



## The Big Four

### Lesson

#### Goals

Students will learn to identify the four basic necessities of life: sun, air, water and soil.

#### Objectives

Students will identify the four basic necessities of life through various growing experiments.

#### Standards

*Science: Life Science*

GR.2-S.2-GLE.1

GR.4-S.2-GLE.1

GR.4-S.2-GLE.3

GR.5-S.2-GLE.1

**Total Time** – 60 minutes (day one), 5 minutes per day for 2 weeks

#### Materials

- Radish seeds
- Lettuce seeds
- Germination mix
- Clay
- Water
- Salt
- Grow lights or south-facing window
- Growing containers

#### Did you know?

A cucumber is made up of 96% water.

#### Method

##### Introduction (15 minutes)

1. Ask the class to try to think of the four things that are essential for life.
2. Discuss with class that life depends on plants, which need soil, water, sunlight and air in order to grow. To be good gardeners we have to pay attention to what plants need in order to grow. If we care for them, they will grow to be healthy and give us healthy food to help us grow.
  - a. You can show the class the image at the end of the lesson to help them understand how important soil, water, sunlight and air are to everything we eat.

##### Activity (35 minutes)

1. Explain to the class that they are about to do various experiments to determine the importance of soil, water, sunlight and air.
2. Break the class into four groups.

3. Before doing the growing experiments, give each group a complex food that they might typically eat (pizza, hamburger, etc). Give the group five minutes to trace the food back to sun, air, water and soil.
4. Explain to the class that they are going to be doing a scientific experiment today. During a scientific experiment it is important to only change one variable because then we can figure out what is causing a change. It is also important record what you do (methods), what you think will happen (hypothesis) and what will happen (results).
5. Have each group do one of the following:
  - a. Group One: Plant two containers of radish seeds. One with many and the other with only a few. The soil, water and light should be the same for both containers
  - b. Group Two: Plant two containers of lettuce. One will always be watered with regular water and the other with salt water. The amount of seeds, soil and light should be the same for both containers
  - c. Group Three: Plant two containers of lettuce. One will be kept in the dark (i.e. a closet) and the other in normal growing light. The amount of seeds, soil and water should be the same for both containers.
  - d. Group Four: Plant one container of lettuce in germination mix and the other in clay. The amount of seeds, water and light should be the same for both containers.
6. Have students write out their methods and what they think will happen to the different containers and why (this is the hypothesis). Make sure the students also write down how they will know if they are right or wrong.
7. Have the students check on their experiments regularly. The containers will need to be watered daily. When watering, have the class record any changes, including a simple drawing of the two containers. The salt water should be prepared beforehand with the help of a teacher.

### **Two Weeks Later**

8. After carefully watering the containers and recording the changes, have write down what happened in their experiment. Have one person from each group explain their experiment and what happened. Was the group right in their hypothesis?
9. Discuss with the class what these experiments tell us about soil, water, sunlight and air.

### **Snack & Conclusion (10 minutes)**

1. Have the class try to think of a living thing that can survive without air, sunlight, water and soil (anaerobic bacteria live without air, fish can live without soil, deep sea creatures live without sunlight). In what ways can we ensure that our garden plants are getting enough of the Big Four?
2. Have a healthy snack (such as the Carrot Sunshine Yogurt Salad below) and discuss how each part of the snack relies on the Big Four. The image at the end of the lesson may be helpful for this discussion.

### **Assessment Tools**

- Participation
- Hypothesis
- Continued care and recording

### **Possible Modifications and Extensions**

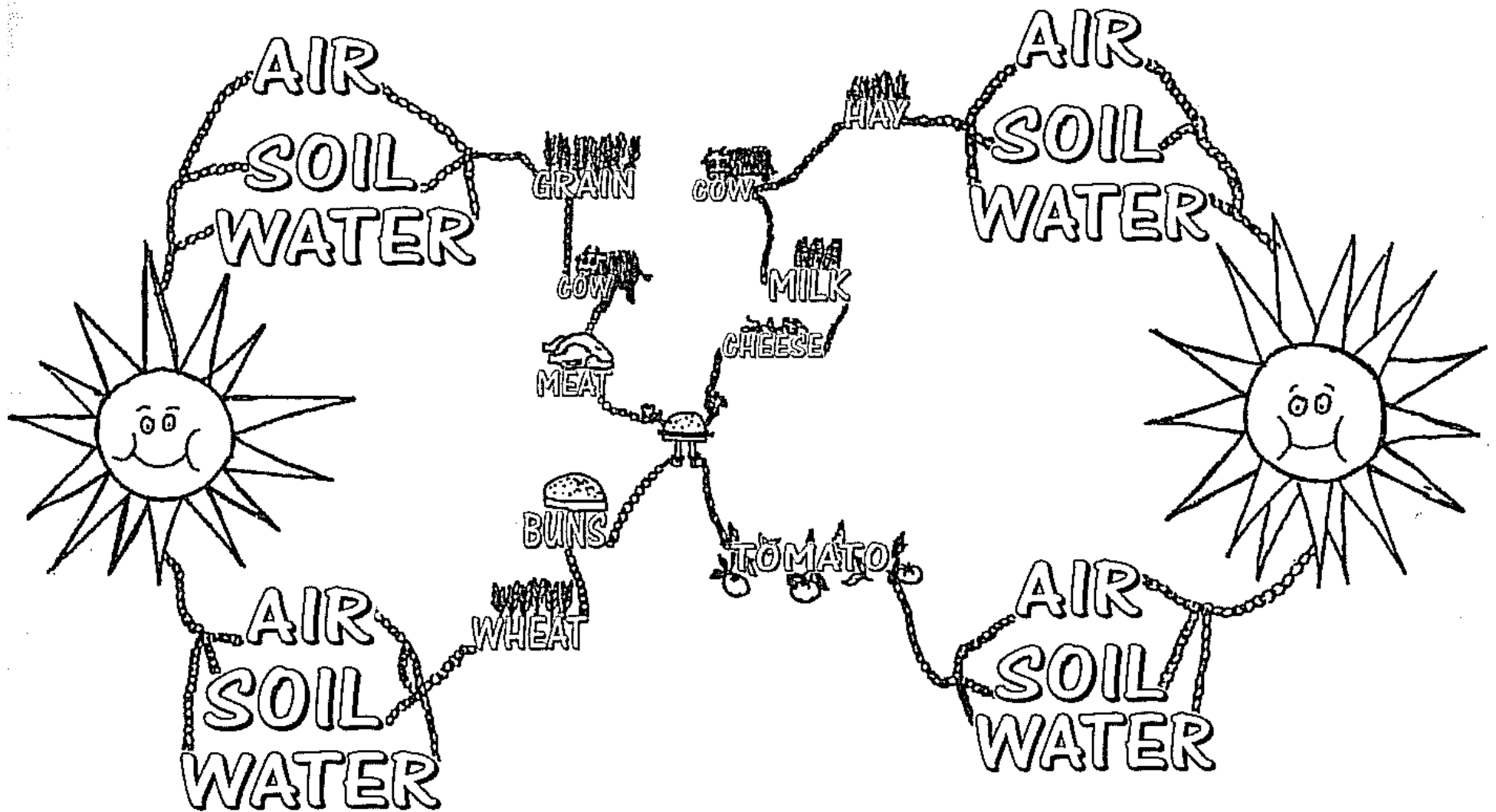
- This is a good introduction to what plants need before starting plants in the classroom.
- There are many different types of experiments that can be done. Get creative!
- For older grades, make the connection to photosynthesis and the importance of the Big Four during that process.
- For older grades, make a connection to use of resources and climate change.
- Google images of living things that can survive without the Big Four (anglerfish are one of the weirdest).

### **Carrot Yogurt Sunshine Salad**

- Carrots, grated
- Apples, diced
- Celery, diced
- Almonds, chopped
- Pineapple, chopped
- Raisins
- Vanilla yogurt
- Lemon juice
- Honey
- Salt and pepper

Preparation (15 minutes): Mix carrots, apples, celery, almonds, pineapple and raisins in a large bowl. Wisk together the remaining ingredients and pour over the salad. Lightly mix all together, eat and enjoy!

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**Source**

Jaffe, Roberta, and Gary Appel. *The Growing Classroom: Garden-based Science*. South Burlington, VT: National Gardening Association, 2007.