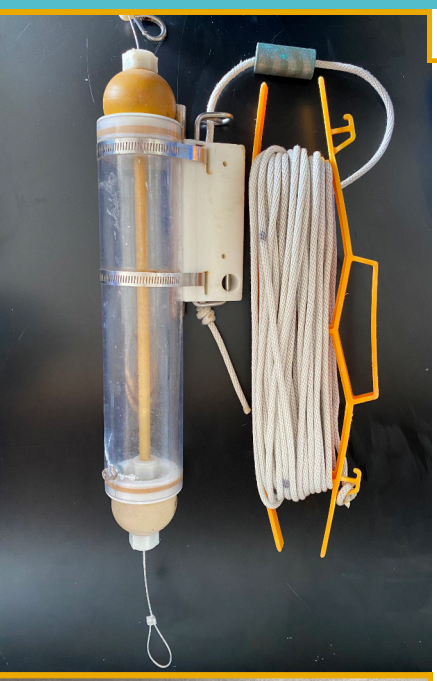
Crystal Cove's Marine Protected Area

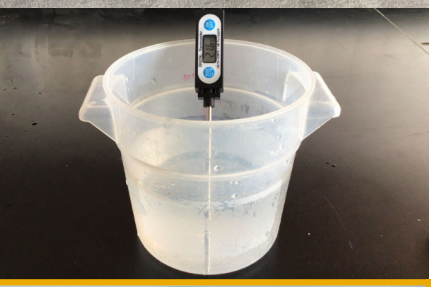
Equipment User Guide



Van Dorn Bottle

A Van Dorn Bottle is used to collect water samples at specific depths. These samples are used for our other water quality measurements.

1. **Pull** on the end cap with the loop and press down on the pin release.
2. **Secure** the end cap loop around the trip mechanism pin.
3. **Pull** the end cap with the hook on the opposite end and hook the end cap to the wire above the loop.
4. **Lower** the Van Dorn Bottle to the desired collection depth.
5. **Release** the messenger to activate the trip mechanism.
6. **Retrieve** sample.



Thermometer

A thermometer is used to measure the temperature of the water sample.

Surface seawater temperature range within the Crystal Cove State Marine Conservation Area: 60 - 68 degrees Fahrenheit or 15.5 - 20 degrees Celsius.

1. **Uncap** thermometer and put the metal end into sample cup.
2. **Turn on** thermometer.
3. **Let thermometer rest** until temperature stops changing.
4. **Record** the value on your data sheet.

pH Meter

A pH meter is used to measure the pH of the water, in other words, how acidic or basic it is.

Average seawater pH within the Crystal Cove State Marine Conservation Area: 8.1 pH

1. **Move** meter probe from fresh water cup to sample cup.
2. **Turn on** meter.
3. **Let meter rest** in sample until the reading stops changing.
4. **Record** pH on your data sheet.
5. **Turn off** meter and return meter probe to fresh water cup.

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Hydrometer

A hydrometer is used to measure the salinity of the water sample.

Seawater salinity range within the Crystal Cove State Marine Conservation Area: 33 - 35 parts per thousand (ppt)

1. **Fill** hydrometer with the water sample from cup.
2. **Use** wooden stirrer to remove bubbles from pointer. Bubbles tend to form along the bottom of the pointer.
3. **Read** the scale for salinity, measured in parts per thousand. (The other scale is for specific gravity.)
4. **Try to hold the hydrometer level.** Read the scale and estimate where pointer is. Record the value on your data sheet.

Dissolved Oxygen Kit

A dissolved oxygen kit is used to measure the amount of oxygen that is dissolved within the water sample.

Seawater dissolved oxygen range within the Crystal Cove State Marine Conservation Area: 5 - 6 parts per million (ppm)

1. **Rinse** the sample bottle.
2. **With the bottle closed,** submerge it into the water sample and uncap it to fill the sample bottle.
3. **Tap** the bottle to get rid of any bubbles within and cap it while it is still submerged.
4. **Open** the sample bottle and add 8 drops of ***manganous sulfate solution*** and 8 drops of ***alkaline potassium iodide-azide***.
5. **Close** the sample bottle and invert it back and forth until a precipitate forms.
6. **Once precipitate forms,** allow the sample bottle to sit until precipitate settles below the shoulder of the sample bottle.
7. **Reopen** the sample bottle and add 8 drops of ***sulfuric acid***.
8. **Close** the sample bottle and invert it back and forth until the precipitate and reagent dissolve and the sample turns clear-yellow to orange.
9. **Grab your titration tube** and fill it with the contents of the sample bottle until 20mL.
10. **Using your plunger,** collect sodium thiosulfate by inserting it into the bottle and inverting it until the contents in the plunger reach the zero mark 0.
11. **Use the plunger** to slowly add ***sodium thiosulfate*** into your titration tube until the contents turn to a pale yellow color. Swirl the titration tube as you add drops.
12. **Remove** the cap and plunger from the titration tube, to add 8 drops of ***starch indicator*** solution into the titration tube. The sample will start to turn blue.
13. **Recap** your titration tube. Using the plunger, continue adding ***sodium thiosulfate*** into your solution until the solution becomes clear. Swirl the titration tube as you add drops.
14. **When the solution is clear,** remove the plunger and read where the remainder of the content is.
15. **This is the dissolved oxygen within your sample.** Record the value on your data sheet.