

SOIL pH: FIELD WORKSHEET



Name: _____

Class: _____

Date: _____

CHECK OFF EACH STEP AS YOU ACCOMPLISH IT

1. Site Name: _____ Site Location: _____

2. BEFORE LEAVING FOR THE SITE (if you completed W-S-07, you may skip this section):

- a) ___ Mark each container with a unique ID.
- b) ___ Use the hammer and nail to poke a small hole in the center of the bottom of each sample container.

AT THE SITE (if you completed W-S-07, you may skip this section):

- ___ 3. Expose your study site by removing all vegetation and scraping off the top layer of soil to uncover a fresh layer.
- ___ 4. Using the trowel, begin digging downward into the soil. Attempt to keep the sides of the hole as vertical as possible. This will reduce incidents of collapse. The hole should be wide enough to reach your arm down with the container. We suggest starting with a diameter of 1 foot as the hole will inevitably narrow as it gets deeper.
- ___ 5. Continue digging until you see a marked change in soil texture, color, moisture, or composition. This means you have reached the second soil horizon and have thus completely exposed the first.
- ___ 6. Place the container against the side of the hole and press it into the soil. The puncture you placed in the bottom of the container will allow air to escape. You will know the container is full when soil starts coming out of the puncture hole.
 - a) If the soil is too hard and you are unable to press the container into the soil, lightly tap the hammer against the edges.
- ___ 7. Smooth off any irregular clumps from the top of the sample to create a flat face.
- ___ 8. Use the meter stick to measure the depth of the sample. Record it on the table. Also record the horizon number of your sample.
- ___ 9. Take 2 additional samples at this depth. Label the samples with the horizon number and the sample number.
- ___ 10. Continue digging until the second horizon is fully exposed. Repeat the sampling procedure (Steps 5-7).
- ___ 11. Repeat for as many horizons as feasible, until the hole starts collapsing and samples are impossible to take.

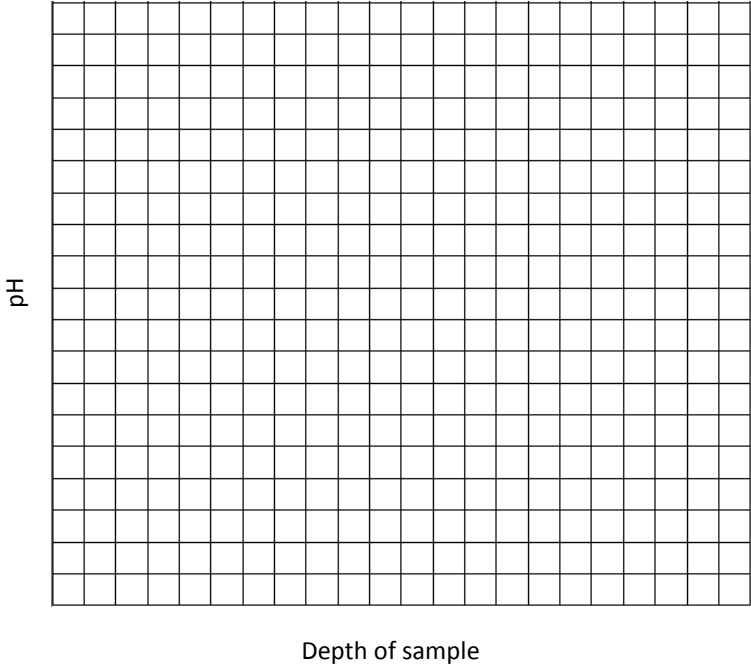
CHECK OFF EACH STEP AS YOU ACCOMPLISH IT

BACK IN THE CLASSROOM (if you completed W-S-07, you may skip to #14):

- ___ 12. Wait until your samples have dried. The simplest way to achieve this is to set the samples on a windowsill in your classroom. Check daily if the samples are dry. Unless your samples were quite moist, 48 hours should be plenty.
- ___ 13. Pour the sample through the sieve, collecting the throughput soil on the paper plate. Use your hand to *lightly* brush back and forth on the top of the sieve to break apart clumps push soil through. **DO NOT FORCE IT!** Rocks larger than 2mm will remain on top of the sieve.
- ___ 14. Measure out 40g of soil with the scale and place the soil in the beaker.
- ___ 15. Measure 40 mL of water in the graduated cylinder and pour into the beaker.
- ___ 16. Stir the sample with the stirring rod until it is thoroughly mixed, then let the sample sit.
- ___ 17. Wait until the sample separates out until an obvious supernatant forms (until most of the soil has settled onto the bottom and a clear liquid sits above it)
- ___ 18. Using whatever measurement of pH you have available to you (meter, pen, paper, strips), take the pH of the supernatant (the clear liquid above the soil) and record on the table.
- ___ 19. Calculate the average pH for each horizon and record on the table.
 - a) pH is logarithmic, so taking the average like you would normally won't work. If you feel comfortable, you may convert pH to hydrogen ion concentration using the formula: $[H^+] = 10^{-pH}$. For example, a pH of 7 has a hydrogen ion concentration of 10^{-7} . Once you have converted all the pHs of a single horizon, you may average the results normally. Convert the average back to pH using the formula: $pH = -\log([H^+])$.
 - b) if your teacher allows it, go <http://wgr-sw.com/pH/>, and enter the pH values you wish to average. This tool will give you both the arithmetic average and the true average. Record the latter on the worksheet.
- ___ 20. Is your soil acidic or basic? Do you notice any trends as you descend through the horizons?

21. What happens to the pH as you go deeper into the soil? Use the graph below to plot the average pH at each horizon vs the depth of the sample. Note: because pH is logarithmic, you may not have very noticeable changes.

Title: _____



22. Research the types of environments and events that cause acidic vs basic soil. Based on your findings, what do you believe caused your soil to have its particular pH?

23. Research the types of plants that would thrive in the pH of your soil. Does the vegetation at your site seem to fit with the soil?



Name: _____

Site: _____ Location: _____

Date: _____

Container/ Sample ID	Horizon #	Sample Depth (cm)	Sample 1 pH	Sample 2 pH	Sample 2 pH	Sample 3 pH	Average pH at this horizon