

FEEDING OUR PLANTS WITH SEA CUCUMBER FERTILIZER

Fertilizer recipe by Dako Natting (Marshall Islands High School)

LEARNING GOALS

By the end of the lesson, students will be able to:

- Use key vocabulary to explain how plants absorb nutrients (get food) from their roots
- Use sequential language to explain how to make and use fertilizer

Approximate time: 30 to 60 minutes

TEACHER BACKGROUND INFORMATION

When you take a close look at soil in the ground, you will see that it is alive. Many types of decomposers are living in the soil, breaking down organic material and turning it into nutrients to feed plants. There are insects, worms, snails, and many other invertebrates crawling around in the soil. These “shredders” work to break down organic matter—like leaves, manure, bark, roots and fruits—into tiny pieces.

Microorganisms also live in the soil. Our soil is full of these creatures, and they are so small that we need a microscope to see them. In fact, there are more microbes in one teaspoon of soil than there are people on our planet! Microorganisms decompose, or further break down, the tiny pieces of organic matter that were chewed up by the shredders. This helps the soil to better store water and air. Other microorganisms take nitrogen from the air and change it into food for plants. And still other microorganisms protect plants by attacking pests and diseases.

Fertilizers support healthy soils. By adding fertilizer to our garden plants, we are adding nutrients like nitrogen and potassium to the soil. Plants can absorb these nutrients through their roots. Additionally, these nutrients promote the growth of beneficial soil microorganisms to build organic matter in soil.

Fortunately, it is easy to make your own liquid fertilizer from sea cucumber! Making your own fertilizer is readily available, affordable, and environmentally friendly. This fertilizer will enrich your soil and reduce your need for chemical fertilizers and pesticides in your garden.

MATERIALS

Five-gallon bucket, knife, one sea cucumber, one-gallon container, 5 gallons of water, diagram of plant in soil (page 4), 9 word cards

Before class, write out directions for making and using sea cucumber, leaving blank the sequential words at the start of each sentence.

SEQUENCE

Activate Prior Knowledge	5 minutes	<p>Show diagram of plant in soil, just the side of diagram with plant. Ask:</p> <ul style="list-style-type: none"> • What do you see? Students will probably respond with a number of plant parts. Review plant parts (e.g., leaf, stem, root, flowers) • Does the plant need food? Where does its food come from? <p>Explain that today we're going to learn how a plant gets food from the soil and how to feed our plants with fertilizer</p>
Building Key Vocabulary (Word Wall)	10 minutes	<p>Introduce the following words on word cards: fertilizer, soil, invertebrate, microorganism</p> <ul style="list-style-type: none"> • Go over the meaning and model making a meaningful sentence for each word. • Label diagram using word cards <p>Explain how plants absorb nutrients in soil through roots and how fertilizer feeds plants by adding nutrients to soil (a) for plants to absorb and (b) to promote the growth of beneficial soil microorganisms.</p>
Hands On	15 minutes	<p>Introduce sequential words on word card: First, Second, Next, Then, Finally</p> <p>Review directions for making and using sea cucumber. Ask students to help you fill in the correct sequential words.</p> <p>As a class, follow the directions for making sea cucumber fertilizer.</p>
Wrap Up	5 minutes	<p>Review key vocabulary from the word wall and diagram.</p> <p>Ask students: How do plants get food from their roots?</p>

DIRECTIONS TO MAKE & USE SEA CUCUMBER FERTILIZER

Making Sea Cucumber Fertilizer

1. First, fill a five-gallon bucket with water.
2. Second, chop the sea cucumber into small pieces.
3. Then, add one quarter (1/4) of the sea cucumber to the bucket.
4. Finally, cover the bucket with the lid. Wait one to two months, stirring once per week.

Using Sea Cucumber Fertilizer

1. First, fill the one-gallon container with water.
2. Next, add half (1/2) a cup of fertilizer to the container.
3. Finally, water the soil around your plants with the water and fertilizer solution.

EXTENSION & INTEGRATION IDEAS

Math + Language + Science	Ask students to keep a daily observation journal to measure and record the growth of their plants, as well as the frequency and amount of fertilizer they use. Students can also record weather data, like rainfall, temperature, and wind speed.
Science + Math	Help students to design and run an experiment to find the ideal amount of fertilizer for a type of plant. For example, does a plant thrive best without fertilizer (control), fertilizer every day, or fertilizer once a month? Make sure to write a hypothesis before the experiment and a summary of findings at the end of the experiment to confirm or refute your hypothesis using data on plant growth.
Language	Write a fictional story about the day in the life of a composter, like a worm or microorganism (see Diary of a Worm)
Math	Ask students to measure plant growth every day and keep observations in a journal Have students practice fractions when cutting the sea cucumber and converting measurements to other systems of measurement (e.g., gallons → liters) when making the fertilizer.

