Name(s):

Date:

Mystery Water Lab: Which Water Would You Drink??

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To understand what the major contributing factors are to the water chemistry of any natural system (ex. streams, lakes, groundwater), a full suite of chemical analyses must be done. To begin to understand the geochemical, biological, anthropogenic, and other controls on any natural water it must be analyzed, at a minimum, for the following parameters:

- pH (pH units)
- temperature (F)
- specific conductance/conductivity (µS/cm)
- total dissolved solids (ppm)
- salinity (ppt)

Knowing these parameters can help provide insight into what is "normal" for different waters (Figure 1) and when there might be a problem. For example, a sudden change in one (or all) of these parameters might indicate a pollutant and the need to do more in-depth analysis and monitoring.

Conductivity	(uS/cm)
DISTILLED WATER	0.5 - 3
MELTED SNOW	2 - 42
TAP WATER	50 - 800
POTABLE WATER IN THE US	30 - 1500
FRESHWATER STREAMS	100 - 2000
INDUSTRIAL WASTEWATER	10000
SEAWATER	55000

Salinity	(ppt)
FRESHWATER	< 0.5
BRACKISH / ESTUARY	0.5 - 17
BLACK SEA	16
OCEAN RANGE	32 - 37
OCEAN AVERAGE	35

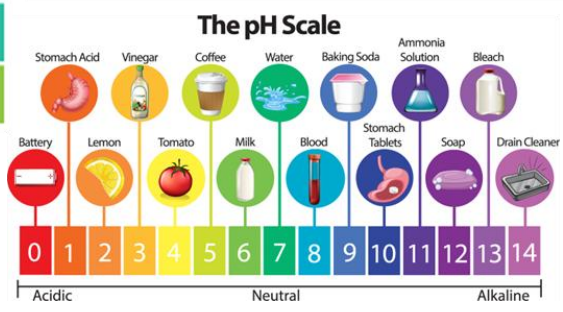

Figure 1. "Normal" Chemical Composition of Different Waters

Luckily there are "smart" multi-meters that can measure all these important parameters with one meter. To get acquainted with these multi-meters and interpreting the results, we will analyze some "mystery" water samples for the above parameters. You will try to determine the identity of the "mystery" samples based on the chemical results you obtain.

Activity: Use the multi-meters to fill in the table below with the chemical results you obtain for each "mystery" sample. For each "mystery" sample guess what you think the true sample identity is based on the chemical parameters.

Mystery Sample Choices: *drinking fountain water, potable tap water, non-potable tap water, distilled water, bottled drinking water, Propel water, household well water (groundwater), Grand River water*
**Circle the sample you think would most "want" to drink*

Mystery Sample ID#	pH	Temp.	Total Dissolved Solids	Conductivity	Salinity	Sample Choice	True Sample Identity
Units	**---**	**F**	**ppm**	**µS/cm**	**ppt**		
A							
B							
C							
D							
E							
F							
G							
H							

Follow-up questions:

1. Which parameter was most useful in helping you determine the correct sample choice?

2. Which 2 parameters were the most different from each other? Provide an explanation for this difference.

3. What surprised you when examining the results for these water samples?