[INTRO](http://docs.google.com/intro.html) | [HYPOTHESIS](http://docs.google.com/hypothesis.html) | [PROCEDURE](http://docs.google.com/procedure.html) | [DATA](http://docs.google.com/data.html) | [CONCLUSION](http://docs.google.com/conclusions.html) | [IMPORTANCE](http://docs.google.com/importance.html) | [RECOMMENDATIONS](http://docs.google.com/recommendation.html) | [BIBLIOGRAPHY](http://docs.google.com/bibliography.html)

## **Procedure**

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| --- | --- |
|  | Because my project, was more of a research/study, there isn't an extensive procedure that goes into it. Not to mention money. |

**Materials needed:**

* tide pool location
* tide chart book
* tape measurer
* thermometer
* hydrometer
* Informational books, and references

**Procedure:**

**1 - select days to go to the tide pools ( Pillar Point)**

* pick up a tide chart book from you local drug store
* look up the month and days that are convenient for you that are at negative tides. (the negative tides are marked in red)
* record the times and the tide level of the days selected
* look in the middle of the book for the "correction table" and look up Halfmoon Bay (closest to Pillar Point). It should read that you are to take off 50 min. from the given time ex-if it said a -2 tide on Mon 3, at 2:00, then take off 50 min from that, meaning the tide should be fully out at 1:10.

**2 - chose a topic/getting basic observations**

* bring paper and a pencil to record any observations (a seashore field guide book might be useful for identification)
* go to (the) Pillar Point on one of the days you have selected (there is a 15 minute walk to the tide pools, so I have found that if you arrive 1 hour before the tide is to be fully out, then you won't be pressured for time)
* explore, get a feel of what the area is like, ask yourself questions, find some organisms that interest you. If looking for sea urchins, go to the low tide line (the edge of the water), start close to the beach and work your way down
* explore the low tide line and make observations on where things live, what they might eat
* work you way back to the beach area, looking in pools in the higher intertidal zone, making observations, ask yourself questions-like why are there more organisms in this place than over there?, what kind of organism is this?
* record your observations
* go home, think about the observations you made, research about things that interested you
* make (a) one or two more trips out, and decided what you like most, or what your biggest question is that you want to explore
* decide what you want your main question to be, and pick the location at which you want to research

**a. If you are doing the sea urchins**

* pick a spot along the low tide line at which has an abundance of sea urchins
* then pick a pool closer to shore (higher intertidal range) that doesn't have as many sea urchins
* write down observations, how much algae is present, where they are (rough waters, calm) at each location
* go home and research your ideas and ask yourself-why are there so many sea urchins in the lower intertidal then there are in the higher intertidal?
* research a little, and make a hypothesis and a prediction

**3- collect data**

* go back to the tide pools, bring with you the hydrometer, thermometer, measuring tape, and writing utensil
* measure off an area near the low tide line that you have chosen (maybe 3'x5'?)
* mark it somehow, or remember it, so that you can come back to it at another date
* count how many sea urchins are there (make sure you look in all crevices, and closely, they like to be on top of each other)
* fill the cylinder up half way (from the hydrometer) with water from you location
* put the float in it and let it sink until steady
* read the number where the water line is at, and record in parts per million (ppm)
* put the thermometer in the water
* leave it there for a couple of minutes, then record the temperature
* repeat steps for your location in the higher intertidal zone
* go home and research more about sea urchins
* your information will be enough, but it might be useful to go back a couple of other times, maybe once a month, and repeat the same steps, and make more observations

**4- research your hypothesis/question**

* go to the library to look up sources ( I have found that there aren't any books on sea urchins themselves, so look up sea life, or something more general)
* go to borders, or a local books store, and find books there (good sources "Between Pacific Tides" by Ricketts, Calvin, Hedgpeth, and Phillips-there are many series of these)
* talk to people, contact professors at schools, etc.
* come up with conclusions why the sea urchins might be so dense near the low tide line, versus the ones in pools in higher intertidals, that correlate with the data that you have collected