Kachemak Bay And Anchor River Citizens' Environmental Monitoring Program

FIELD PROCEDURES

April 2011

PICK UP BEFORE EACH MONITORING EVENT

⇒ Datasheet
⇒ 1 Sterile pipette
⇒ 2 Coliscan Easygel bottles (from freezer)
⇒ 1 Acid-washed sample bottle (white lid)
⇒ 2 Petri dishes (only if plating bacteria samples away from lab)
⇒ **Replace any expired chemicals, empty camera, or low batteries**
⇒ **Replace any broken equipment**
⇒ **Trade out your Hanna Meter every 3 months**

IMPORTANT NOTE: RECORD ALL SUPPLIES TAKEN FROM THE LAB ON THE SUPPLY LOG!

CHECK ALL CHEMICAL EXPIRATION DATES!

EQUIPMENT IN YOUR WATER MONITORING KIT

- Watch
- Clipboard
- Fine-point Sharpie
- #2 pencil
- Rubber Gloves
- 2.5gal. Plastic Bucket
- Distilled Water Bottle
- Distilled Water Wash Bottle
- Waste Container
- Hanna Combo Meter
- Calibration beakers (3)
- Calibration Solutions: pH 7.01, pH 4.01, µS 1413
- MSDS Sheets (6)
- Air Thermometer (red fill)
- Water Thermometer (green fill)
- 5 ml Test Tubes w/blue caps (2)
- Octet pH Comparators (2)
- 60 ml Dissolved Oxygen Sample Bottles (3)
- 10 ml Titration Syringe with tip
- 30 ml Titration Vial
- WR Indicator Solution (30 ml)
- Manganous Sulfate Solution (30ml)
- Alkaline Potassium Iodide Azide (30ml)
- Sulfuric Acid (30ml)
- Thiosulfate 0.025N Solution (60ml)
- Starch Indicator Solution (30ml)

Cook Inletkeeper is a member supported nonprofit organization dedicated to protecting the Cook Inlet watershed and the life it sustains.

Cook Inletkeeper
3734 Ben Walters Lane
Homer, Alaska 99603
907.235.4068
www.inletkeeper.org

Rachel Lord
Outreach & Monitoring Coordinator
907.235.4068 x29
rachel@inletkeeper.org

Table of Contents

Equipment List 2

General Operating Notes 4
- Procedure for Rinsing Glassware
- Before Using Reagents
- Disposal of Reagent Waste
- Recording Decimal Places

Order for Conducting Tests 5

Hanna Meter Operational Guide 6

Hanna Meter Calibration Procedures 7

Site Characterization and Conditions 10

Odor Identification Chart 11

Beaufort Wind Scale 12

Water Sample Collection 13

Bacteria Pipetting 13

Turbidity Sample Collection 14

Water Temperature 15

Dissolved Oxygen Fixing 16

pH Colorimetric 17

Hanna Meter Tests 18

Bacteria Plating and Incubating 20

Dissolved Oxygen Titration 21

Completeness 22

Cleaning and Maintaining Equipment and Supplies 23

Notes 24

Notes

IMPORTANT GENERAL OPERATING NOTES

PROCEDURE FOR RINSING GLASSWARE PRIOR TO TESTING

Before each test, all glassware should be rinsed three times with the sample to be analyzed. Pour out sample from holes in the side of the bucket. Do not immerse test tubes or bottles in sample bucket to fill (with the exception of the dissolved oxygen bottles), and don't pour rinse water back into sample bucket.

BEFORE USING REAGENTS

Put on your safety goggles & gloves.
Check all expiration dates.
Invert all reagents a few times (i.e. gently shake back and forth) before using them in tests.

DISPOSAL OF REAGENT WASTE

- After completion of each test that requires the use of a chemical reagent, discard the reagent waste into the labeled waste containers (brown 250 ml bottles) provided.
- Rinse glassware twice with distilled water and discard each rinse into waste container.
- When all tests have been completed transfer waste from 250 ml brown waste bottles to labeled gallon waste container provided.
- Once the gallon container is full please bring it to the lab to exchange for an empty waste container.

RECORDING DECIMAL PLACES

When recording your results, be sure to record the number of decimal places given for that particular test.

Example: The water thermometer reads 6.0. Record 6.0 not 6. Or, if the thermometer reads 6.5, record 6.5 not 7 or 7.0. The thermometer reads to the 0.5 decimal place, so record your number to the 0.5 decimal place.

Notes

- Anything else that is dirty

ORDER FOR CONDUCTING TESTS

Below is the order in which to conduct your tests. This order will maximize your efficiency and should be followed. Calibrate your Hanna Meter before going into the field.

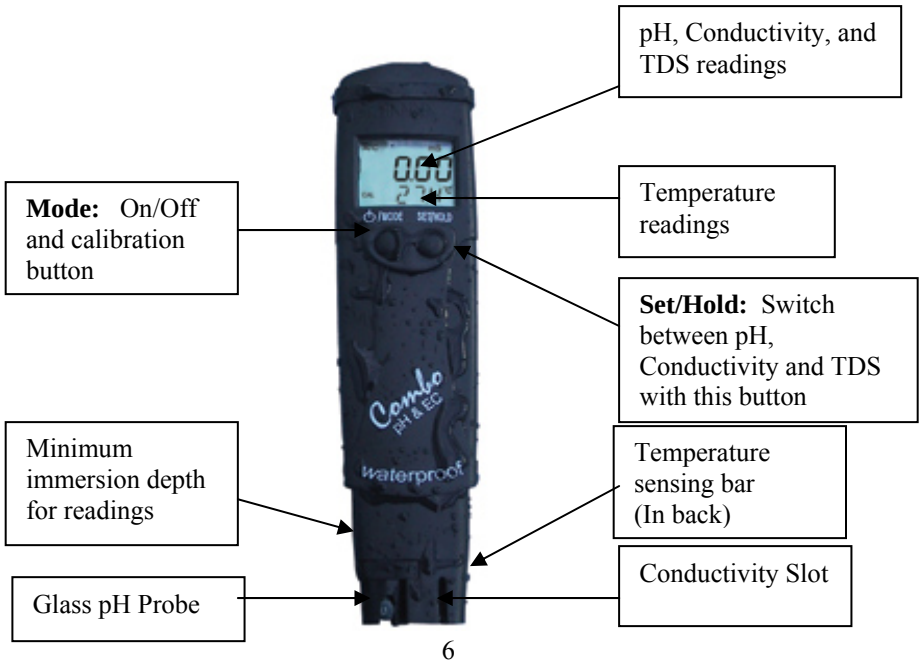
1. Calibrate Hanna Meter and record results.
2. Record the Sampling Information on the datasheet: Site ID, Date, Time, Volunteers' names and signatures.
3. Hang your air thermometer.
4. Record site information (weather, sketch, photos, air temp).
5. Collect water sample in bucket.
6. **Collect bacteria sample.**
7. Collect turbidity water sample.
8. Place water thermometer and Hanna meter in bucket.
9. Fix Dissolved Oxygen.
10. Record Water Temp #1.
11. Record Water Temp #2.
12. Colormetric pH.
13. Hanna readings (temp, pH, specific conductance).

(Back at the lab after field work is complete)

14. Plate Bacteria.
15. Titrate Dissolved Oxygen.
16. Record total volunteer hours worked and mileage driven.

HANNA METER OPERATIONAL GUIDE

1. The Hanna meter is waterproof and will float. Be sure probes are fully immersed when taking measurements or calibrating.
2. **Turning the meter on and checking battery status:** Press and HOLD the MODE button for 1-3 seconds. All the used segments of the LCD will be visible for a few seconds, followed by the remaining battery life expressed in percentage. (Ex: % 95 BATT)
   If the battery % reads below 50%, replace the batteries.
3. **Changing between measurement modes:** To change from one mode to another, press and release the SET/HOLD button.
4. Freezing the Display: Press the SET/HOLD button for 2-3 seconds until hold appears on the secondary display. Press either button to return to normal mode.
5. Turning the meter off: Press the MODE button while in normal measurement mode. OFF will appear on the lower part of the display. Release the button.
6. Storage: **The Hanna meter should be stored upright in its original box with a small amount of pH 7.01 solution in the cylinder where the pH probe fits.**



CLEANING AND MAINTAINING EQUIPMENT AND SUPPLIES

It is important to clean and properly stow all of your equipment and reagents after each monitoring event. Most of your equipment is re-usable and, if properly cared for, will serve you and other volunteer monitors for years to come.

All equipment should be dried and properly stowed in the black plastic "suitcase" to protect it from excess exposure to light. Keep the kit in a dry place protected from extremes of heat and cold. Don't leave it in your car, which can get hot in the summer and cold in the winter. Chemicals may freeze if kept in your car, garage or arctic entry. The empty Coliscan Easygel bottles may be returned to the lab for recycling. Please rinse out the bottles and throw away the caps (they can't be recycled!).

Keep all chemicals and equipment out of reach of children and pets.
DO NOT FREEZE OR LEAVE IN DIRECT SUN!!

CLEANING PROCEDURES

1. Rinse thoroughly with tap water.
2. Wash with a phosphate-free soap (the lab uses Liqui-Nox). Use the brush provided when necessary.
3. Rinse thoroughly with tap water.
4. Rinse three times with distilled water.
5. Allow to dry before returning to kit.
6. Wipe down inside and outside of kit with damp rag and then dry. Allow the inside of kit to completely dry before closing. A good strategy is to leave your kit open to dry for 48 hours, and then close.

CLEAN ALL OF THE FOLLOWING SUPPLIES:

- Rubber gloves
- Sample bucket
- Air and water thermometers
- Turbidity column
- All test tubes
- 3 DO sample bottles and lids
- Titrator, plunger and plastic tip
- Titration vial and cap
- Hanna Meter (do not rinse with DI water for storage)

COMPLETENESS

- Check to see that **all** fields are filled in on the datasheet, front and back, and that the writing is legible.

- If a test was not performed for some reason, explain in the ***Comments*** section and make a reference to that explanation in the blank for recording the data.

- Each volunteer needs to sign the datasheet. Don't forget to record your ***Mileage***!

- Check again to make sure all reagents are not expired, or expiring soon, and that all equipment is working and not broken.

AT HOME OR AT COOK INLETKEEPER LAB

HANNA METER CALIBRATION PROCEDURES

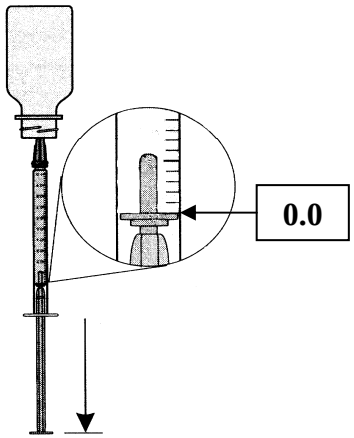
- **Put on rubber gloves & eye protection.**
- Calibration should be done at home or in the lab on each sampling day. Use solutions that are kept cool or refrigerated if possible.
- Record the meter's identification number on the datasheet.

Calibration Procedure

1. If the electrode has been left dry, soak in pH 7.01 solution for at least an hour to reactivate it.
2. Wash three small beakers, rinse with tap water, then rinse with distilled water. Rinse one beaker with a small amount of pH 7.01 solution (green). Pour pH 7.01 solution in the beaker, enough to be able to submerge the pH probe (approx. 30 ml).
3. Rinse second beaker with a small amount of pH 4.01 solution (pink). Pour pH 4.01 solution in the beaker, enough to be able to submerge the pH probe (approx. 30 ml).
4. Rinse third beaker with 1413 µS/cm solution (clear). Pour 1413 µS/cm solution in the beaker, enough to be able to submerge the probe (approx. 30 ml).
5. Rinse Hanna meter thoroughly with distilled water, clean gently with test tube brush if necessary, then rinse with a small amount of pH 7.01 solution.
6. Submerge the electrode in the pH 7.01 solution. While the meter is still submerged in 7.01 solution, turn the meter on by pressing the MODE button until the screen is activated.
7. If the meter is not reading pH, press SET/HOLD until it displays pH measurement mode on the top right corner of the LCD. If the LCD displays TEMP, you have held the MODE button in too long. Press the ON button and start over.
8. **Gently move the probe back and forth in the solution.** Allow the meter to stabilize (this may take several minutes), then record the pH and Temp readings on the datasheet as initial pH.
9. To calibrate, press and hold the MODE button through the OFF reading until CAL, then release the button. CAL will flash only briefly so you must be watching for it. Once it flashes release the MODE button. The LCD will display pH 7.01 USE. A small CAL tag will blink on the left side of the LCD. Keep the meter in the solution until the meter has calibrated.
10. **Continue moving the probe gently back and forth**.

11. Once the meter has calibrated for pH 7.01, it will flash OK and then display 4.01 USE on the LCD. This happens quickly so you must be watching for it.
12. Remove the meter from the 7.01 solution and thoroughly rinse with distilled water then rinse with a small amount of pH 4.01 solution to eliminate cross contamination.
13. Place the electrode in the 4.01 solution. Gently swirl the probe to fully coat the probe with pH 4.01. When the second buffer is recognized and has calibrated, the LCD will flash "OK" for 1 second, and the meter will return to normal measurement mode, reading the pH 4.01 solution. **Continue moving the probe gently back and forth.** Record the pH reading after it has stabilized (this may take several minutes) and the temperature reading on the datasheet.
14. The CAL symbol on the LCD means that the meter is calibrated.
15. Rinse the meter thoroughly with distilled water and immerse the probe in the 1413 μS/cm solution, **moving the probe gently back and forth.**
16. Press the SET/HOLD button until the LCD displays "μS" in the top right corner.
17. **Continue moving the probe gently back and forth**. Allow the Temperature and Specific Conductance to stabilize (this may take a minute or two), then record the temperature and specific conductance readings on the datasheet.
18. Press and hold the MODE button until CAL is displayed on the lower LCD. Release the button. If the LCD displays TEMP, you have held the MODE button in too long.
19. **Continue moving the probe back and forth in the solution.**
20. The LCD will display 1413 USE and a small CAL tag will blink on the left side of the LCD. Once the calibration has been automatically performed, the LCD will display OK for 1 second and the meter will return to the normal measurement mode. This happens quickly so you must be watching for it.
21. The CAL symbol on the LCD means that the meter is calibrated.
22. Record the initial specific conductance (once stabilized) and temperature on the datasheet.
23. Rinse meter with pH 7.01 solution or tap water, and replace the cover, keeping a small amount of pH 7.01 solution in the cap where the pH electrode fits.
24. Dispose of calibration solutions according to chemical waste management procedures.

DISSOLVED OXYGEN TITRATION



1. Titration must be performed within 6 hours after fixing.
2. Rinse the titration vial 3 times with a small amount of the solution from sample bottle 1.
3. Fill it to the 20 ml line with the bottom of the meniscus at the top of the line, then cap the vial.
4. Rinse the titrator tip with DI water three times. Attach titrator tip and fill titrator with sodium thiosulfate to the 0.0 line. Avoid air bubbles by swiftly drawing in a few ml and expelling into the thiosulfate bottle until no bubbles are present in the titrator.
5. Insert the titrator into the central hole of the titration vial cap until it snaps into place.
6. **Add 3 drops of SODIUM THIOSULFATE** and swirl the vial to mix.
7. Continue this titration process until the solution is a pale yellow color—lighter than when you started titrating (around 4 or 5 on the titrator).
8. Gently remove the titration vial cap with the titrator still attached. Be very careful not to change the position of the plunger or to shake any fluid loose from its tip.
9. **Shake the STARCH INDICATOR SOLUTION bottle well and add 8 drops** to the vial. The sample solution will turn from pale yellow to dark blue. It is better to add the starch solution too early than too late.
10. Replace the cap with the titrator carefully on the titration vial and swirl until the solution turns a uniform blue.
11. Continue the titration process one drop at a time until the solution just turns from blue to clear. Avoid going past 10.0 mg/l mark on titrator. If you reach 10.0 before the solution turns clear, refill the titrator with thiosulfate to 0.0.
12. When the blue turns to clear, read the titrator and record this figure on your datasheet to the nearest 0.1 mg/l. Remember to add 10.0 mg/l if titrator was refilled.
13. Carry out the titration steps on the sample bottles marked 2 and 3.
14. If all three titration values are within 0.6 mg/l of each other then you are done with the test. If any titration reading differs by 0.6 mg/l or more, titrate another 20 ml sample from the bottle whose reading fell outside the 0.6 mg/l range and record the result. If the DQO is met, check the ***DQO MET*** box under **Dissolved Oxygen** on your datasheet.
15. Under **Dissolved Oxygen,** record the ***Titration Date*** and ***Titration Time***.

IN THE LAB

BACTERIA PLATING AND INCUBATING

1. Use the sharpie marker to mark the lids (the larger half) of two pretreated petri dishes with the date, the time, the name and number of your sampling site, and the amounts 1 ml and 5 ml. **(Please keep your writing close to the edge of the lids!).**

2. Match the bottles of Coliscan-water mixture to the petri dishes marked with the same number.

3. One at a time, pour each bottle of Coliscan-water mixture into the bottom half (the smaller half) of its respective petri dish. Cover the dishes with the designated lids and gently swirl the liquid so that it covers the entire bottom of the dish, using a figure 8 pattern.

4. Place the labeled petri dishes containing the Coliscan-water mix into the incubator.

5. Under **Coliform Bacteria** on your datasheet record the ***Time Plated***.

IMPORTANT NOTE: THE INCUBATOR IS TURNED OFF DURING NON-SAMPLING PERIODS. MAKE SURE IT IS ON, AND CONTACT THE MONITORING COORDINATOR WITH ANY CONCERNS!

CALIBRATION NOTES

- Your Hanna Meters will work better and calibrate faster the more often they are used! Calibrate at least for each sampling event, preferably more!

- Make sure the probes are fully submersed in the solutions when calibrating

- This takes some patience! Especially with pH, and if your meters aren't used often, it may take several minutes for the meter to stabilize.

- **Once every 3 months** trade your Hanna meter in for a "new" one at the Inletkeeper Lab. This will ensure that you always have a working meter with clean electrodes and full batteries!

AT THE SITE

SITE CHARACTERIZATION AND CONDITIONS

1. Hang air thermometer (red liquid fill) in shaded area approximately 5 feet off the ground or other location where the thermometer is not influenced by site conditions (*e.g.,* snow cover). Allow it to stabilize and read after 10 minutes. Keep checking at 1 minute intervals until the reading comes up the same twice in a row.
2. Fill out page one of the datasheet: monitor names and signatures, site ID, and date.
3. Record air temperature on datasheet.
4. Record weather description; precipitation the last 24 hours (estimate in inches, trace, or zero); wind speed, direction and character; water surface condition; observations (including odor, debris, wildlife, etc.). Use the Beaufort Wind Scale (page 12) to help determine wind speed and the Odor Identification chart (below) to identify odors.
5. Sketch your sampling site. Include where your sample was taken and a permanent fixed object (i.e. bridge, road, etc.) that can act as a point of reference.

HANNA SPECIFIC CONDUCTANCE MEASUREMENTS

1. Keep the meter submerged. Select specific conductance by pressing the SET/HOLD button. "µS" will be displayed as the unit. Gently move the meter front to back.
2. Continue to swirl the meter until both the specific conductance and temperature readings have stabilized. The stability symbol (clock) on the top left of the LCD should not be visible, and the Specific Conductance value should not be drifting.
3. Record the specific conductance reading as ***Conductivity Replicate 1***. Wait 15 seconds and record the specific conductance reading again next to ***Replicate 2***, and ***3*** if necessary. If the readings do not meet the DQO, in other words if Rep #1 and Rep #2 differ by more than 2 µS/cm, wait 15 seconds and record the specific conductance reading again next to Rep #3. Check Reps #2 and #3 for meeting the DQO. Repeat until consecutive readings meet the DQO (differ by 2 µS/cm or less). If the DQO is met, check the ***DQO Met*** box.

HANNA FINAL TEMPERATURE MEASUREMENT

1. After the pH and Conductivity readings are recorded and have met DQO, with the Hanna meter in pH mode proceed with recording the ***Stop Temp***. To meet Data Quality Objectives, the Start and Stop Temperatures for the Hanna Meter tests must be within 0.5 °C.

2. Turn off the Hanna meter by pressing the MODE button until OFF is displayed, then releasing.

   Clean the Hanna meter gently as needed and rinse with stream water, tap water, or pH 7.01 solution. Place a few drops of pH 7.01 solution in the protective cap where the pH electrode fits. Put protective cap on and return the Hanna meter to its box for storage. **Store upright to help keep pH probe wet.**

HANNA METER TESTS

- The Hanna Meter should be placed in the bucket with the water thermometer following the bacteria sample. Remember to rinse the meter before placing it in the sample bucket.
- Turn the Hanna Meter on by pressing the MODE button

Allow the meter to stabilize in the bucket – this may take anywhere up to 15 minutes!

HANNA START TEMPERATURE MEASUREMENT

1. Select the pH mode with the SET/HOLD button. Stabilize the Hanna meter readings in the bucket. The pH should not be drifting. This could take up to 15 minutes! BE PATIENT!
2. After the Hanna meter has stabilized in the bucket, record the Meter # and ***Start Temp*** on the datasheet under Hanna Meter.
3. Keep the probe submerged throughout the pH, specific conductance, and final temperature readings.

HANNA PH MEASUREMENTS

1. Ensure you are in pH mode.
2. Continue to submerge the meter until you are sure the pH is not drifting.
3. Proceed with recording pH Replicates in 15-second intervals, using 0.02 as the DQO standard. The idea here is to allow the meter to stabilize on a final reading. If possible, get two consecutive readings that are identical. Record pH readings under ***pH Replicate 1, 2,*** and ***3*** if necessary. If the DQO is met, check the ***DQO Met*** box.

NATURE OF ODOR		DESCRIPTION OF ODOR, SUCH AS ODOR OF:
Aromatic (spicy)	Camphor, cloves, lavender, lemon	
Balsamic (flowery)	Geranium, violet, vanilla	
Chemical	Industrial wastes or treatments	
	Chlorinous	Chlorine
	Hydrocarbon	Oil refinery wastes
	Medicinal	Phenol Iodine
	Sulfur	Hydrogen sulfide (rotten eggs)
Disagreeable (pronounced, unpleasant)	Fishy	Uroglenopsis, Dinobryon (dead algae)
	Pigpen	Anabaena algae (visit a pig farm to sample this distinctive odor)
	Septic	Stale sewage
Earthy	Damp earth	
	Peaty	Peat
Grassy	Crushed grass	
Musty	Decomposing straw	
	Moldy	Damp cellar
Vegetable	Root Vegetables	

6. **Once every 3 months:** Take 3 photos of your site (one looking upstream, one looking downstream, and one of your sampling site) and record photo number and photo description on datasheet. Attach a scrap piece of paper to the clipboard with site# and date in bold print, and include this clipboard in the photos to clearly document where and when the photos are taken. If no pictures were taken, make a note to that effect.

Note: If necessary take more pictures to document changes in your sampling site, *e.g.,* erosion, newly constructed beaver dams, etc. Call the Monitoring Coordinator at 235-4068 ext.29 if you do not have a camera and need photos taken at times other than your quarterly photo shoot.

BEAUFORT WIND SCALE				
Beaufort Number of Force	**Wind Speed**		**World Meterological Organization Discription**	**Estimating Wind Speed effects Observed**
	knots	mph		
0	Under 1	Under 1	Calm	Calm; smoke rises vertically
1	1-3	1-3	Light air	Smoke drift indicates wind direction; vanes do not move
2	4-6	4-7	Light breeze	Wind felt on face; leave rustle; vanes begin to move
3	7-10	8-12	Gentle breeze	Leaves and small twigs in constant motion; light flags extended
4	11-16	13-18	Moderate breeze	Dust, leaves, loose paper raised up; small branches move
5	17-21	19-24	Fresh breeze	Small trees in leaf begin to sway
6	22-27	25-31	Strong breeze	Larger branches of trees in motion; whistling heard in wires
7	28-33	32-38	Near gale	Whole trees in motion; resistance felt in walking against wind
8	34-40	39-46	Gale	Twigs and small branches broken off trees; progress generally impaired
9	41-47	47-54	Strong gale	Slight structural damage occurs; slate blown from roofs
10	48-55	55-63	Storm	Trees broken or uprooted; considerable structural damage occurs
11	56-63	64-72	Violent storm	Usually accompanied by widespread damage
12	64 and over	73 and over	Hurricane	

pH COLORIMETRIC METHOD

1. Rinse two 5 ml glass test tubes and caps with sample water three times.
2. Fill each tube so the meniscus is at the 5 ml line with sample water.
3. While holding the dropper vertically, **add 10 drops of WIDE RANGE INDICATOR SOLUTION (green)** to each test tube.
4. Cap, invert and shake each tube several times to mix.
5. Remove the cap and insert one test tube into the Octet Comparator (Black Box) and match sample color to appropriate color standard.

   HINT: Hold the comparator up so that light enters through the special light-diffusing screen in the back, but avoid viewing the comparator against direct sunlight or an irregularly lighted background.

6. Read pH measurement to the nearest 0.25 units. Record result next to ***Replicate 1*** under **Colorimetric pH**.
7. Repeat step 5 for the second test tube and record result next to ***Replicate 2***.
8. Check the ***DQO box*** if the two readings meet DQO and be within 0.25 of one another. Re-do the test if DQOs are not met.

DISSOLVED OXYGEN FIXING

1. If possible, rinse the outsides of each 60 ml sample bottle in the stream before submersing it in your bucket.
2. Rinse the outsides and insides of each 60 ml sample bottle 3 times.
3. Fill each sample bottle *in situ* or from bucket by submerging **upright capped** bottles to mid depth, uncapping, and re-capping when filled. Invert cap while bottle is filling and tap the side of the bottle to dislodge air bubbles.
4. Invert bottles to check for bubbles after each one is filled. If bubbles are present, empty the bottles outside of the bucket and refill.
5. When all bottles are filled and free of bubbles, place bottles in kit.
6. *Wearing gloves and safety goggles*, uncap all 3 bottles.
   Add 8 drops of MANGANOUS SULFATE SOLUTION (pink reagent) to each sample.
   Then **add 8 drops of ALKALINE POTASSIUM IODIDE AZIDE (clear reagent)** to each sample. Avoid splashing, mixing in air, and dropper tips touching the sample. Re-cap all three bottles and mix gently back and forth for 15 seconds.
7. Allow the precipitate to settle past the neck and down to the shoulder of the bottle.
8. When precipitate has settled below the top of the label on the bottles, uncap all three bottles.
9. **Add 8 drops of SULFURIC ACID (clear solution)** to each sample bottle.
10. Cap the bottles and mix by tipping gently as before **until the precipitate has dissolved**. The DO is now "fixed".
11. Record the fix time and the temperature of the water *in situ* or in the bucket at this time.
12. Perform DO titration at home or in the field **within 6 hours**.

IMPORTANT NOTE: THE DO BOTTLES MAY BREAK IN COLD TEMPERATURES! TRY KEEPING THEM IN A SHIRT POCKET TO STAY WARMER.

WATER SAMPLE COLLECTION
2.5 Gallon Sample Bucket

1. Rinse the bucket three times with sample water **downstream of your sampling site.**
2. At your sampling site, lower the bucket gently into the water, and fill it to a level about 2 inches from the lip of the bucket. If the water at your site is more than an arm's length away, your bucket should have a rope tied to the handle. After securing the other end of the rope to something solid, fill the bucket by turning it upside down and dropping it straight down into the water. This will help avoid the futility of having the empty bucket floating all over the surface and refusing to fill.
3. If you are working in very shallow water, do not disturb the bottom while collecting the sample, this will artificially increase the turbidity. Don't slosh the bucket around, as this may increase the dissolved oxygen content. Once you've collected the sample, handle it gently and avoid letting debris enter the bucket.
4. Keep bucket in the shade so the temperature will not increase.
5. Record the time the sample bucket was collected.

IMPORTANT NOTE: COLLECT YOUR BACTERIA SAMPLES BEFORE CONDUCTING ANY OTHER TESTS TO AVOID CONTAMINATION!

BACTERIA PIPETTING

1. Use your sharpie to mark the lids of 2 bottles of Coliscan Easygel™ with the numbers 1 and 5. Under **Coliform Bacteria,** record the ***Easygel Exp.*** , checking to make sure the Easygel is not expired.
2. Use the sterile pipette included in your kit to carefully draw a 1 ml water sample *in situ* or from your sample bucket and deposit it into the Easygel™ bottle you have marked as 1. Repeat the process once more, this time drawing and depositing a 5 mL sample into the bottle marked 5.
3. Under **Coliform Bacteria,** record ***Time Mixed*** on your datasheet and ***circle the location*** you drew the sample from. You have six hours holding time until you need to plate the sample in a petri dish. Keep the bottles cool until then.

TURBIDITY SAMPLE COLLECTION
250 ml Sample Bottle

1. Completely fill in the label of your acid-washed 250 ml bottle with sample#, site#, date, time, and your name.

2. Under **Turbidity Sample Collection,** record the ***Bottle #*** on your datasheet.

3. Rinse the sample bottle three times with sample water downstream of your sampling site.

4. Fill the bottle *in situ* at your sampling site, mid stream and mid depth. If filling the sample bottle *in situ* is not possible, fill the bottle from the bucket.

5. Record the sample collection ***Time*** and ***circle the sample location*** on your datasheet.

6. When finished with monitoring, take sample bottle to the lab and refrigerate there, or, if you are not going directly to the lab, keep refrigerated (4-10°C) until brought in to the lab. The holding time for the analysis to be performed is 24 hours recommended, up to 48 hours allowed, so bring the sample in on Monday morning or ASAP if sampling on Sunday.

WATER TEMPERATURE

IMPORTANT NOTE: GET THIS MEASUREMENT AS SOON AS POSSIBLE AFTER TAKING THE BACTERIA SAMPLES, ESPECIALLY IN THE SUMMER WHEN THE BUCKET TEMPERATURE MAY START TO INCREASE!

1. If possible, hang thermometer (green liquid fill) *in situ* where sample was collected. If you are not able to measure in stream, hang water thermometer inside sample bucket immediately after pipetting bacteria sample.

2. Read thermometer as soon as the temperature has stabilized – at least 5 minutes after hanging in the bucket. Record temperature and time on datasheet under Replicate 1.

3. Check the thermometer again in 2-5 minutes. If the temperature is not the same as the first reading, continue checking the thermometer at one minute intervals until you readings within 0.5 degrees of one another. The two readings that meet the DQO standards need to be made within 5 minutes of each other.

4. Check the DQO Met box if the two readings are within the DQO.