



Foldscope Activity - Exploring Algae

LEADER'S GUIDE

*Education is not the filling of a pail,
but the lighting of a fire.*
- William Butler Yeats

Activity Description

Participants will explore algae samples. They will identify the different parts of several algae samples and observe the differences in color, form, and cell structures.

Ages: 10+

Recommended Ratio: Variable, ideally 1 leader to 8-10 students

Time: approx 1 hour

Ocean Literacy Principles: 5 - The ocean supports a great diversity of life and ecosystems.

Materials

Foldscopes, slides and clear tape, algae, knife to cut samples, cutting surface, reference materials.

Optional Materials:

Light box for viewing, smart phone or tablet, additional references or internet for identification and information.

Options

- Algae samples can be brought into the classroom for participants to make slides.
- Participants can search for algae samples while walking on the beach.
- Slides can be pre-prepared if there is not enough time.

Risk Assessment

- Foldscopes should never be viewed looking into the sun or into direct, unfiltered light.
- Participants should be careful working with glass slides to avoid cuts.
- Caution should be used if knives are used to prepare samples.



LESSON STEPS	LEARNING OUTCOMES
1) The Leader should introduce algae explaining what they are, the three families and how to identify them, their important role in the ecosystem, the impacts of pollutants and algae blooms, and the type of fish that depend on certain algae.	Students should come away with a general knowledge about algae such as their role in a balanced ecosystem with coral reefs, the negative impacts of high growth rates caused by fertiliser run-off and human waste, causes and impacts of toxic algae blooms, algae as a human food source and alternative livelihood for fisher folk, and the importance of algae in providing food and habitat for many (local) species, particularly fish.
2) Ask students to examine their own algae specimens.	With the use of basic identification guides, students should be able to classify their algae samples into brown (Phaeophyta), green (Chlorophyta), red (Rhodophyta) and identify the species.
3) The Leader should explain how to cut or scrape, if necessary, the algae. Calcareous algae may need to be viewed in profile if the sample is too thick. Students should be able to fix a sample to the slide with clear tape or a plastic film cover.	Students should be able to prepare their own slides and view them. They should be encouraged to experiment with their methods to get the best results possible.
4) Students should work with the Foldsopes to correctly place the slides and focus on the samples. Depending on the thickness of their sample, they may need to vary the intensity of the light shining from behind/below the sample. They should draw on paper what they see through their Foldsopes.	Students should be able to draw what they view and indicate the presence and alignment of cell walls, the nuclei, etc. They should be encouraged to label their drawings and make notes.
Optional: If the Leader or students have smart phones or tablets, they can attach the magnet connector to their device and take photos of the samples.	Photos can be used for posts to www.microcosmos.foldscope.com , to share with classmates and family, and for other projects.

STEP 1

- Given the importance of algae, it is surprisingly difficult to find free sources of quality information - especially for algae in the tropics. We recommend that Leaders look at "Do You Know Your Marine Algae?" from the University of Maine: <https://bit.ly/2jnxpET> for a general introduction to marine algae.



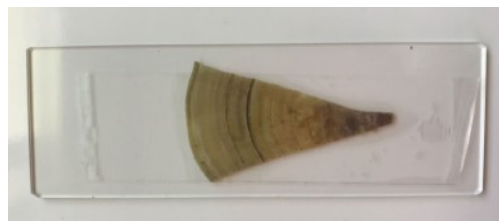
STEP 2

- We photocopied a 1-page color handout for students for identification of algae. The reference we used was "Snorkler's Guide to Marine Life of the Philippines," by Lee Goldman.



STEP 3

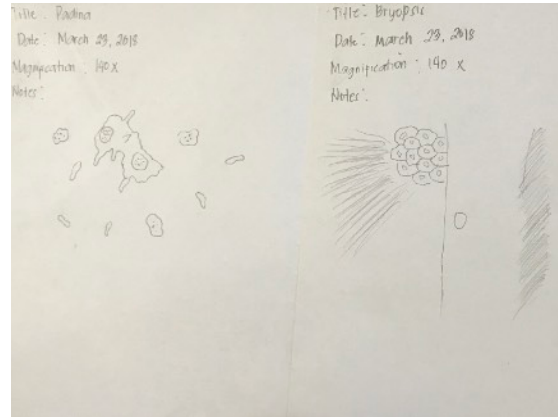
Students preparing slides with knives, cutting surface, tape, and slides:





STEP 4

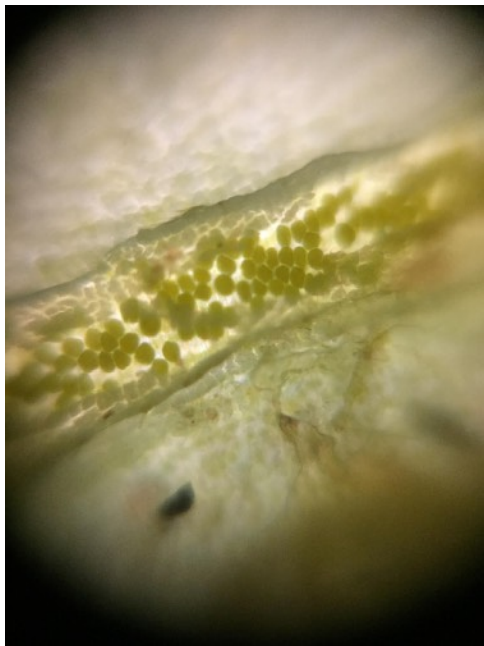
Viewing and drawing:



EXAMPLES

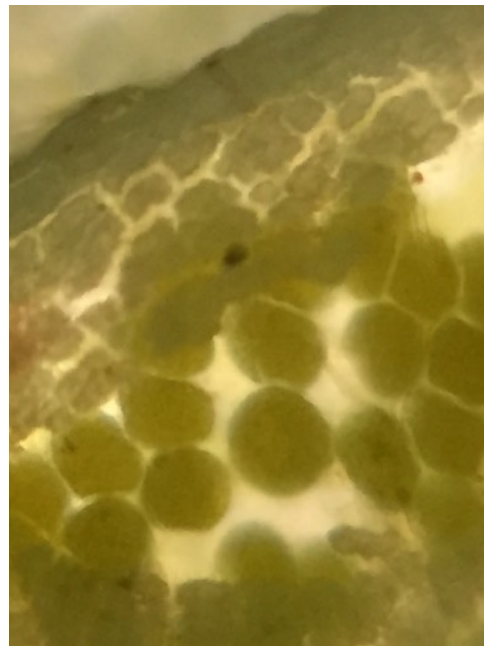
Photos taken with smart phone:

Foldscope lens only (x 140)



Padina sp.

Foldscope lens (x 140) plus x 5 zoom phone

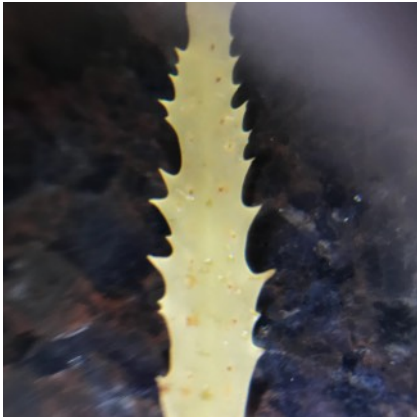


Padina sp.



Photos taken with smart phone, magnification unknown:

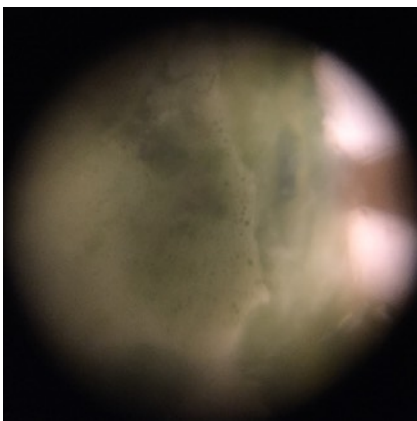
Sargassum sp. viewed with magnifier



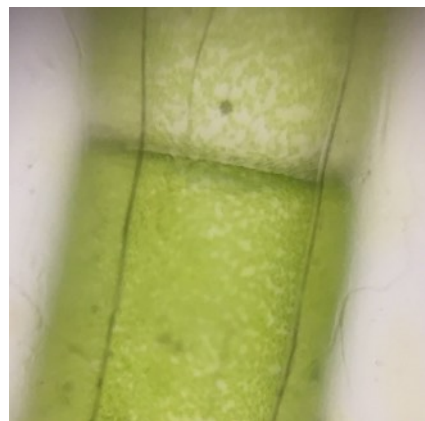
Sargassum sp. a brown algae



Halimeda sp. a calcareous green algae



Unidentified strand of green algae



Dichtomaria sp. a calcareous red algae

