

# Do now (5 minutes)

- ▶ Grab an Apron.
- ▶ There are some that are cut short for our classmates. If you can use a longer apron, then use it and leave the ones that are cut off for others.
- ▶ **THANK YOU!**

# What's the perfect pH for a plant?



Table 2. Effects of soil reaction on availability to plants of soil nutrients (after Truog). The width of the bar determines the relative availability of each element with a change in soil reaction.

# Background Information

- ▶ Living things are especially sensitive to changes in pH.
- ▶ Plants, for example, will be incapable of absorbing nutrients from the soil if the pH is:
  - ▶ too low (**acidic**) or
  - ▶ too high (**basic**).



# Prep

- ▶ Aprons,
- ▶ Safety Gloves,
- ▶ Monitoring Equipment Boxes (DO NOT OPEN)

How do we use a pH sensor?

# Intro to Gear Boxes

- ▶ DO NOT OPEN YET.
- ▶ Notice the markings on the outside of the box. (e.g. G1)
- ▶ Your group will be using the same box throughout the whole year.



How do we use a pH sensor?

# Intro to Gear Boxes

- ▶ KEEP IT NEAT AND CLEAN!
- ▶ Found on Yellow Cart.
- ▶ Don't share equipment.
- ▶ If something is wrong, let me know.



How do we use a pH sensor?



# How do we use a pH sensor?

Mr. M. Gonzalez

How do we use a pH sensor?

# Objectives

- ▶ I can explain how to use the Hanna Combo sensors.
- ▶ I can navigate through the menu of options on a sensor.
- ▶ I can practice protocols in sensor maintenance.



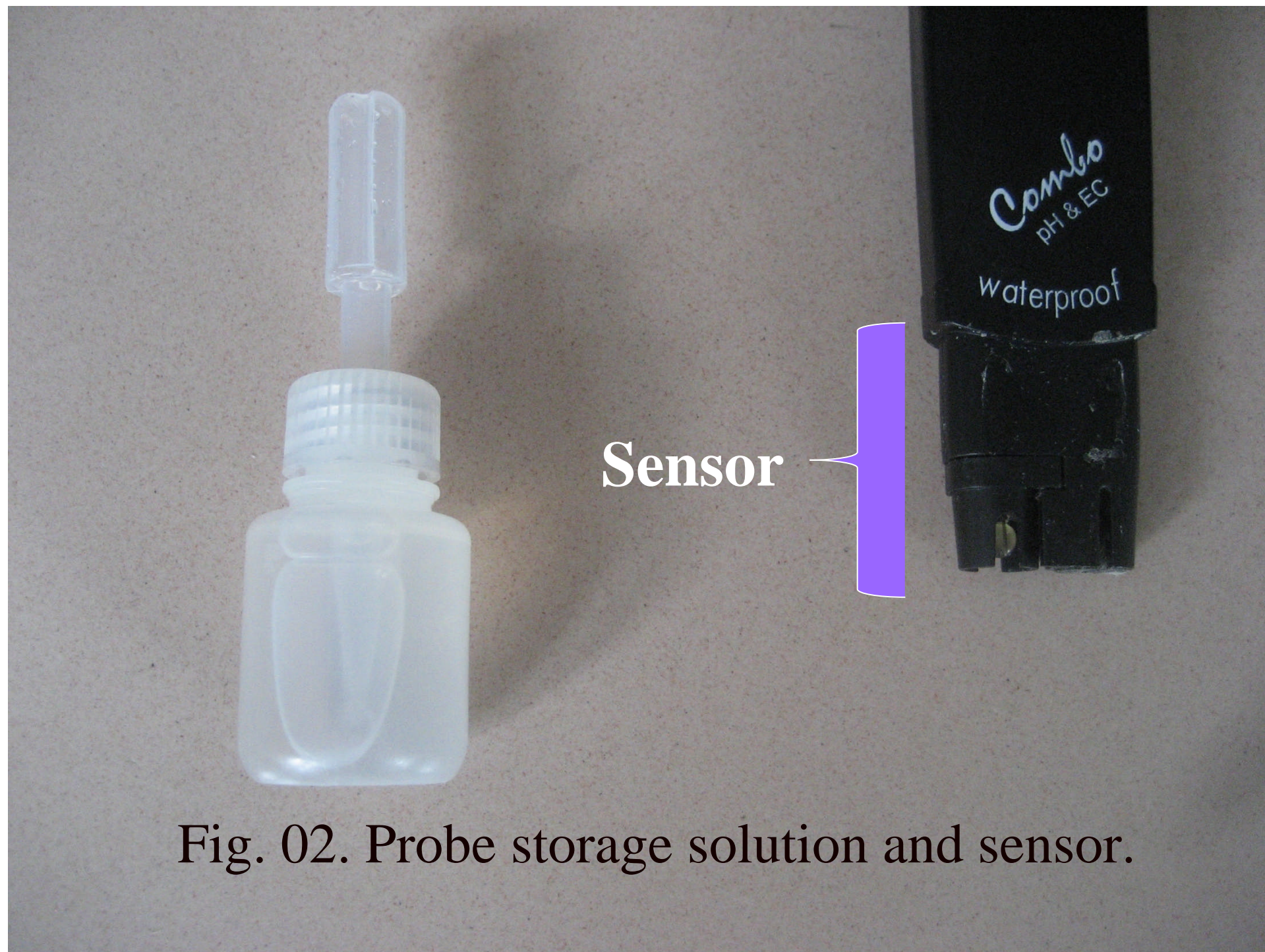
# Materials Review

Meter



Fig. 01. Hanna Combo meter (pH).





Sensor

Fig. 02. Probe storage solution and sensor.

# Hanna Meter Components

- ▶ The **data signal** or just **signal** in this case is an electrical impulse of a specific magnitude (strength) that changes according to the pH level in the solution.
  - The lower the pH the weaker the signal and vice versa.
- ▶ The **meter** refers to the portion that holds the computer board and circuitry that processes the data signal.
- ▶ The **sensor** or **probe** is the portion that actually gets the signal from the solution, sample, or environment.



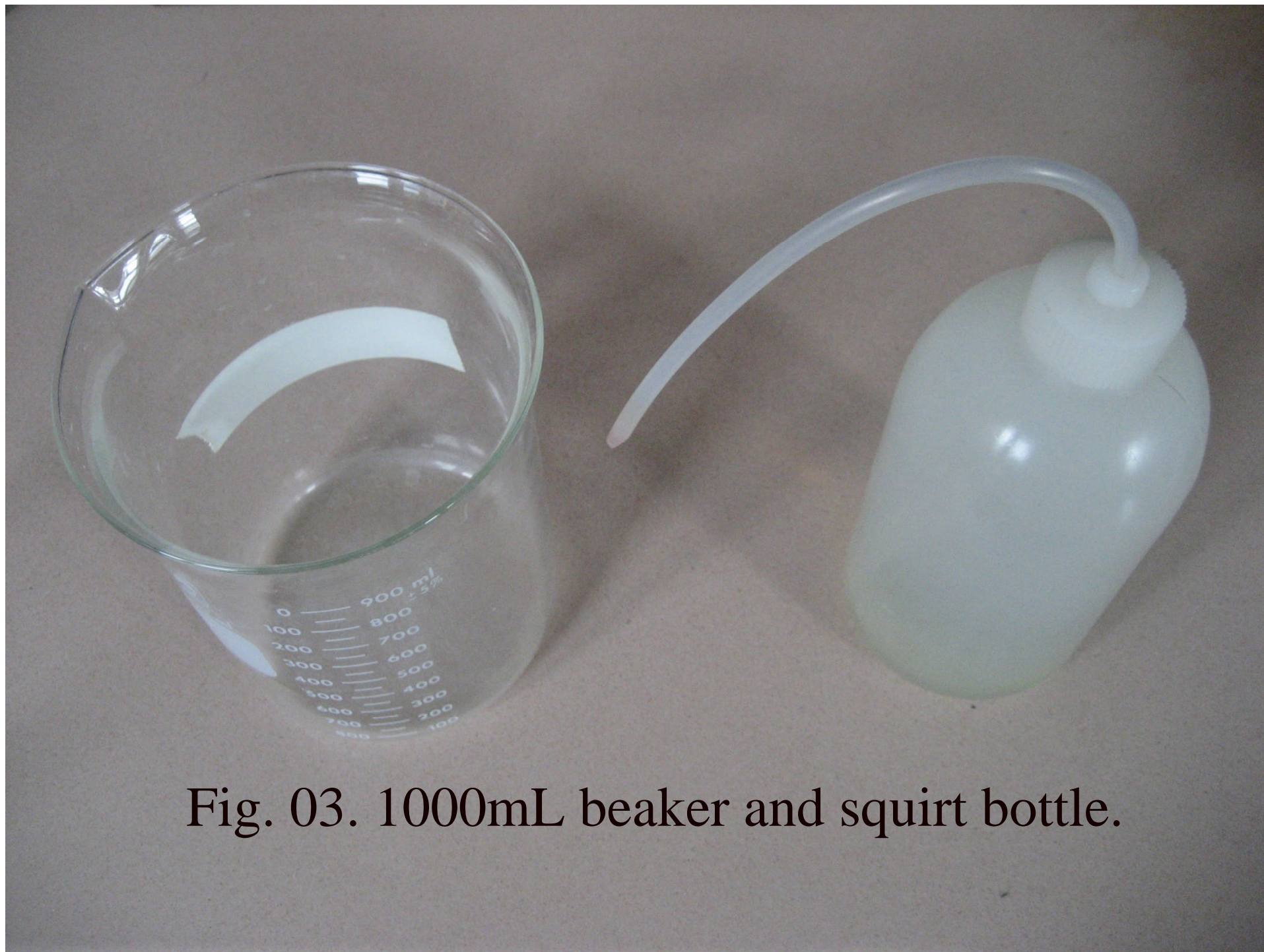


Fig. 03. 1000mL beaker and squirt bottle.

# Procedures

## ► Measuring pH

- Take the cap off the meter, place it in a safe spot, and rinse off the probe with the squirt bottle into the waste water cup.



How do we use a pH sensor?



# Procedures

## ► Measuring pH

- Do not touch the probe with the plastic tube of the bottle. Just spray the probe until it is clean.
- Work neatly or you'll have to clean up more at the end.



How do we use a pH sensor?

# Procedures

## ► Measuring pH

- Turn on the meter by pressing the Mode button firmly.
- If the letters “pH” do not appear at the top right-hand portion of the screen press the set button firmly and continuously until it does.



How do we use a pH sensor?



# Exercise

- Press the “Set” button and write down the differences between each screen.

Screen name?	Units	Comments

How do we use a pH sensor?

# Review Measuring Procedures

## ► Measuring pH

- Place the probe into the solution. Wait until the primary display stabilizes (15s) before you read the value.
- For now, if the value stays for 3 seconds use it for your data.
- Take the probe out of the sample and write the value in your journals.



Table 01. Data table

Probe	pH
Yours	?
Partner 01	?
Partner 02	...

How do we use a pH sensor?

# Review Measuring Procedures

## ► Compare:

- Compare your pH reading with at least 2 partners.
- What do you notice?

## ► Errors:

- Drift + Calibration,
- Human,
- Variation in Nature



Table 01. pH Data Table

Probe	pH
Yours	?
Partner 01	?
Partner 02	...

How do we use a pH sensor?

# Procedures

- pH Storage Solution is on the yellow cart.



How do we use a pH sensor?

# Procedures



## ► Measuring pH

- Rinse the probe after each sample solution.
- Read other assigned samples.
- After your final rinse place 4 drops of pH storage solution into the little cup located inside the probe cap.

How do we use a pH sensor?



# Procedures



## ► Clean-up

- Recap the probe **FIRMLY** by lining up the lettering on the cap and the face of the meter.
- Wait for clean-up instructions.
- Clean up your area, dump your rinse water out, dispose of gloves, and return materials.
- Begin work on your bar graph and analysis questions.

How do we use a pH sensor?



Clean up Tables  
Fold up Gloves  
Hang Aprons

How do we use a pH sensor?



# HW

- ▶ What do you think the letters in “pH” stand for? Give a reason for your answer.
- ▶ Hint: In yesterday’s lesson we spoke about the particular atoms are that make a solution acidic or basic.

How do we use a pH sensor?