1 Million Turtles
COMMUNITY CONSERVATION PROGRAM

Term 3, Lesson 2

Water Quality Testing

Learning Objectives:

1. Conduct water quality testing;
2. Collect water samples for eDNA analysis.

Photo credit: Dr. James Van Dyke

Environmental DNA (eDNA)

Environmental DNA (eDNA) refers to genetic material (DNA) shed by organisms into their environment.

eDNA allows us to monitor native and invasive species and conduct broad-scale biodiversity monitoring.

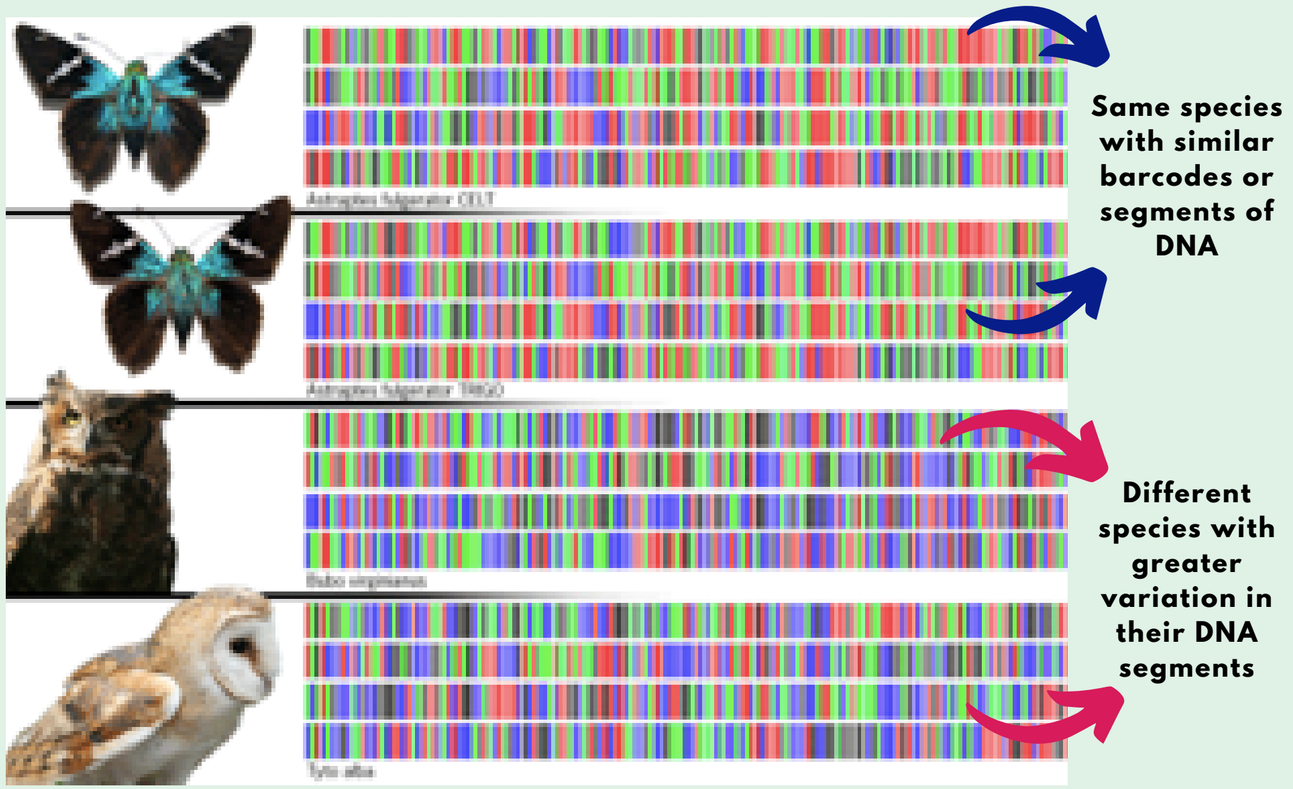
Benefits of eDNA Sampling

- Eliminates the need to directly observe or capture organisms.
- Less invasive and cheaper than traditional sampling methods.
- Can detect species earlier.
- Can detect species that are low in abundance or cryptic.
- Can be used to detect species in areas that are difficult to access with traditional sampling methods.
- Scientists can study many areas quickly and easily.
- Sampling can be conducted in any weather.
- Fosters community engagement as it is a citizen science friendly method.

How do we target what is in the water?

DNA barcodes - a specific gene region (DNA segment) is targeted for the organisms that we are interested in detecting.

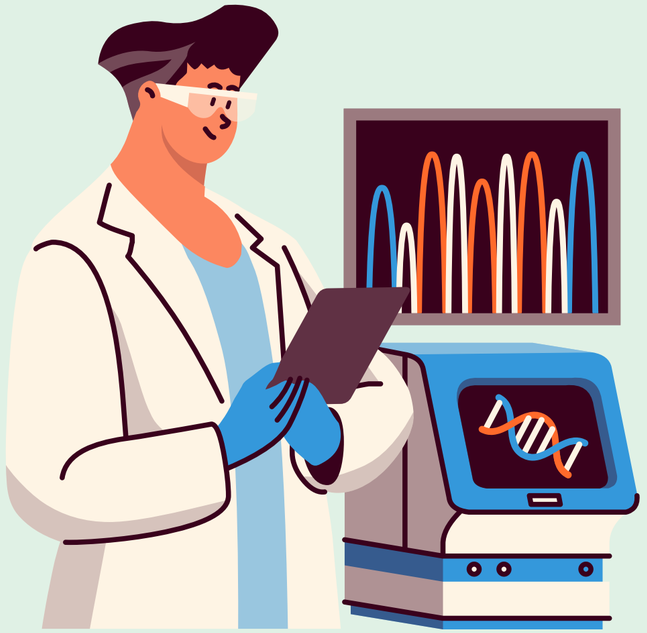
The DNA segment can have small variation among individuals of the same species, but greater variation for different species.



How do we find out who is in the water?

In the laboratory:

1. DNA fragments in the water samples are amplified using PCR. This process is used to make many copies of the specific DNA region.
2. Scientists then read the DNA sequences.
3. Species are then identified by comparing the DNA fragments to a database with reference sequences to determine which animals DNA are present in the sample and the sampling site.



Classroom Activities

Activity 1 - Video: What is eDNA? (EnviroDNA)

https://www.youtube.com/watch?v=TQdTV1rAlWY&t=120s

Video: How is eDNA sampled? (Odonata Great Australian Platypus Search)

https://www.youtube.com/watch?v=30G16kOFN7U&t=248s

Classroom Activities

Activity 2 - Worksheet

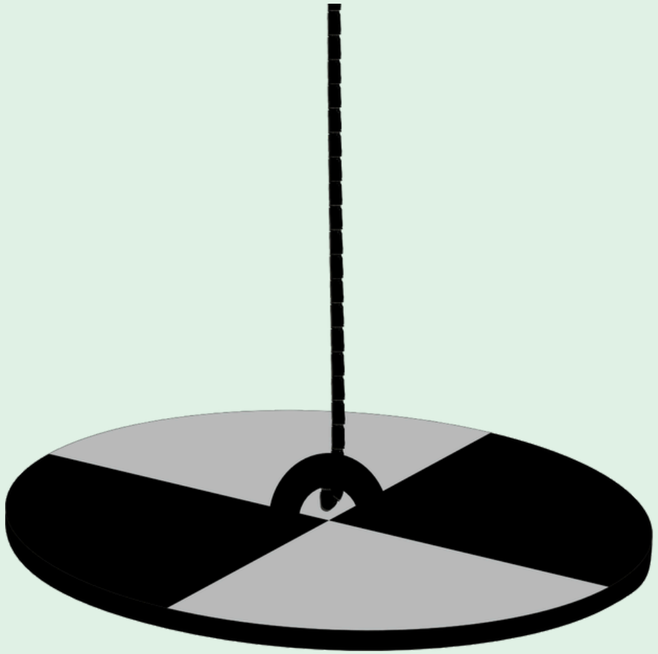
Research the species listed in the worksheet and circle those that may be detected in the eDNA sample you collect from your local wetland.

Classroom Activities

Activity 3 - Make your own Secchi disc

Make your own secchi disc!

https://www.youtube.com
/watch?v=sbQ2nVt_5GY



Wetland Activities

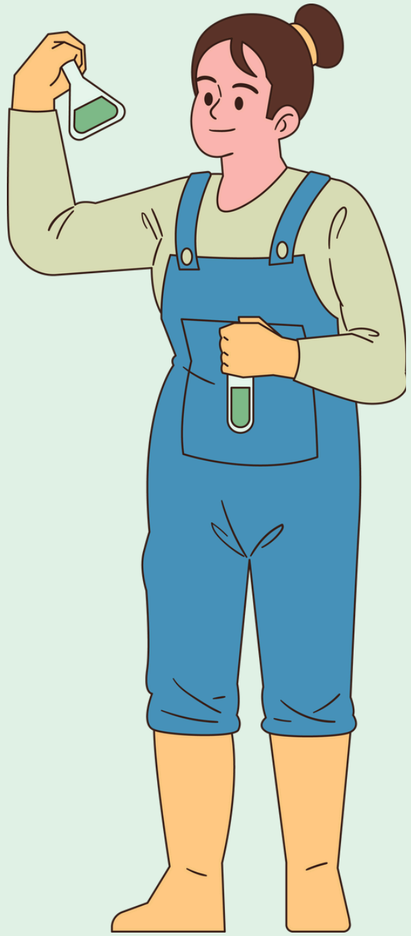
Activity 1 - Water quality testing

- In groups, conduct water quality testing at pre-selected locations around your local wetland.

Wetland Activities

Activity 2 - eDNA sampling

- Collect a sample of water from the wetland to be sent for eDNA analysis.
- Wear gloves when collecting the sample to prevent cross-contamination.



Classroom Activities

Activity 4 - Experimental Design

- Revisit your experimental design and your research question.
- Graph your data, based on your research question.
- Interpret your findings and accept or reject your hypothesis based on your results.