

# Soil Formation & Edible Horizons

Student Name: \_\_\_\_\_

All soil is made up of solid materials (sand, silt, clay) and organic matter, just in different quantities depending on their location and CLORPT factors. CLORPT stands for Climate, Organisms, Parent Material, Time and Topography. These five soil factors affect all the soils on the planet. Soil horizons form over hundreds, thousands, and even millions of years. It is a process we can see *after* it has happened, but not in action.

## Part I: Soil Horizons Forming in the Blink of an Eye

Observe and record what's happening to the salad dressing mixture as it settles out. Your teacher will announce the passing of 30 seconds. Every 30 seconds describe in words or by drawing a picture what is happening in the chart below. Each 30 seconds is equivalent to approximately 100 years of soil horizon formation. Calculate the equivalent amount of years at each 30 seconds during your observation.

| Time  | Observation |
|---|-------------|
| 30 seconds<br>What is the equivalent in years? _____            |             |
| 1 minute<br>What is the equivalent in years? _____              |             |
| 1 minute, 30 seconds<br>What is the equivalent in years? _____  |             |
| 2 minutes<br>What is the equivalent in years? _____             |             |
| 2 minutes, 30 seconds<br>What is the equivalent in years? _____ |             |
| 3 minutes<br>What is the equivalent in years? _____             |             |
| 3 minutes, 30 seconds<br>What is the equivalent in years? _____ |             |
| 4 minutes<br>What is the equivalent in years? _____             |             |
| 4 minutes, 30 seconds<br>What is the equivalent in years? _____ |             |
| 5 minutes<br>What is the equivalent in years? _____             |             |

## Part II: Gallery Walk

- 1) Find a partner who will work with you on the remaining parts of this project.
- 2) There are two different sets of Soil Information Cards that are hung on the wall in sequential order. One set of cards describe the soil horizons and their composition. The second set describes the soil forming factors in detail (CLORPT). The first three cards in each set are identical to provide some background information.
- 3) One partner will go to the soil horizon information cards and the other will go to the soil formation factors cards.
- 4) As you read through the cards, be sure to record the information below. Once you have completed taking notes on your set of cards, work with your partner to exchange the information that each of you recorded from your different topics. During the exchange of information, each partner should be describing what they learned from their sets of cards, not just having their partner copy what they wrote down.

### General Questions (Cards 1-3)

- 1) What is soil?
- 2) What is a soil horizon?
- 3) What is a soil profile?

### Soil Formation Cards

- 1) How does soil form?

| <b>Soil Forming Factor</b> | <b>Description</b> |
|----------------------------|--------------------|
| CL- Climate                |                    |
| OR-Organisms               |                    |
| P-Parent Material          |                    |
| T- Topography              |                    |
| T-Time                     |                    |

## Soil Horizon Cards



| Horizon Name | Description |
|--------------|-------------|
| O            |             |
| A            |             |
| E            |             |
| B            |             |
| C            |             |
| R            |             |

*Fig.1 Huddleston, J., & Kling, G. F. (1996). Manual for Judging Oregon Soils (6th ed., p. 9). Corvallis, OR: Oregon State Extension Service.*

### **Review Questions:**

Complete the following questions to review concepts learned in today's lesson.

- 1) Explain how some horizons support plant growth better than others and how the color of the soil signifies the nutrient availability within the soil.
  
- 2) When looking at a soil profile, how do you distinguish horizons from one another?
  
- 3) With your partner, develop a mnemonic device to remember the order of the soil horizons (CLORPT is an example of a mnemonic device). Write down your mnemonic device and be prepared to share with the class.

### Part III: Edible Soil Horizons

1) Working in partners, one student from each partner group should collect the supplies from the teacher. You should have the following supplies:

- 1 Ziploc bag with 4 chocolate cookies
- 1 Ziploc bag with 2 chocolate graham crackers
- 1 Chocolate pudding cup
- 1 Vanilla pudding cup
- 2 Clear plastic cups
- 1 paper cup with 1/3 cup of chocolate chips

2) Each partner grabs one of the ziploc bags containing food items. The partner with the chocolate cookies will want to break up the cookies into large chucks by squeezing them in the bag. The partner with the graham crackers will want to break it up into tiny pieces by squeezing them in the bag.

4) Next, grab one of the clear plastic cups, this will hold your soil profile. **Don't mix up the ingredients until your teacher approves the cup at the end of the activity when you can eat it.**

5) In the bottom of the cup, divide the chucks of chocolate cookies between you and your partner and place them in your cup.

6) Then, divide the chocolate chips that you have in the paper cup amongst each of your cups.

7) The vanilla pudding will be next. Divide the pudding cup evenly between you and your partner and place it in your cup.

8) Add the chocolate pudding next, dividing it up the same way you did before with the vanilla.

9) Then, divide up the crushed graham cracker and add it to the top.

10) Now, using what you know about soil layers, without your worksheet, label each layer with the horizon it represents in order. Also, provide labels such as top soil, subsoil, parent material, etc.

11) Once your soil profile is complete with labeling done, raise your hand for approval from your teacher.

12) Your teacher will review the soil profile and provide you with a couple of organisms (gummy worms) for your soil and a spoon! Enjoy your soil profile!