Student Name: _____ Partner Name: _____	Lab Date: _____, 2017	**Soil pH Report 2017**

Objectives of this report.

Personal Lab Results

Site: ----------

Horizon: ----------

pH in H_2O: ----------

pH in $CaCl_2$: ----------

**** Please attach pH table of class results***

PRINCIPLES behind methods used to determine soil pH.

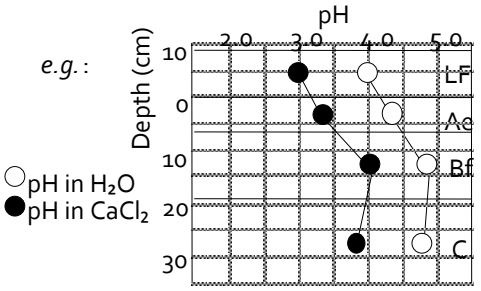
Do NOT just repeat methods section!

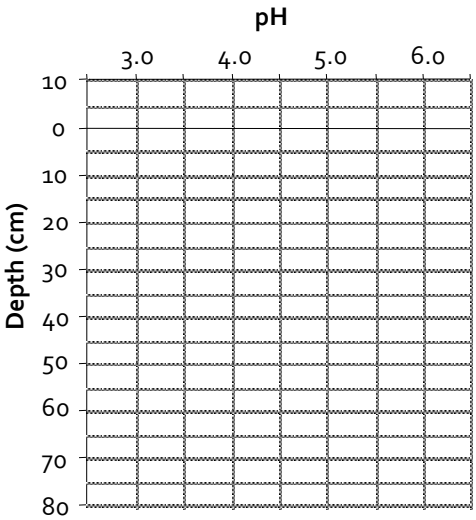
Theoretical / Apparatus Diagram

Results-pH Graphs

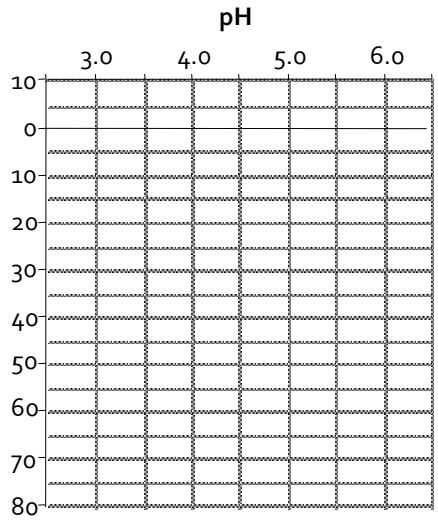
Draw in straight lines where the horizon boundaries occur (see data above for representative thicknesses of horizons sampled) and label them. Plot pH (both in H_2O and in $CaCl_2$) values at the **mid-point*** of each horizon depth. Use the symbols in the following example for all your graphs.

e.g.:



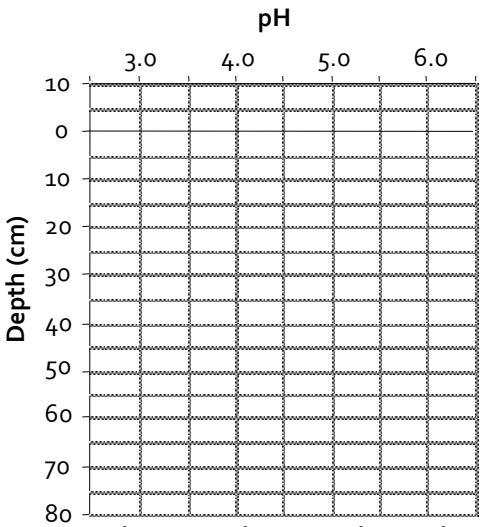


Site 1 – Woodlot RP Plantation

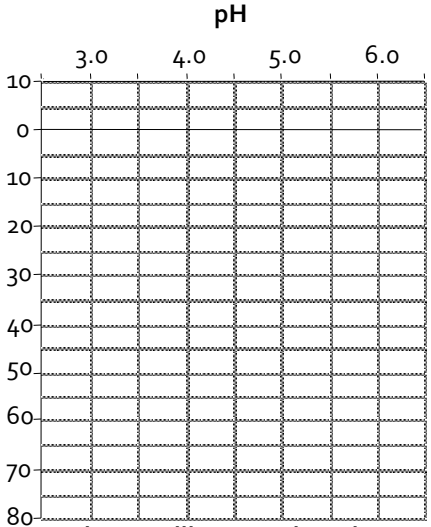


Site 2 – Odell Mixedwood

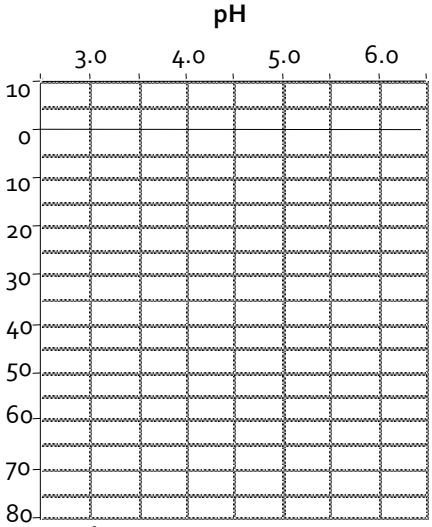
*** Plot values for C horizons 10 cm below boundary**.



Site 3 – Currie Mountain Basalt



Site 4 – Killarney Lake Esker



Site 5 – Sunset Dr. EWP PLT

Determine which soil layers have the lowest and highest pH values - **Use Cacl2 Readings** & Rank Them...

Highest: **Site / Horz. / pH :** _____ _____ _____ _____ _____

Lowest: **Site / Horz. / pH :** _____ _____ _____ _____ _____

Any observable trends in the pH ranking?

Likely reasons for soil acidity levels?

State your overall conclusions about soil acidity at each site visited. ***How does soil pH relate to soil parent material (PM) , vegetation type, position in the landscape, and related soil formation processes?***

Site 1 – UNB Woodlot Red Pine Plantation On Glacial Till (GS & RS derived)

Site 2 – Odell Park - Glacial Till & Colluvium - TH / IH Mixedwood Overstory

Site 3 – Currie Mountain – Igneous Basalt With Colluvium & Red Siltstone Till

Site 4 – Killarney Lake – Glacial Esker Deposit

Site 5 – Sunset Drive – White Pine Plantation On Deep, Sandy Glaciofluvial / Alluvial Terrace

Answer these 6 general questions regarding soil pH.

Soil pH values tend to increase with soil depth. Why?

Saturated soils will have a lower or higher pH than upland soils?

With a change in forest cover from coniferous to deciduous…how would soil pH change and why?

Which soil parent material will produce the highest pH values underneath forest cover? Why?

Would the pH of the forest floor increase or decrease after forest fires? Why?

If you ground a rock, made a slurry of the material, and tested for pH, would the slurry be acidic, neutral, or basic? Why?

Draw and label a single, two-dimensional picture (i.e. geological cross section) that shows the distribution of : the soil parent materials (various types) including bedrock, soil layers by landscape position, the gradation in terms of soil pH, other site Variations (vegetation, slope, drainage, mottling, coarse fragments, rooting, etc.)

Indoor Landscape Sketch Checklist

	Generalized Landscape Profile Correct?
	Site Locations Identified?
	REP. Overstory Vegetation Identified?
	Bedrock Type(s)?
	Soil Parent Material(s)?
	Relative Watertable Identified?
	Appropriate Colouring? (VEG, PM, BEDROCK, pH, etc)
	Stylized Reference Legend? pH, TEX, Fe/OM, QUAL
	Soil Profile Boxes (With Scale)?
	Rooting, Mottles, Coarse Fragments?
	Compacted Horizons (Cross-Hatched)?
	Cardinal Direction Identified / North Arrow Provided?
	Additional Detail(s) Provided?

Additional Comments:

✓	Well Done
✗	Poor / Not Present
/	Needs Improvement
NA	Not Applicable

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The pH meter measures the concentration of hydrogen ions (H+) in an aqueous solution that are responsible of its ACIDITY or ALKALINITY. It's formed, in its simplest and most used version, by the so-called GLASS ELECTRODE, a tube made by a special semi-porous glass containing an HCl solution with a known and constant concentration (better named as ACTIVITY) of H+ and a silver (Ag) probe covered by AgCl (silver chloride) immerged in it, to keep constant the H+ and Cl- activities in this solution.

Just few mm outside this glass tube, there's another Ag probe, equally immerged in the solution to be measured for its H+ activity and linked with another .Ag/AgCl glass electrode that is the reference, with a constant electric potential. The porous glass of the electrode prevents the H+ ions to diffuse from both sides, but allows the exchange of Na+ ions (contained in the silicates of the glass) with the external solution, for keeping the continuity ot this electrical system. The H+ activity difference between the solution inside the electrode and the external one is measured as electric potential difference, then, converted in pH units (0-14) by the instrument.

This electrode is small, also few cm long, easy and fast to use and sensible (+/- 0.001 pH units) and the relation between the potential measured and the H+ activity (a) is expressed by the NERNST EQUATION, very important in chemistry, where E is the electric potential (electrode/solution):

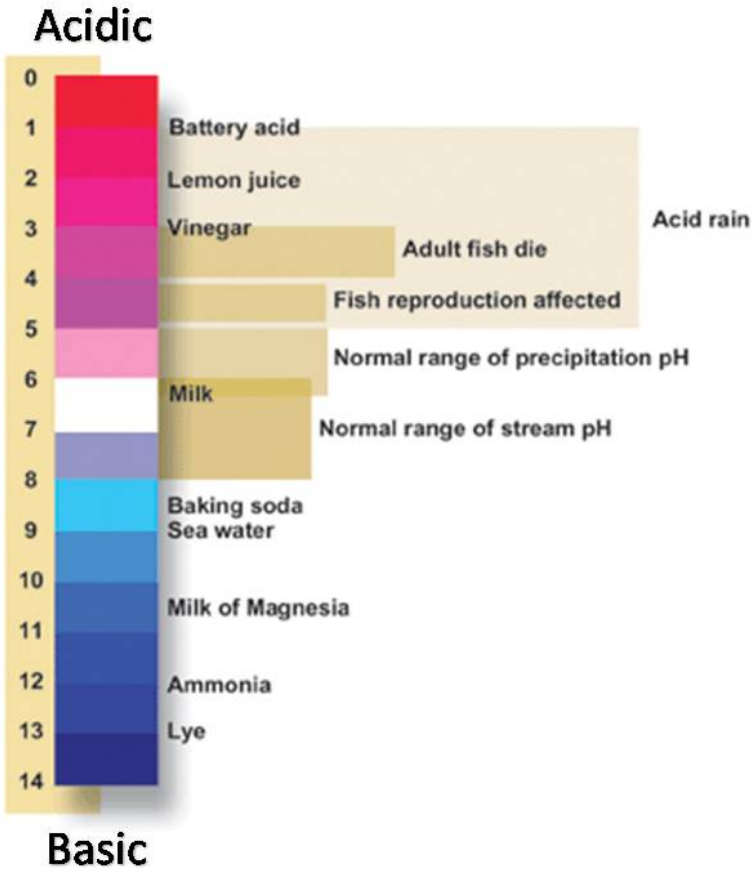
$$E = 0.059 \log [a0(H+) / a1(H)]$$

where a0(H+) is the activity of H+ inside the electrode, constant and =1, while a1(H+) is the unknown activity of the solution to be measured.
So, the formula becomes:

$$E = 0.059 [1 / a1(H+)]$$

but, following the definition of pH (pH = log 1 /a(H+)),
this formula is simply:

$$E = 0.059 \text{ pH then, } pH = E / 0.059$$



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Overall, Excellent detail but should related the pH ranges directly to the horizons

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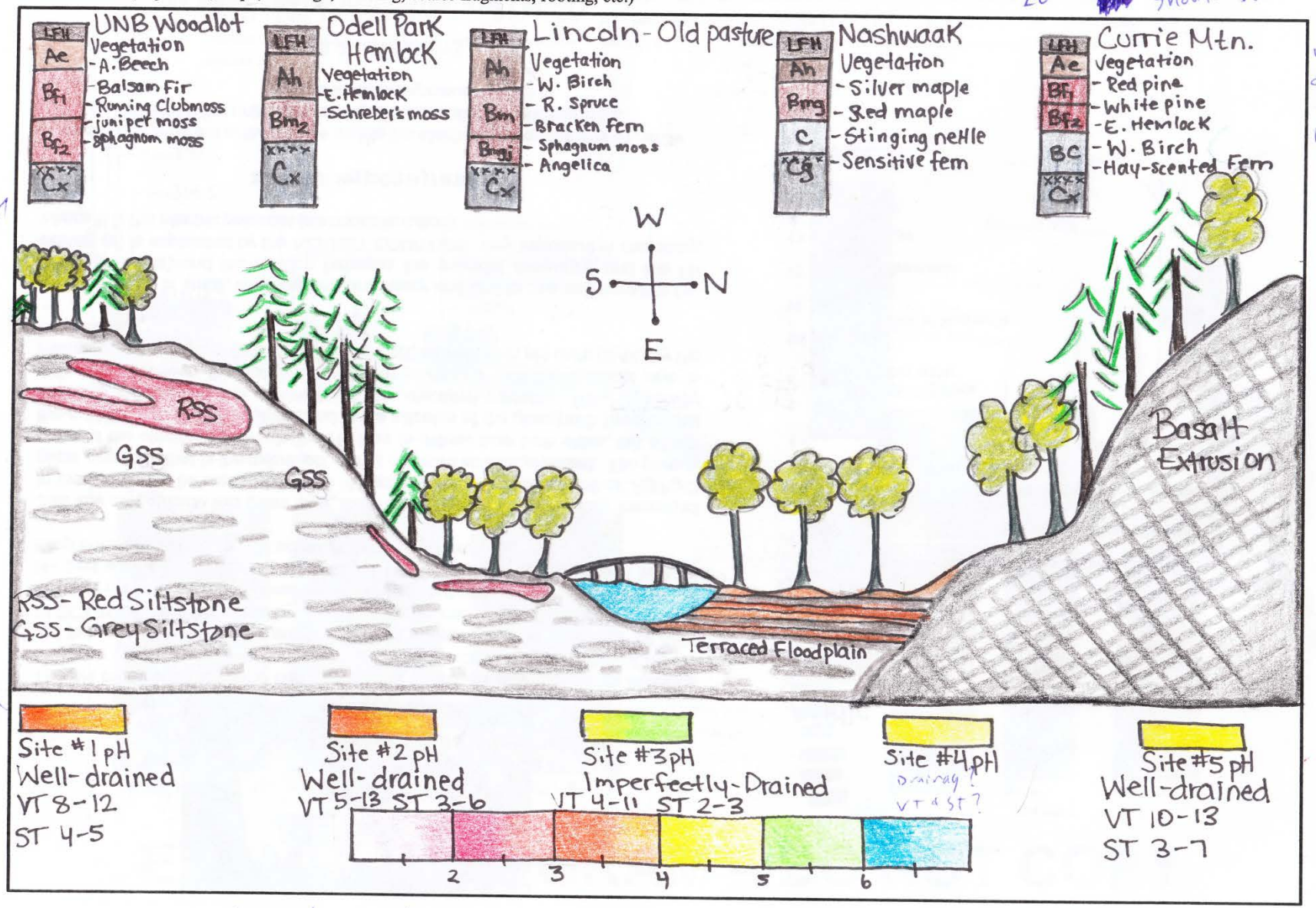

some rough scale would be nice

EXAMPLE DIAGRAM – DO NOT COPY