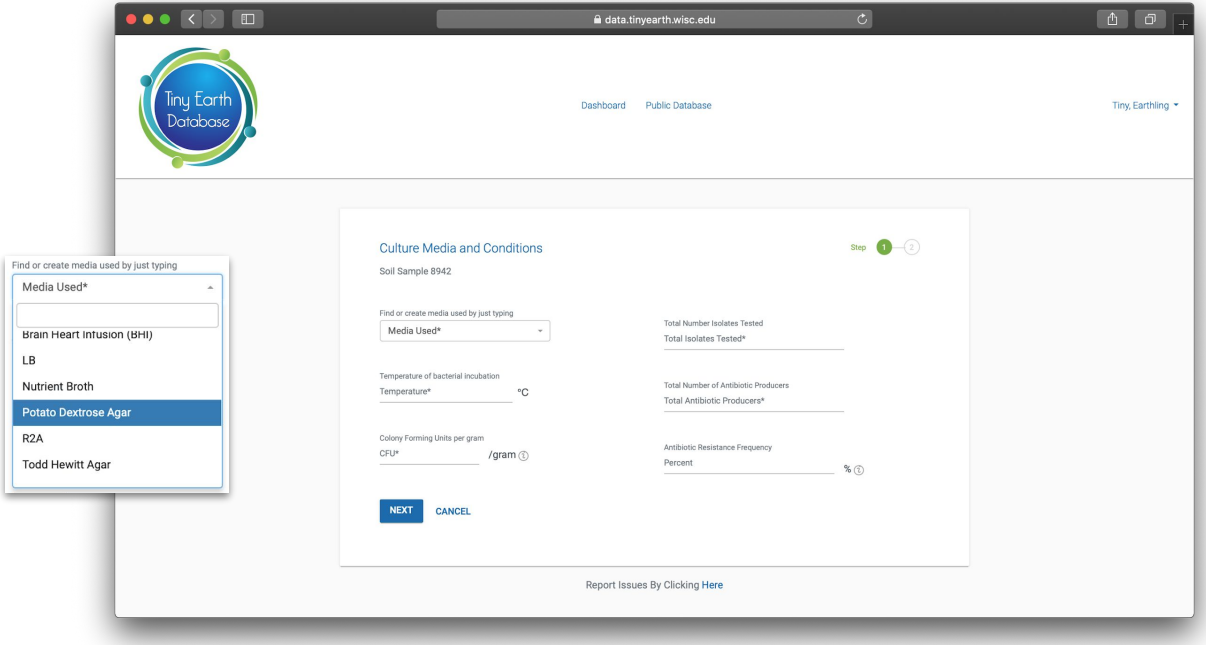
# Enter Culture Conditions

# **Step 1: Media and quantity of isolates tested**

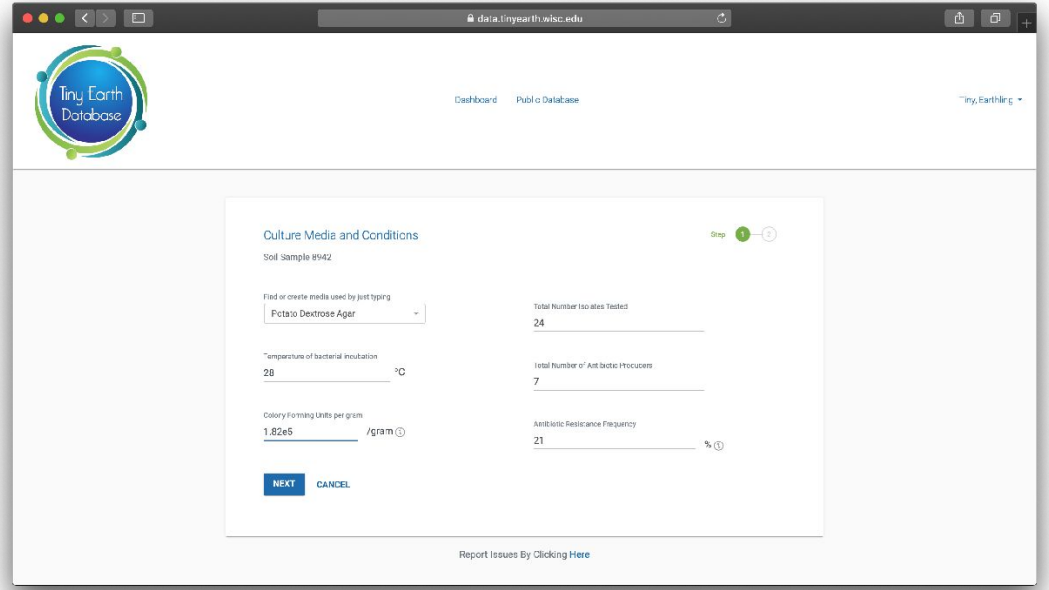
On the Soil Sample page, click “ADD CULTURE CONDITIONS”

First, select the media you grew your soil dilutions on. You may type a different media and click on it if your media is not on this list.

Be sure to fully spell out any media used not on this list.



# Enter Culture Conditions **Step 1: Media and quantity of isolates tested**




Next, enter:

- Temperature (in celsius) of incubation between the time you plated your soil dilution and counted CFUs
- Colony forming units (CFUs)/gram of soil. CFUs must be entered in scientific notation, for example 1.82e5
- Total number of bacterial isolates tested (aka screened against at least one ESKAPE safe-relative)
- Total number of antibiotic producers against at least one ESKAPE safe-relative

*Note: If isolates were tested for antibiotic resistance, against streptomycin for example, record the percent resistant out of those tested and indicate which antibiotic was used on Step 2.*

# Enter Culture Conditions
# **Step 2: Photos of dilution plates and descriptors**

You are encouraged to upload photos of your dilution plates here.

Click “UPLOAD PHOTOS”

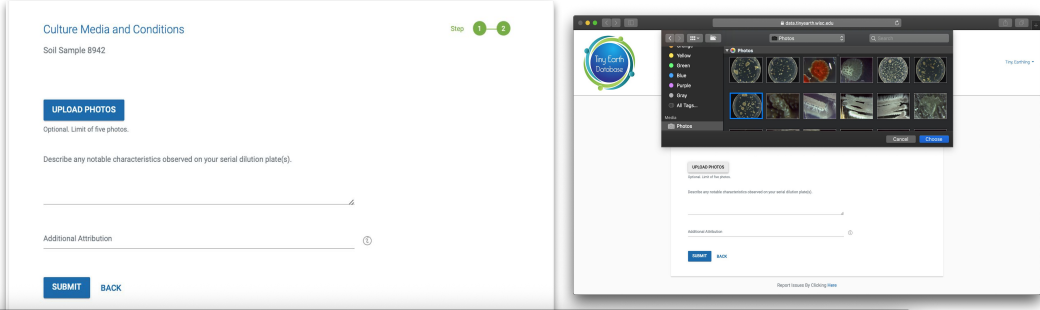
Describe the photo, noting specific characteristics or unique qualities.

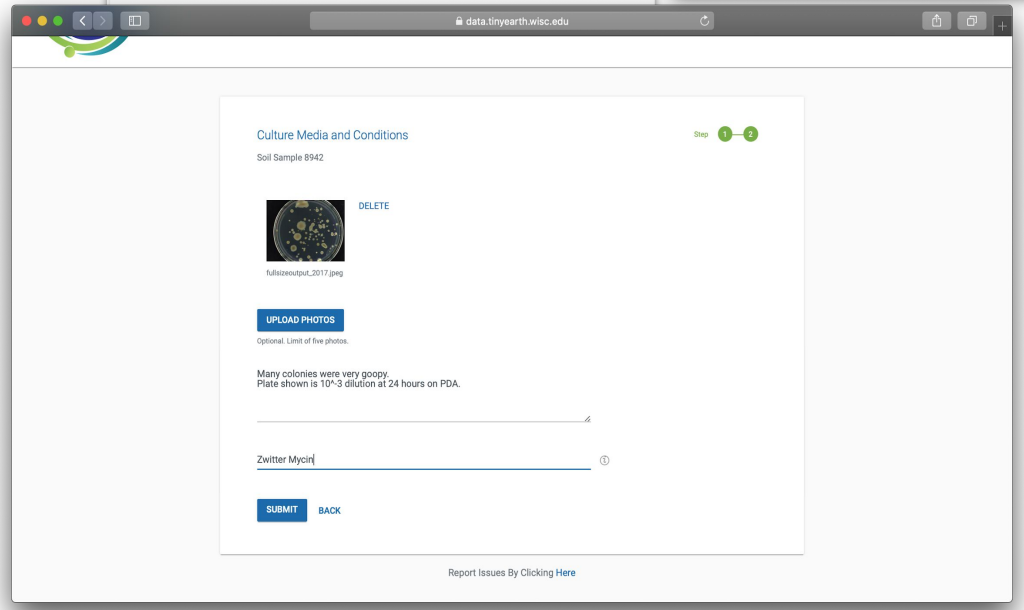
Some things to include:

- Hours or days of growth
- Dilution factor

Include your partner's name in “additional attribution” if another person was involved with making or using these isolates

Click “SUBMIT”



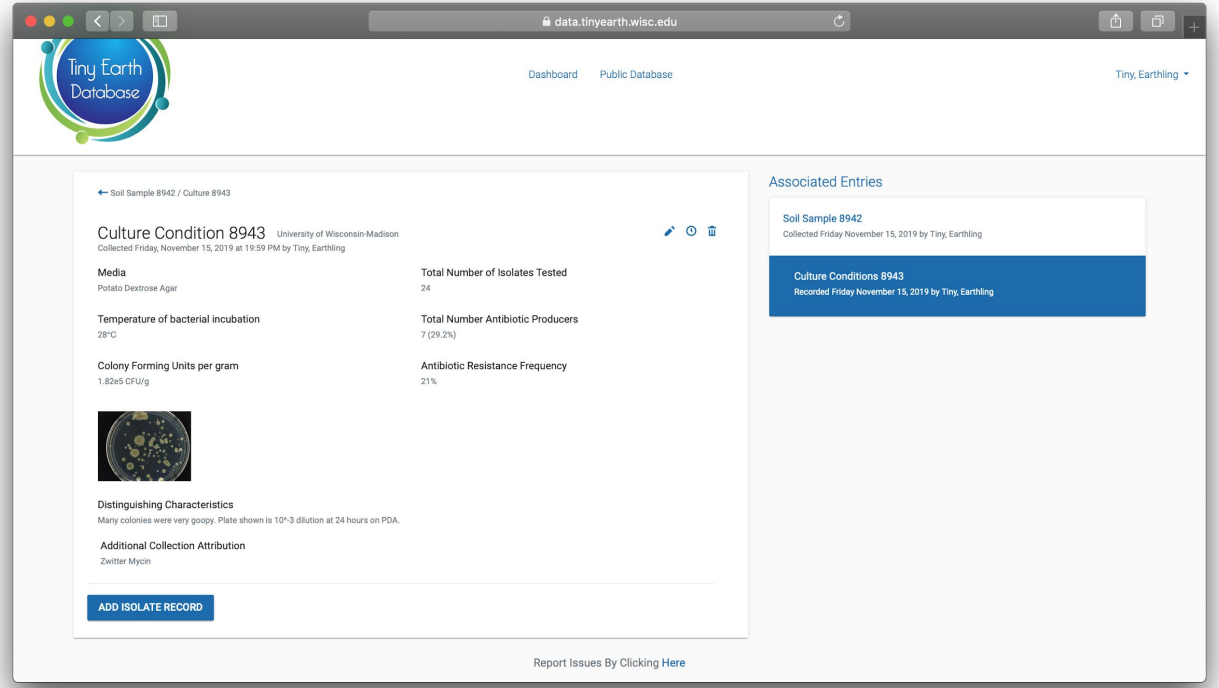



# Enter Culture Conditions
# **Finished Page**

Again, you can always edit or delete Culture Condition entries.

You may also go back to the Soil Sample entry and create multiple culture conditions under one soil sample.

Click “ADD ISOLATE RECORD” to enter data for single isolates.



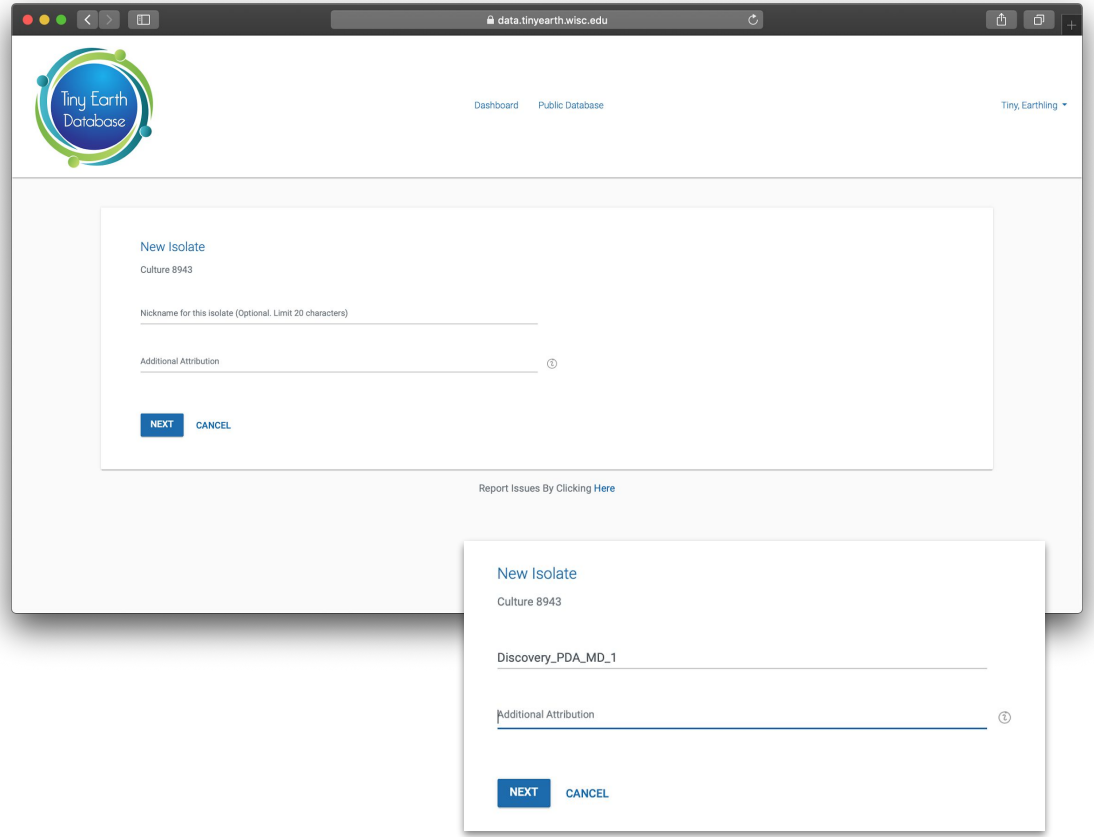
# Enter New Isolate Record

Enter a “nickname” for your antibiotic-producing isolate. You may call it whatever you’d like.

Once your isolates are published, the nickname you give it will be accessible to the public. Choose something that helps you identify your isolate. The Database will give your isolate a number which will be linked to this nickname. Keep both identifiers for your records.

Include an “additional attribution” if another person was involved in finding this isolate.

Click “NEXT”



# Enter New Isolate Record
# **ESKAPE Test**

Select appropriate box for ESKAPE screen.

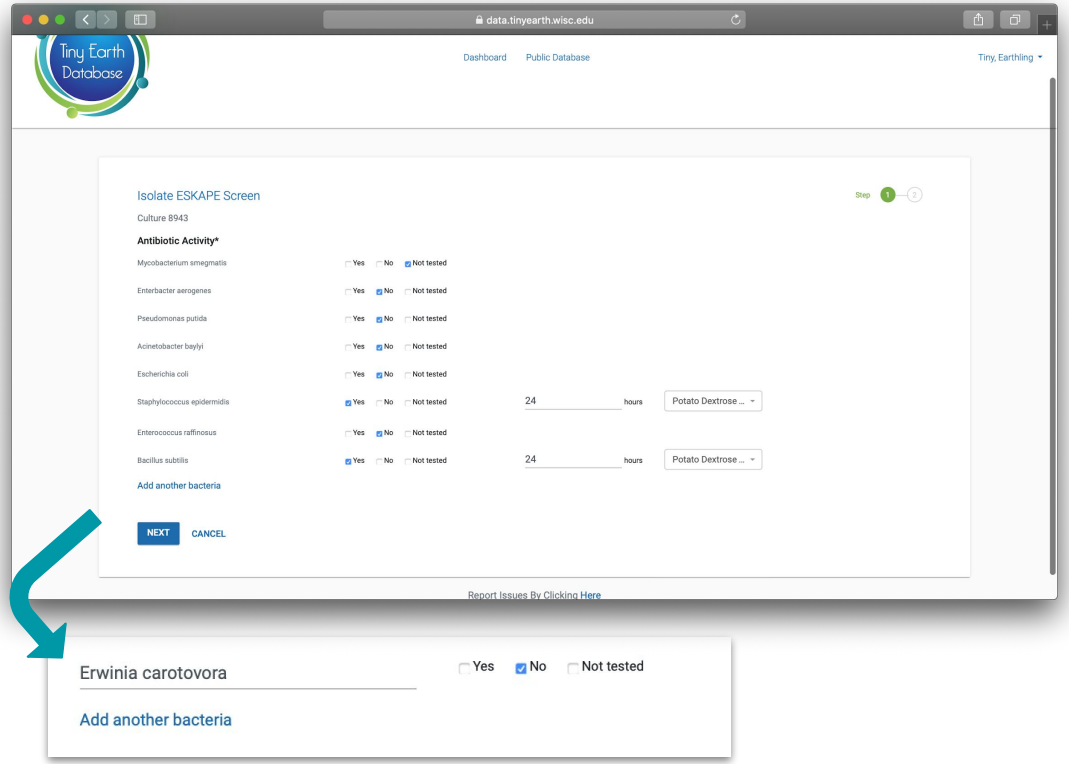
If the isolate showed antibiotic activity against a specific ESKAPE, click “yes” and enter the hours between plating and reading the screen and the media screened on.

If the isolate did not show antibiotic activity, click “no”

If an ESKAPE was not tested, click “not tested.”

If you screened your isolate against a bacteria that is not on the list, click “Add another bacteria” and enter the species and screening results.

Once finished, click “NEXT”



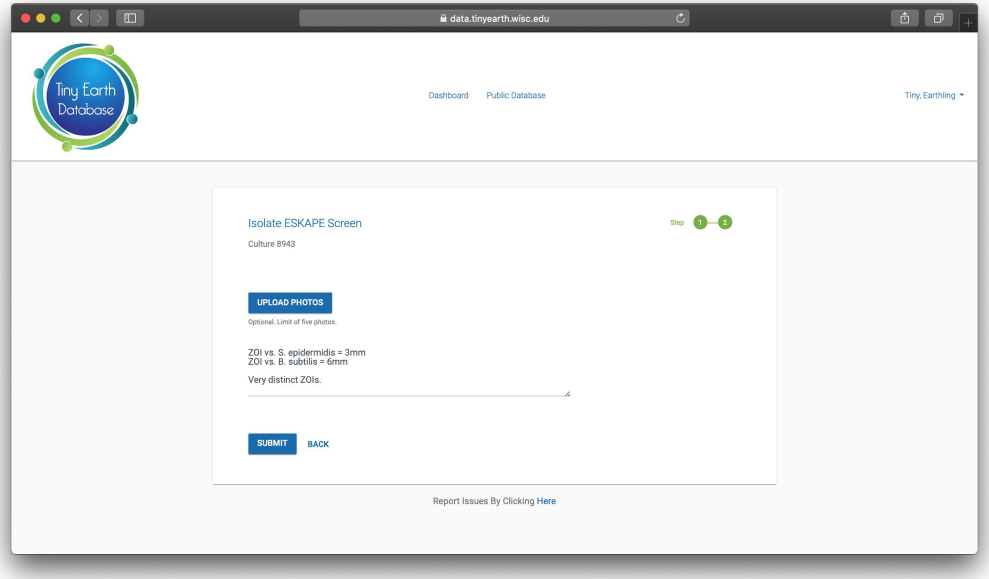

Note: Knowledge of which ESKAPEs your isolate has been screened against will help the Tiny Earth Chemistry Hub greatly. Thank you!

# Enter New Isolate Record **ESKAPE Test**

On Step 2 of Isolate ESKAPE Screen, enter any defining characteristics of the screen, such as size of zone of inhibition (measured from edge of isolate growth to furthest point of the zone).

Upload photos of the screen plates.

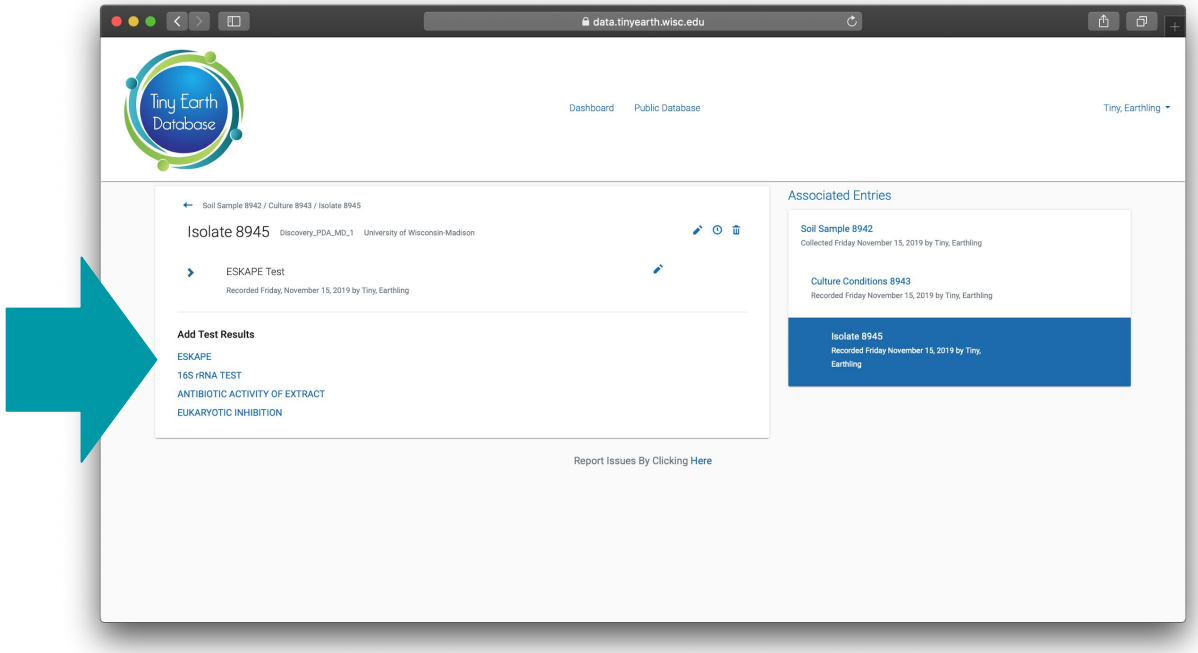
Click “SUBMIT”



# New Isolate Record
# **Data Entry Options**

Once you have entered Isolate ESKAPE Screen data, you can also enter

- 16S rRNA PCR results,
- Chemical extraction results, and
- Eukaryotic test results.



# New Isolate Record: **16S rRNA PCR Results**

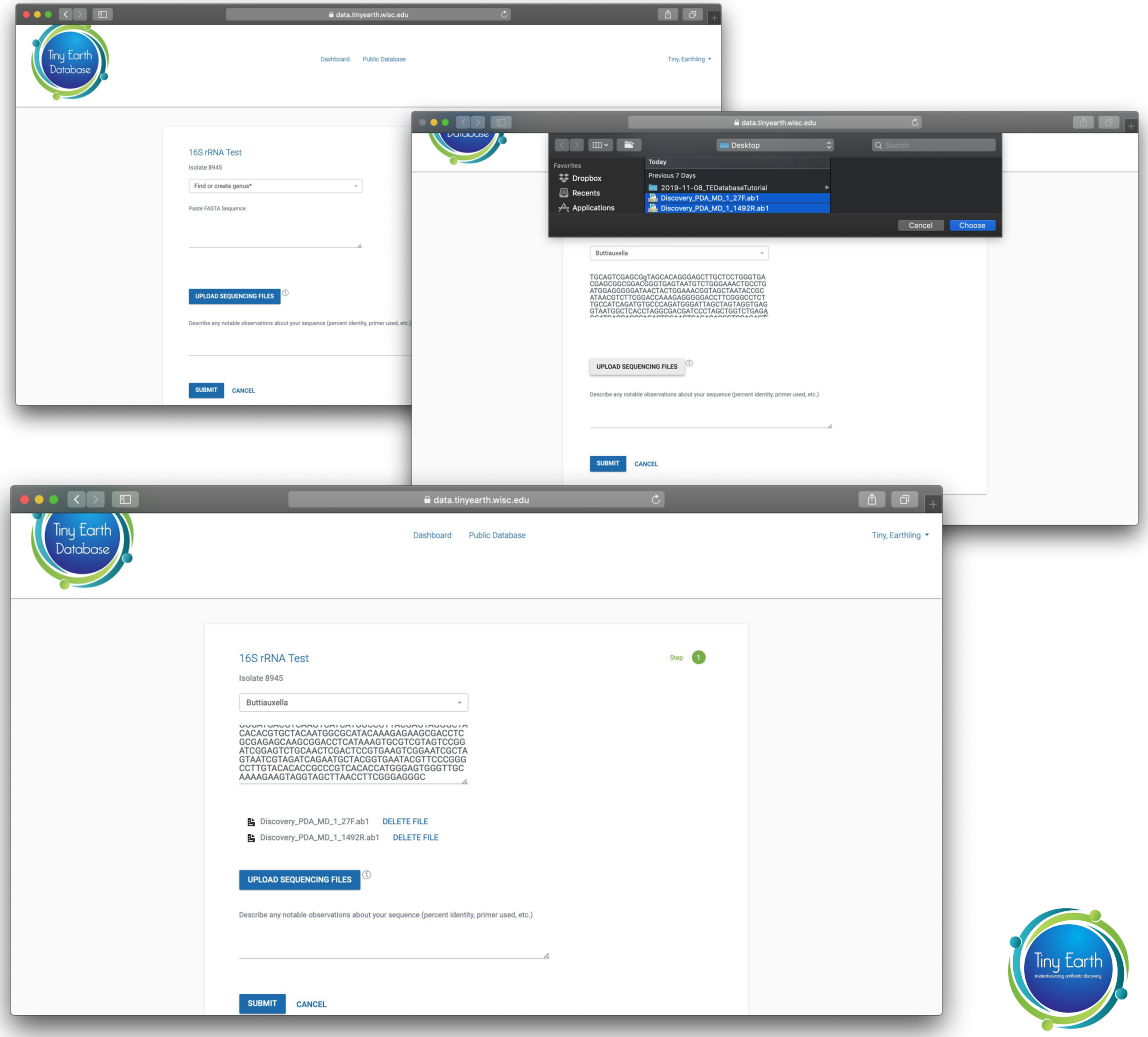
Clicking on “16S rRNA TEST” under “Add test results” will bring you to this page.

Enter the genus of your isolate by choosing from the dropdown menu or typing in a genus that is not present.

Copy and paste the 16S rRNA sequence

Click “UPLOAD SEQUENCING FILES” to submit the original files from 16S sequencing. For example, upload the actual sequence file, not a Word document with the sequence.

Click “SUBMIT”



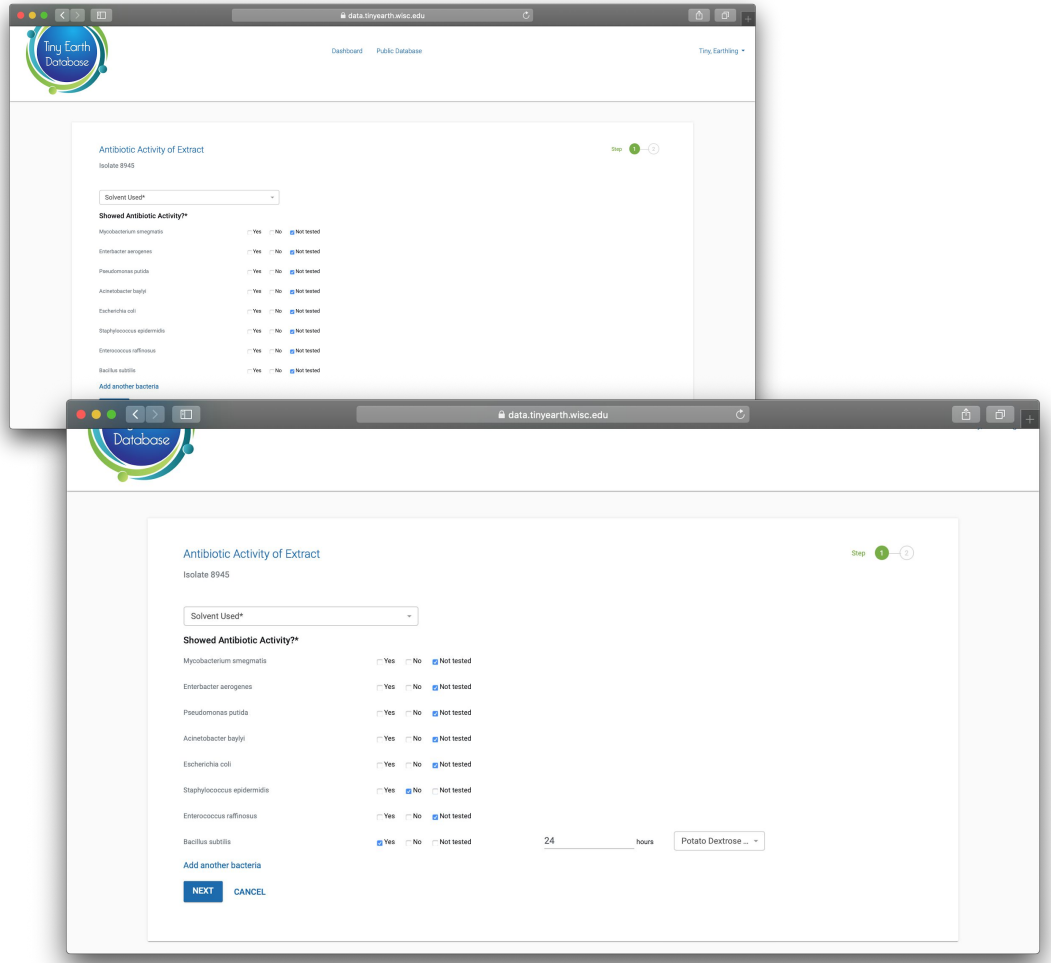
# New Isolate Record: **Step 1: Antibiotic Activity of Extract**

Back on the isolate homepage, you will see a link to “ANTIBIOTIC ACTIVITY OF EXTRACT” under “Add test results.”

Here, select the solvent used for extraction, or enter a different one if yours does not appear on the dropdown menu.

Select appropriate boxes for screening with the chemical extract, following the same procedure as the “Isolate ESKAPE Screen”

Click “NEXT”

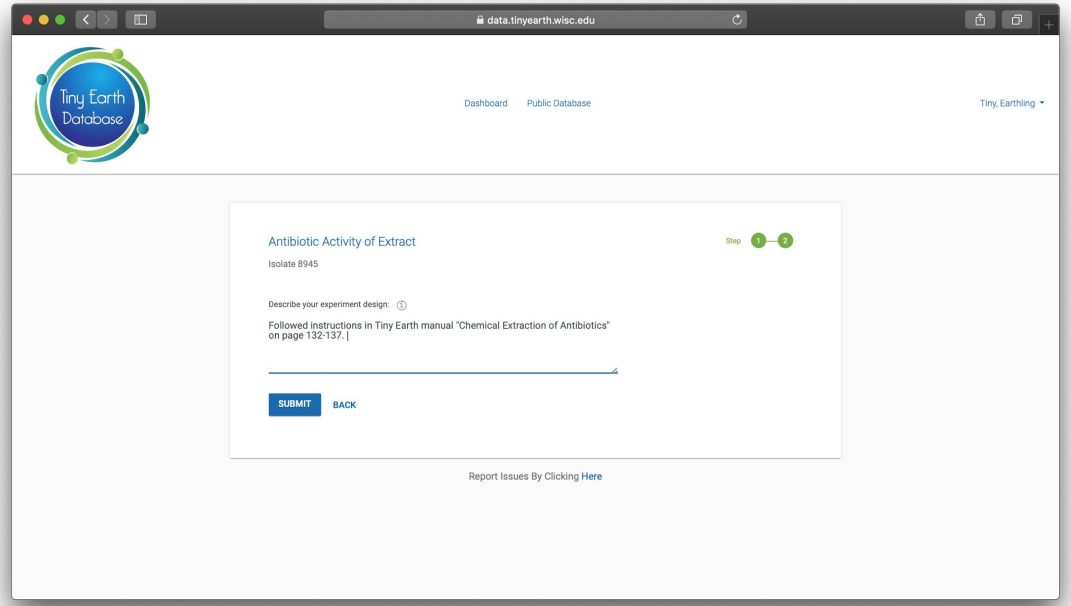


# New Isolate Record: **Step 2: Antibiotic Activity of Extract**

Describe your procedure for chemical extraction on Step 2 of “Antibiotic Activity of Extract.”

Note if there were any deviations from the protocol described in the Tiny Earth Manual.

Click “SUBMIT”



# New Isolate Record: **Step 1: Eukaryotic Inhibition**

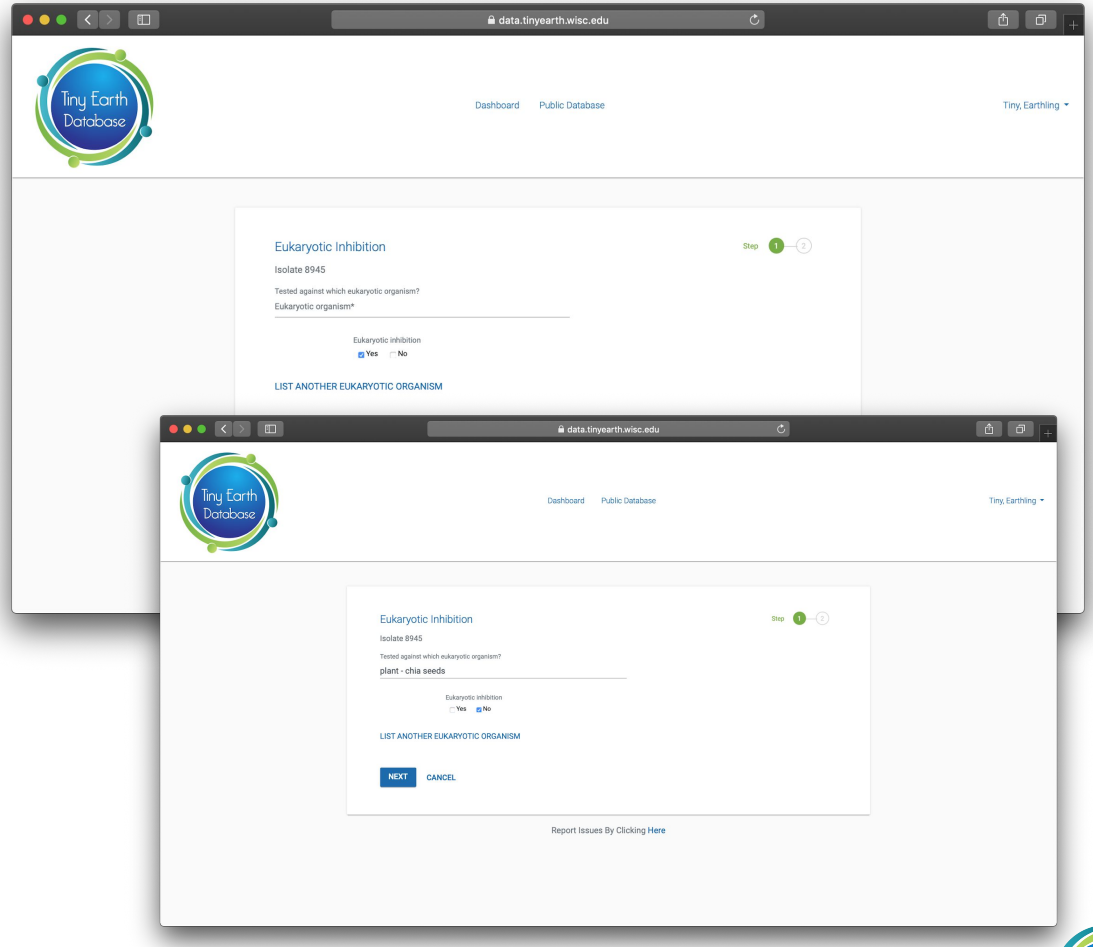
Back on the isolate homepage, you will see a link to “EUKARYOTIC INHIBITION” under “Add test results.”

List the organism that your isolate or extract was tested against.

Indicate “yes” or “no” if there was inhibition.

List as many organisms as you tested.

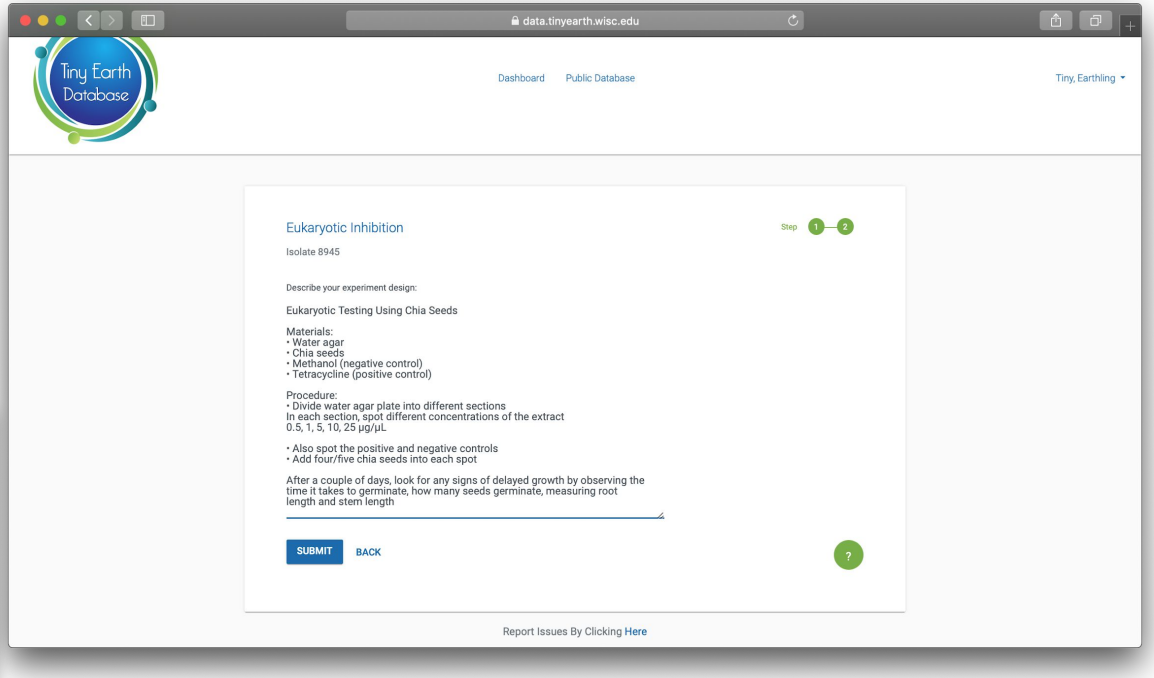
Click “NEXT”

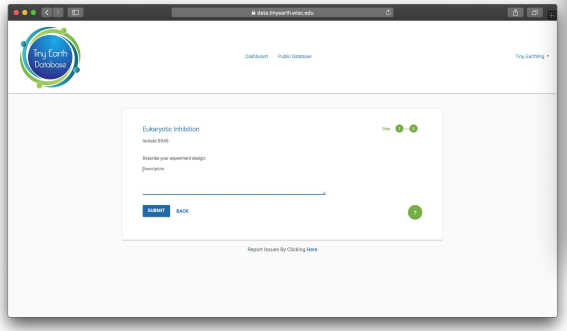


# New Isolate Record: **Step 2: Eukaryotic Inhibition**

Describe, in detail, your experimental design on Step 2 of “Eukaryotic Inhibition.”

Click “SUBMIT”



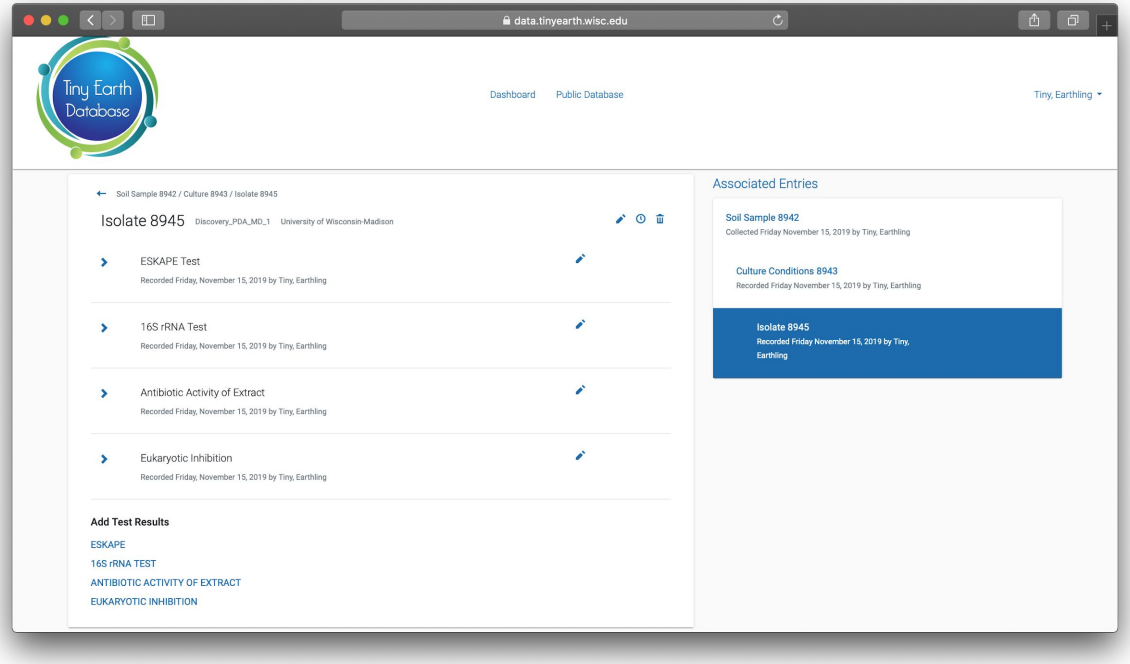



# Complete Isolate Record Page

All isolate test records will appear under the isolate's page.

Click on "Soil Samples" or "Culture Conditions" to add more sample data and information.

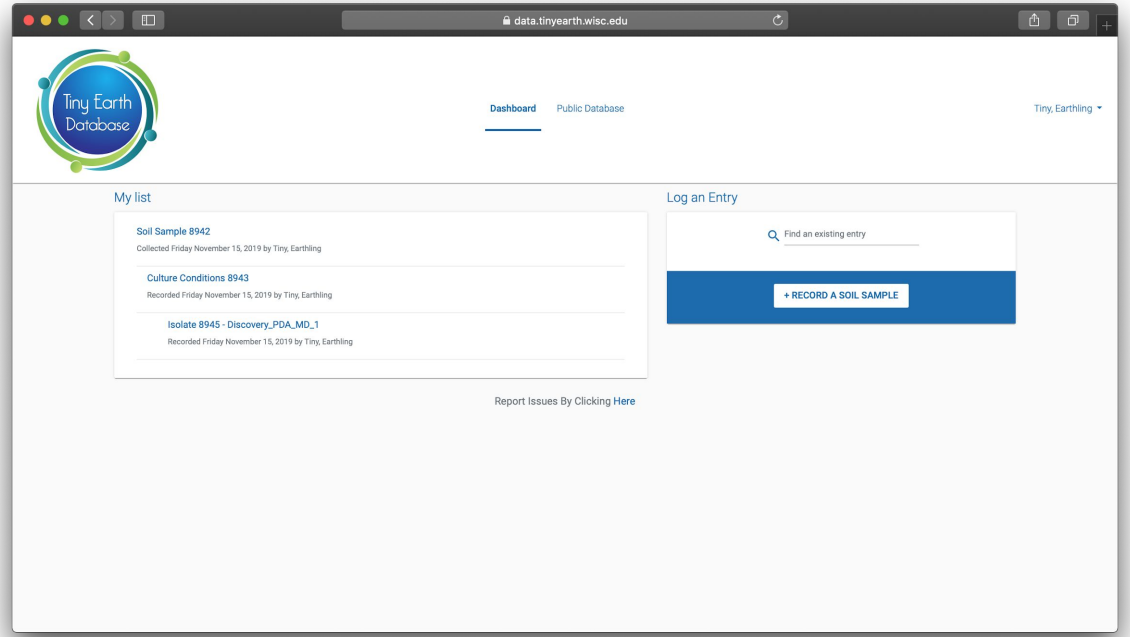
Click on "Dashboard" to see all samples you recorded in the database.



# The Finished Dashboard

Congrats! You have successfully entered soil data, culture conditions, and isolate test results on the Tiny Earth Database.

You are able to enter multiple Culture Conditions under one Soil Sample and multiple Isolates under each Culture Condition.




Tiny Earth website: tinyearth.wisc.edu
Tiny Earth Database website: data.tinyearth.wisc.edu

Questions? Email tinyearth@wid.wisc.edu