LAB: GROUNDWATER FLOW   NAME:_____ DATE: _____

by Charles Burrows

OBJECTIVE: Determine the direction of groundwater flow and a well's risk of being polluted.

MATERIALS: Blank Paper, Centimeter Ruler, Calculator

1. On a blank piece of paper, draw three small circles with X's in them (⊗) in a big triangular configuration, as far away from each other as possible, but not at the edge of the paper. This is a map of three wells.
2. Draw a second circle around ONE of the wells. That is **your personal source of drinking water**.
3. Randomly label the wells **A**, **B**, and **C**.
4. Draw a one-cm-square somewhere **within** the triangle of your three wells. Write "P" for "pollution" in the square. Like this: P
5. To find the water table elevation at each well, use this formula:

water table elevation = surface elevation of top of well - depth to water in well

WELL LETTER	SURFACE ELEVATION OF TOP OF WELL (ft)	DEPTH TO WATER IN WELL (ft)	WATER TABLE ELEVATION (ft)
A	290	90	
B	150	80	
C	170	20	

6. Use a ruler to draw three straight lines connecting the centers of the X's in each well, creating a triangle from your three wells.
7. Write the "WATER TABLE ELEVATION" next to each well on your map (from the table above).
8. Near the mid-point of each line, label the sides of the triangle **X**, **Y**, and **Z**.
9. Each side has two wells for endpoints. Use the "WATER TABLE ELEVATION" values to complete this table:

LINE CONNECTING WELLS	DIFFERENCE BETWEEN THE TWO WATER TABLE ELEVATIONS
X	
Y	
Z	

10. Complete the following table to determine the length of one 10-foot-elevation-change segment for each line, and how many of these segments there will be: *(Round to the nearest 10th.)*

LINE CONNECTING WELLS	NUMBER OF SEGMENTS = DIFFERENCE BETWEEN THE TWO WATER TABLE ELEVATIONS **DIVIDED BY TEN**	LENGTH OF LINE (cm)	THE LENGTH OF ONE 10-FOOT-ELEVATION-CHANGE SEGMENT = LENGTH OF LINE (cm) **DIVIDED BY** THE NUMBER OF SEGMENTS
X			
Y			
Z			

11. On each line (X, Y, and Z), draw a tick mark for every 10-foot-elevation-change using the information from the table above. (⊢┼┼┼┼┼┼┤) NOTE: Each line uses its own scale.
12. Number all of the tick marks by tens, between the values of each well.
    (Example: Between 150 and 200, the tick marks should be: 160, 170, 180, & 190.)
13. Connect numbered tick marks **of the same value** with dashed lines.
14. Starting at the pollution box, draw a big arrow **perpendicular** to the dashed lines, and pointing towards the lowest values.
15. **QUESTION:** Does your well (your personal source of drinking/bathing water) seem to be in danger of being polluted? Explain your answer here: