LESSON 3
Moss Biology and Diversity

OBJECTIVE
Learn about moss biology and diversity by examining locally collected specimen under a microscope.

TIME AMOUNT
1 Hour

MATERIALS
- Printed images (last page)
    - Close up of moss (feel free to use other photos than the ones provided)
    - Microscope view of a tardigrade
- Microscopes
    - 1 per table
    - Nature journals + pencils

PROCEDURES
0-15 min
Prompt students to guess what is on the printed page (moss).
- Students may think *trees* since it is zoomed in super close, so why do they think it is a tree? Have students explain.

Prompt students: What are mosses? Have you noticed them on the trail?
- **Mosses** are ***non-vascular*** plants, meaning that they do not have the same type of cells like other plants.
    - **What does vascular mean?** Vascular is a type of tissue used to transport water, sap, and nutrients throughout a plant the plant version of human veins that carry blood.

Mosses are **often green** because of the **chlorophyll contained within them** that helps them transform light into food/energy.
- **What do we call the process of turning light into energy?**
    Answer: photosynthesis

Since mosses **do not transport water throughout**, they must absorb water directly from their surroundings (**like a sponge absorbs water**).

Prompt students: So what type of environment would be good for mosses?
- Areas that maintain humidity and general moisture (i.e., a lot of rain or very humid when not raining).
- **Direct sunlight all the time?**
    - No. Intermittent periods of light (forests with tree canopy) or in low light areas like cave entrances are best.

Prompt students: Based on what we have seen on our hikes, do we think there are a lot or a few types of mosses (species)?

Answer: There are **more than 10,000 species of moss around the world.**

Prompt students: Do mosses have roots?

Answer: no.

Why? Roots are a structure *used in vascular plants* to transport nutrients from the soil, up into the plant. Mosses do, however, have ***rhizoids*** which are root-like structures that anchor the mosses to rocks, trees, and dirt.

Prompt students: How do we think mosses create more mosses?

Answer: mosses **do not produce seeds**. Instead, mosses produce **spores** (like fungi).

Mosses **do not have flowers.**

Mosses **do not have fruits.**

Mosses are **made of two parts:**

Green fuzzy

Brown sprouts

Prompt students: Since mosses are so small, do we think any animals use them for a home?

Answer: Yes. Many microscopic organisms live inside mosses, including **Tardigrades** (water bears or moss piglets).

Near-microscopic animals (can still see with naked eye, but just BARELY) with **long, plump bodies and scrunched-up heads**. They have **eight legs**, and **hands with four to eight claws on each**. While strangely cute, these tiny animals are **almost indestructible** and can even survive in outer space (livescience.com).

15-60 min

Now that we know a bit more about mosses, let's take a look at some found at the Clifton Institute (or wherever you are exploring)!

Objective 1

How many types of mosses can you find?

a. Look at the structure and color of each moss sample.
b. Draw what you see.

Objective 2

Can you find any organisms in the moss?

c. Draw what you see.
d. Are there tardigrades? Or something else?
e. Make sure to indicate (write or draw) which moss sample your organism came from.