So far, we have primarily focused on experiments that exclude or transplant organisms to test hypotheses about the influence of abiotic factors (e.g. environmental temperature and submergence time) and biotic interactions (e.g. predation, competition, facilitation) on biodiversity patterns *within* intertidal sites. Now we will consider how comparative studies (i.e. observations across multiple locations) can help us to evaluate hypotheses about community structure varies between intertidal sites with different properties.

**How do habitat factors like wave exposure and substrate type influence intertidal species diversity and abundance?**

We are going to address this question by sampling and comparing intertidal invertebrate communities at sites that differ in habitat structure near to BMSC. Specifically, we will focus on Scott's Bay, which is home to abundant intertidal life occupying high wave exposure habitats (outside of the bay) and low wave exposure habitats (inside the bay). Intertidal species vary greatly in abundance, body sizes, appearance (e.g. cryptic colorations), and mobility. As a result, one sampling method is unlikely to accurately capture the distribution and abundance of all the community members within the intertidal zone.

# Assignment Goal

In class, you will generate hypotheses about various aspects of habitat structure (e.g. wave exposure and substrate type) that influences species diversity in the intertidal zone. We'll then discuss the utility of a range of approaches used by intertidal ecologists to sample species with different characteristics. We will then work together to develop a sampling scheme to assess the diversity and abundance of the species you learned to ID in Assignment #1. Then, on Thursday afternoon we will head into the field and put the sampling plan in to action.

This project involves group work (~4 students per group) in the field and to write up the project. Field data collected by each group will be pooled to produce a class-wide data set for the analysis. Overarching project tasks include:

1. Field data collection (on Oct 25th)
2. Data management (entry, quality assurance, and meta-data creation; by Oct 26th)
3. Data analysis & graphing
4. Speed talk presentations (Nov 1st)

Each phase is described in more detail below.

# 1. Field data collection (10 points)

We will carry out biodiversity sampling at Scott's Bay on the morning low tide (1.8m @ 0920) on Monday, Oct 25th. We will work together in class on Friday morning to develop the spatial sampling plan, create data sheets for recording information generated by each sampling method, and conduct a dry run of the plan. Sampling equipment includes transect tapes, quadrats, clipboard, data sheets, and pencil.

# 2. Data entry and sharing (10 points)

Data from each group must be entered into a class-wide master spreadsheet. Coordinating data entry and ensuring that data are error free is essential for any science project. Review your notes from Friday morning about best practices when entering and storing data, and to decide upon a data entry format. **Each group is responsible for entering their data into the class spreadsheet by 4pm on Oct 26th.**

## 3. Data analysis and visualization (10 points)

Your analyses and displayed results must relate to the hypotheses you made about the effect of habitat structure on intertidal community structure at the outset of the project. The challenge here is to decide on how best to present your results- as is the case with all primary research. Begin by exploring the data, making some preliminary graphs, having discussions with your teammates, and discussing challenges with your instructors. You will need to decide on the best approach for displaying the main results. Your group should create 2-3 clear graphs that visually display your results, and one summary table of the results of accompanying statistical analysis.

## 4. Speed talk/ digital presentation (10 points-graded individually)

Rather than a written report you will create a digital poster presentation as a way for you to practice succinct science communication. Each member of the group will prepare an individual presentation geared towards either the scientific community or the general public. Each digital poster will be encompassed in the equivalent of 1 powerpoint slide and use the graphs and tables created by your group. Your grade will be based on the following criteria:

- Clarity of your hypothesis/ question
- Appropriate use of figures and tables as aides
- Appropriate language for target audience
- Clarity of results /your conclusions

## Submission Details

Use the GitHub classroom link here: https://classroom.github.com/g/Og6uSyIi to accept the assignment and view submission instructions.