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# Lab Report Template

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**Project 4.2.3-Buffering Soils**

## Problem

This experiment will determine which soil texture (loam, sand, and clay) has the most buffer capacity.

## Hypothesis

The clay will probably have the most buffer capacity compared to sand and loam soil textures.

## Materials

- 2 250ML beakers
- Sand
- Clay
- Loam
- Water
- LabQuest 2
- Stirring rod
- pH sensor
- Plastic cup

## Procedures

1. Fill one beaker to 100ML of water
2. Put four spoonfuls of soil into cup.
3. Pour the 100 ML from the beaker into the plastic cup.
4. Add five drops of acid.
5. Stir the water and soil.
6. Test the PH.
7. Keep adding five drops of acid until there is a significant change in pH. (Significant change: 0.5)
8. Repeat steps for other soils.

## Data Collection

**Table 1- Adding drops of HCL acid until significant change (0.5)**

| | **pH** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Sand** | 7.37 | 7.33 | 7.26 | 7.17 | 7.10 | 7.07 | 7.01 | 6.98 | |
| **Loam** | 7.05 | 7.00 | 6.80 | 6.85 | 6.79 | 6.67 | 6.60 | | |
| **Clay** | 6.80 | 6.75 | 6.69 | 6.65 | 6.53 | 6.46 | 6.30 | | |
| **Number of drops** | **5** | **10** | **15** | **20** | **25** | **30** | **35** | **40** | **45** |

**Table 2 – Drops Needed to Decrease pH of Soils 0.5**

| | Original pH | Number of Drops of HCL | Final pH |
|---|---|---|---|
| Sand | 7.48 | 40 | 6.98 |
| Loam | 7.09 | 35 | 6.60 |
| Clay | 6.80 | 35 | 6.30 |

## Analysis of Results

According to our results, sand has the highest buffering capacity. Although, I do believe we did make an error somewhere. (Because clay should have had the highest buffering capacity, not sand) I think where we went wrong was either not stirring the soil, and acid enough, or maybe we didn't clean off the pH sensor well enough. The pH sensor may have touched the soil a few times as well.

## Conclusions

In Conclusion, the hypothesis was proven to be incorrect. We found that sand had the highest buffering capacity, although we did make an error somewhere because sand should not have the highest buffer capacity, clay should be the one with the highest buffer capacity. This experiment does give me some questions. Where did we go wrong in this experiment? Did we not stir the soil and acid enough? Or did we not clean the pH sensor well enough? Did the pH sensor touch the soil by mistake? Also, after doing this experiment, I have myself asking, what could we have done better on this experiment?