

How to do practical learning in STEM education during a pandemic - examples of at-home experiments in plant biology

Anne Elisabeth Bjune and Ragnhild Gya

Department of Biological Sciences and bioCEED, University of Bergen, Norway

Bjerknes Center for Climate Research, Bergen, Norway

anne.bjune@uib.no - ragnhild.gya@uib.no

AIM

Practical teaching give authentic learning experiences and teach valuable skills for undergraduate students in the STEM disciplines. How can you do this during university lockdowns due to the COVID-19 pandemic. One solution is to do it at home.

At-home do-it-yourself (DIY) experiments include physical interaction with the study organism or system to give the students a practical, authentic learning experience while keeping their motivation high, even if teaching is off-campus

PEDAGOGY

Designing good off-campus teaching can be hard, we focused on these pedagogical tools to design these experiments to ensure the learning outcomes we wanted.

Student active
Inquiry based

Peer learning
Discussion seminars

BIO101 is an introductory course to evolution and systematics in microbiology, zoology and botany at the University of Bergen, Norway.

The botany module of the course include evolutionary development of plants, current systematics and morphological differences between groups.

EXPERIMENT 1

Water holding capacity in mosses

- Formulate a hypothesis
- Collect two moss species
- Measure wet weight
- Dry in an oven at 40 C for a few hours
- Measure dry weight
- What are your conclusions

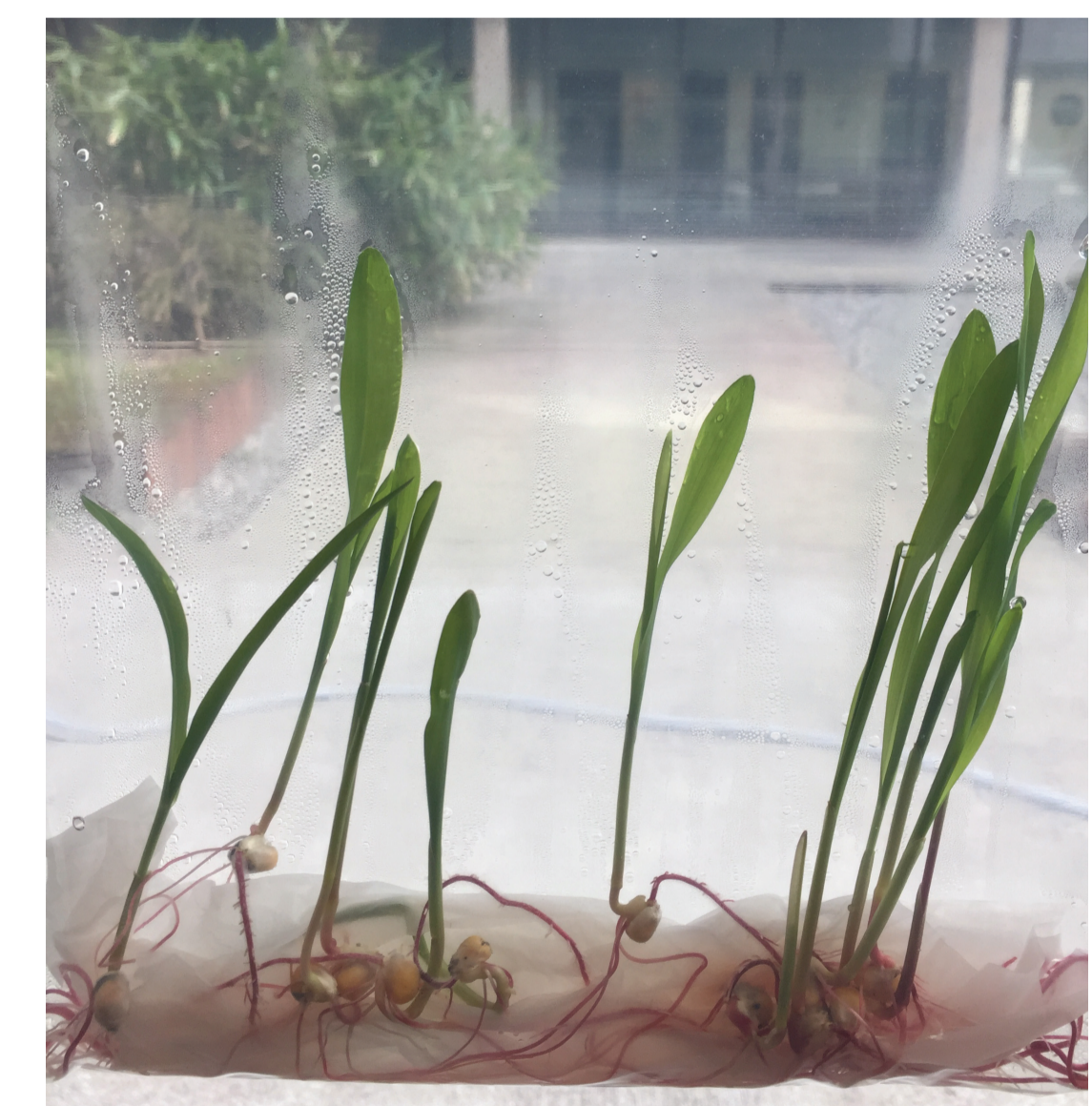


	Moss 1	Moss 2
Dry weight moss (g)		
Wet weight moss(g)		
Amount of water (g)		
Ratio water/dry weight moss (g)		

EXPERIMENT 2

Seed germination trial

- Find at least two types of seeds in your kitchen/garden
- Put them on moist paper in a sealed bag
- Observe the development of roots and leaves
- Take photos or make drawings twice a week
- Is it a monocot or dicot?



CONCLUSIONS

Based on the feedback from the students and our observations of the quality of the reports from the lab we have the impression that students were happy to do some practical work during lockdown and the quality of the reports submitted did not decline compared to previous years.

Reference:

Gya, R. & Bjune, A.E. 2020. Taking practical learning in STEM education home: examples from do-it-yourself experiments in plant biology. Ecology & Evolution, submitted