

BEFORE THE UNIT BEGINS SECTION

Welcome to **Matter and Energy in Ecosystems**. We have prepared several documents to help you organize this three-week unit, and we encourage you to read over them before you begin teaching the unit. The documents below can be found in the “Before the Unit Begins” section. **Any additional supporting materials (including anchor charts and printable or downloadable files) referenced in a lesson can be found in the “Supporting Files” section for that day’s lesson.**

- The **Pacing Chart** provides a daily overview of the mini-lessons, inquiry circles, science Investigation, and the applicable standards.
- The “**Lessons at a Glance**” document provides a snapshot of the **materials** you will need to prepare for each day. The full instructions for setup are in each day’s lessons. We highly recommend that you **read over each day’s lesson ahead of time**.
- The **Science Language** section contains **science language picture cards** and an alphabetical list of the science language for this unit. We encourage educators to **use new science language in context** as it is introduced in each day’s lesson. **The teacher will need to print color copies of the picture cards before Day 1 so that they are ready for introduction with each lesson.** The picture cards are also suitable for building reference-word walls to meet all learners’ needs.
- The “**Food Waste Resources**” spreadsheet lists text and media resources for the inquiry children will conduct. This spreadsheet is available in the “**Before the Unit Begins**” section.

NOTES:

- Each science investigation contains **Background Information for the Teacher**. This is provided **for the teacher’s reference only** and is not intended to be taught as part of the lesson, as some of the information may be above the grade level of your learners.
- Throughout the unit, **children will work in scientific teams** and assume scientific roles (with specific duties) within these teams. Suggestions for how to create teams are included in the Day 1 lesson.
- **Winogradsky Columns**. Bacteria and other microorganisms we cannot see play a critical role in the decomposition of organic matter. However, a traditional Winogradsky column takes a long time to stratify. For this reason, we have chosen a modified version that will allow learners to observe physical change in a shorter amount of time and provide evidence of the existence of these unseen decomposers.
- The modified Winogradsky columns, hereafter referred to as “bottles,” **will need to be prepared 3 days ahead of time**. We suggest setting them up on a Friday so that the bottles are ready for introduction to the class on a Tuesday.
- **IMPORTANT: The teacher should not reveal how the bottles were made or what they contain until Day 7, allowing learners to make inferences about what is happening.**
- **On Day 6**, the Elaborate section of the Guided Science Investigation includes instructions for making and using a red cabbage indicator to test for the presence of carbon dioxide. For convenience during field testing, we have provided pH indicator strips for testing (however, you are welcome to make and use a red cabbage indicator if preferred).

Elaborate (modified for the use of pH indicator strips)

1. *How do we know it was carbon dioxide?* Tell learners they will use the pH indicator strips to test for the presence of carbon dioxide.
2. Explain that the strip will turn bright or dark pink in the presence of acids. Some examples of acids learners are familiar with include lemon juice and vinegar. Carbon dioxide becomes a weak acid in water, and the pH strip will “indicate” if carbon dioxide is present.
3. Model how to dip the pH indicator strip for into a cup for a few seconds, then pull it out and watch for any changes .
4. Ask teams to test each of their cups with a different strip. *What happens to the strips?* (The pH strip dipped into the cup with sugar will turn pink, providing evidence of the presence of carbon dioxide.)
5. *Do you see any evidence that indicates microorganisms may be living in our bottles?* Accept responses. (Presence of bubbles.)