## LAB: pH and Color Indicators

Obtain a 12 by 8 well micro-plate.

Obtain a micropipettor and 3 tips. Use one tip for HCl, one tip for NaOH, and one tip for the distilled water.

KEEP TRACK WHICH PIPETTE TIP IS USED FOR WHICH CHEMICAL. A permanent marker could make this easier.

Set the pipettor to a volume of **25**  $\mu$ L. In cells A1, C1, and E1, put 10 full volumes of 0.1M HCl. That is, fill the pipettor and empty it into the well ten times (10 x 25  $\mu$ L = 250  $\mu$ L). This will equal a total volume of 0.250 mL.

Alternate method: Set the pipettor to 200  $\mu$ L, place one full volume into the well. Set the pipettor to 50  $\mu$ L, place one full volume into the same well. (200  $\mu$ L + 50  $\mu$ L = 250  $\mu$ L).

In cells A12, C12, and E12, put 10 full volumes of 0.01M NaOH.

In cells A2-A11, C2-C11, and E2-E11, put  $\underline{9}$  full volumes (9 x 25  $\mu$ L = 225  $\mu$ L ) of distilled water.

## SERIAL DILUTION PROCEDURE

## Using the HCl tip:

Adjust the pipettor to 25  $\mu$ L.

Stir the contents of well A1. Draw up 25 µL of A1, Place it into cell A2.

Stir the contents of well A2. Draw up 25 µL of A2, Place it into cell A3.

Stir the contents of well A3. Draw up 25  $\mu L$  of A3, Place it into cell A4.

Continue this procedure through A6.

## Using the NaOH tip:

Stir the contents of A12, Draw up 25 µL of A12, place it into cell A11.

Stir the contents of A11, Draw up 25 µL of A11, place it into cell A10.

Stir the contents of A10, Draw up 25 µL of A10, place it into cell A9.

Continue this procedure through **A7**.

Repeat the serial dilution procedure for rows C, and E using the HCl pipette for columns 1-6 and the NaOH pipette for columns 7-12.

Each cell in column 1 should have a pH of 1, each cell in column 2 should have a pH of 2, and this pattern continues across the micro-plate giving a pH of 12 in column 12.

In each well in Row A put 1 drop of <u>universal indicator</u> In each well in Row C put 1 drop of <u>phenolphthalein indicator</u>								
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• Arrange the indicators you examined into groups according to their general use.

Using colored pencils, illustrate your results in the diagram below.

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