

CHAPTER 17	Launch Lab: Buffering Ground Water	BLM 17.0.1
HANDOUT		

Many areas in Alberta have alkaline soils and rocks that neutralize acid deposition. In this lab, you will represent different types of soil and rock by using samples of granite or quartz, and marble. Different types of ground water will be modelled by adding water to these solids. You will compare the impact of acid rain on the models of ground water you prepare.

Safety Precautions



Wash your hands when you have completed the Launch Lab.

Materials

- dilute vinegar solution
- granite or quartz chips
- marble chips
- sample of local soil or rock
- 250 mL beakers (5)
- universal indicator paper (pH paper)
- pH meter (optional)
- 100 mL graduated cylinder
- 50 mL burette
- stirring rod
- retort stand
- burette clamp
- a label or a grease pencil

Procedure

1. Pour 120 mL of the dilute vinegar solution into a beaker labelled “acid rain.” Measure and record the pH of the solution in the table below. Set up a retort stand, burette clamp, and burette. Fill the burette with the simulated acid rain solution. Record the initial volume.

acid rain added (mL)	tap water + acid rain (pH)	granite or quartz + water + acid rain (pH)	marble + water + acid rain (pH)	local soil or rock + water + acid rain (pH)

2. Measure 100 mL of tap water into a labelled beaker. Measure and record the pH. Add 5.0 mL of acid rain to the tap water. Stir, then measure and record the pH. Repeat until a total of 20.0 mL of acid rain has been added. Put the solution aside.
3. Place a few granite or quartz chips into a labelled beaker, then add 100 mL of tap water. Stir the mixture, then measure and record the pH of the solution. Add 5.0 mL samples of acid rain to the beaker. After each addition, stir and measure the pH. After 20.0 mL of acid rain has been added, put the solution aside.
4. Repeat Procedure Step 3 using a few marble chips. Repeat again using local soil or rock.

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5. Set aside each labelled beaker until your next class. Stir each solution before you make a final measurement of the pH. Pour the solutions down the sink, being careful not to discard any solid chips. Return the chips to your teacher.

Analysis

1. Use a spreadsheet program to graph the data in your table. Spreadsheet programs allow data to be plotted in different ways. Which type of graph is best for your data? Explain. **ICT**
2. Rank the water samples from least resistant to change in pH when acid rain was added to most resistant. Does your ranking agree with other students?
3. Compare the pH of each sample after the last addition of acid rain with the measurement made after the solution was left standing. If any measurement changed, suggest a reason for the change.