jove

WEBINAR SERIES
Remote Learning: Findings from a Crisis Period

Reimagining a Field Course for Virtual Delivery

Presented by:

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Faculty of Science, York University

Teach a Virtual Field Course? 😱

How we did #ScienceFromHome with #KitchenSinkEcology

Dr. Dawn Bazely
@dawnbazely on Twitter
@drbazely on Insta

For JoVE Webinars
Remote Learning: Findings from a Crisis Period
October 20, 2020

🙏 With huge support from
Alex, Spandan & Olga at JoVE

From IRL to online

- My In-Real-Life June 2020 field course was cancelled in March 2020 due to the Covid-19 pandemic
- I'm sharing my basic recipe for making a field course virtual, including designing affordable student science-at-home-course kits
- It can be extended to all science labs with:

  A. Some guiding principles for taking a (field) course online

  B. The basic approach and method

- Applying this thinking to a Halloween Trick or Treat Kit for friends' children 👻 🎃

IRL Biodiversity & Watershed Management 2020 was cancelled in March

Faculty of Science, York University Annual Review 2018: https://www.yorku.ca/science/wp-content/uploads/sites/31/2020/07/Faculty-of-Science-2018-Annual-Review.pdf

Virtual Biodiversity & Watershed Management ran Summer 1 Term May-June 2020

yes, that’s my model watershed made of recycling bin contents

At the beginning of April, I brainstormed how to transform a two-week field course that ran daily from 8:30 am to 5 pm, from Monday to Friday, to an online course that was not a duplicate of the field course experience, but which replicated many of those experiences as authentically as possible, and substituted equivalent learning

My main approach was to imagine parallel pandemic-public-health-policy compliant at home activities and to design and mail out an inexpensive kit — $20 CAD for the boxed contents — to 26 students. Please note that field courses usually have a maximum of 16 to 20 students and this virtual course could accommodate 10 more students than the 16 original, in-real-life spaces.

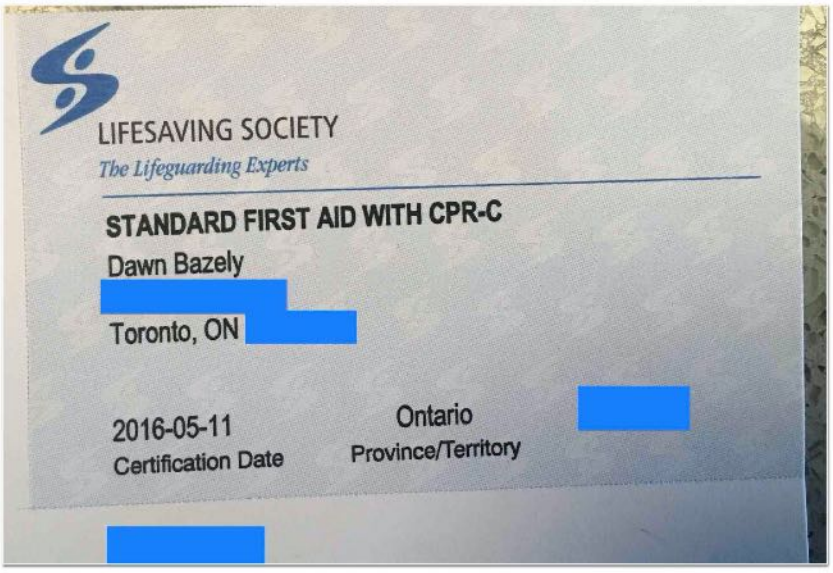
My department chair, Prof. Rob Tsushima and the Undergrad Programme Director, Prof. Paula Wilson were very supportive, as was the Teaching Technician Team.

From IRL to online

- My In-Real-Life June 2020 field course was cancelled in March 2020
- My basic recipe for designing a virtual field course & developing affordable student science-at-home-course kits:
  - Some guiding principles for taking a (field) course online
  - The basic approach and methods
- Applying this thinking to a Halloween Trick or Treat Kit 👻 🎃

From IRL to online:
Basic approach & methods

1. Some guiding principles for taking a (field) course online
   - research the history of your field of science
   - reflect on your own journey as a scientist: what did you really enjoy?
   - ask: what are my course teaching goals and outcomes?
2. The steps
   - set up your at-home workspace
   - mind map the course, research notes, cost out your at-home student lab kit
   - figure out what works at home — test it yourself
   - get help from your colleagues for virtual labs and lectures
   - and anywhere and everywhere else — and credit your sources (very important for building trust)



1) A crisis isn't the time to learn new skills

You will discover your pandemic-safe, virtual approach when you look back at science history and your own science journey

Every university and college course director can create your own virtual labs and an inexpensive at-home lab kit, but it does take quite a lot of creative energy and time.

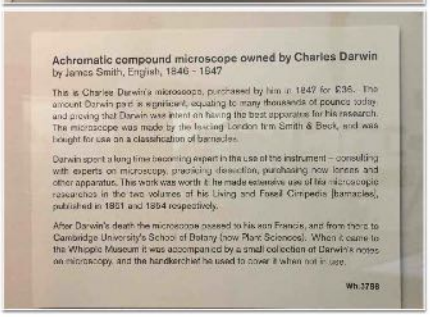
Therefore, rather than everyone reinventing the wheel, my aim is to help and support you, by doing some of the heavy lifting with this basic recipe.

Plus, a crisis isn’t the time to learn new skills.

I am always inspired by Google Scholar’s Standing on the Shoulders of Giants slogan

2) Technology is just a Tool

Whipple Museum of the History of Science University of Cambridge



If it's not working or available go back to basics and ask "what is the point?"

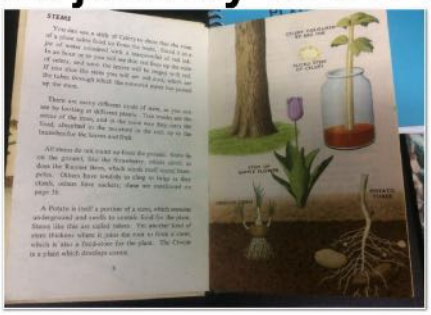
Today, science in the Global North is done today high tech equipment, but that was not always the case, especially with field research.
We teach students that "real science" needs lots of sophisticated gizmos. They help, but critical thinking about science is the driving force.
You will find your pandemic safe, virtual approach when you look back

at history and your own journey in science

Understanding low and high tech: https://dawnbazely.lab.yorku.ca/2018/02/digital-divide-chronicles-part-2/

Photos of Darwin's microscope from Whipple Museum of the History of Science, University of Cambridge: https://www.whipplemuseum.cam.ac.uk/

3) Remember your own journey to STEM



What inspired YOUR interest in science?

You will find your pandemic safe, virtual approach when you look back at history and your own journey in science

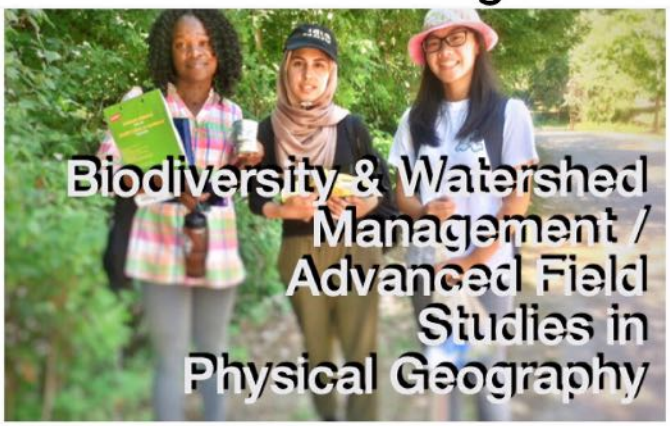
The Ladybird Book, Plants & How They Grow (1965) inspired my interest in botany and plant ecology: https://www.abebooks.com/book-search/title/plants-and-how-they-grow-a-ladybird-natural-history-

book/author/newing-f-e-and-bowood-richard/

I used these ideas in my Plant Biology lab and for a 2016 Advent Botany Post for the University of Reading.

My How to Create a Candy Cane Chrysanthemum Advent Botany Post: https://blogs.reading.ac.uk/crg/adventbotany-2016-how-do-you-create-a-candy-cane-chrysanthemum/

4) Review course learning outcomes



Exclusively for YorkU Geography, Biology & Environmental Science students

8-12 June 2020 &
15-19 June 2020
7:00 am-6 pm
Monday-Friday
Lumbers labs &
Kortright Cons. Area
Prof. Dawn Bazely

jobs for 2 weeks straight, due to weekend work commitments.

In week 1, students are introduced to field work, including how to identify, and monitor plant and animal diversity in different urban, and rural habitats. We are based in the green building of the Archetype House at Kortright.

In week 2, we form student teams, who carry out a 5-day research project developed in consultation with Science Teaching award-winneR Dr. Bazely.

We also learn about careers in physical geography, ecology, and environmental science.

Additional course fees are $350 for van

Our days are a combination of field, lab and classes. At the end of the course, you will:

1. Understand watershed function and biophysical monitoring theory.
2. Know how to use relevant field and lab equipment.
3. Design and carry out a research project, including analyzing and interpreting data.
4. Get hands-on fieldwork experience.

Read the 2016 course blog here:
www.watershedbiodiversity.wordpress.com

From IRL to online: Basic approach & methods

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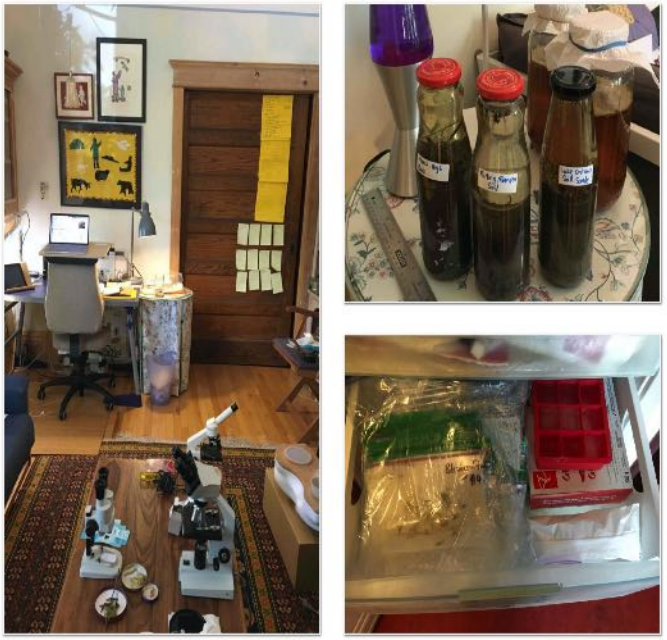
   - get help from your colleagues for virtual labs and lectures
   - and anywhere and everywhere else — and credit your sources

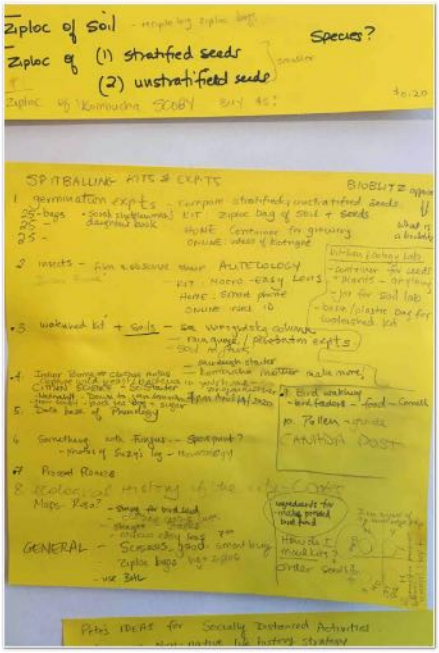
5) Set up your Home Workspace

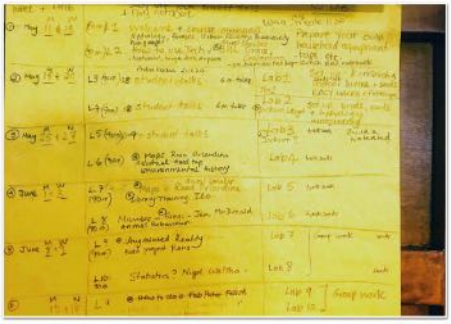


I moved within my home four times after the pandemic lockdown was announced in March: my husband was working from home & my adult children moved home and needed space for meetings. Plus we had an international visiting grad student to my lab in our basement apartment — she could not move onto campus when Winter Term ended because it

was closed to most people.
I ended up in the front sitting room. we moved out an easy chair and brought in my desk
remember that students are probably working under as cramped or more cramped conditions

6) Mind map your ideas





I did lots of online and offline research

I proposed and designed a kit as essential to delivering a hands-on, field course experience

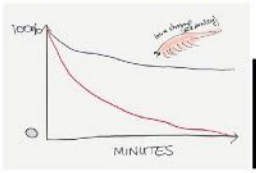
7) Frugal Innovation keeps costs low

Approaching Research with a Frugal Innovation Mindset

Professors Dawn Bazely (York) &
Shibani Chaudhury (Visva Bharati)

We developed a frugal but effective bioassay to test toxicity

- https://twitter.com/Shibanivb/status/793820027187236864



If it's not working or available go back to basics and ask "what are we doing?"

To reiterate: a crisis isn't the time to learn new stuff.

I was familiar with Frugal Innovation, having collaborated on this approach with colleague, Prof. Shibani Chaudhury

I have had access to millions of research dollars over my forty years of research (30 as a professor), but innovation is borne, more often, than

not, out of constraint

Prof. Manu Prakash’s Ted Talk:

https://www.ted.com/talks/manu_prakash_a_50_cent_microscope_that_folds_like_origami?language=en

https://www.foldscope.com/

7) Frugal Innovation to Reduce Cost

Soapbox Science brings high tech research to the streets with home-made props!

We featured our Frugal Innovation research at Soapbox Science
All the speakers had very cool home-made aids to explain very high tech research in plain language. Here are Sasha Welditch and Dr. Nadia Octave at the first North American Soapbox Science event, organized and hosted by Ryerson University, when my colleague, Prof. Imogen Coe was the

founding Dean of Science

http://soapboxscience.org/

8) What works at home?

I learned about Winogradsky columns on twitter, from microbiologist, Dr. Justine Dees, @justineldees.
Which led me to the JoVE video that students used.

What would students have at home?

-The most expensive item in the Field Course Kit was a pair of dedicated scissors!

I built in redundancy for the digital divide, wifi outages.

-This reduced student anxiety.

Shipping the kits with Canada Post tracking numbers hugely relieved my stress

Remember the Rivet Popper Hypothesis about redundancy in Paul R. Ehrlich, Anne H. Ehrlich 1981: Extinction: The Causes and Consequences of the Disappearance of Species (great book)

Biodiversity and Watershed Management Remote Field Course

Department of Biology, York University

Packing List for Your Field Kit – with Pictures –

to do Science at Home & Kitchen Sink Ecology

By

co-opted Course Technician:

YorkU Biology undergrad student, Ms. Carrie Ewins,

and Prof. Dawn Bazely

Document date: 8-05-2020

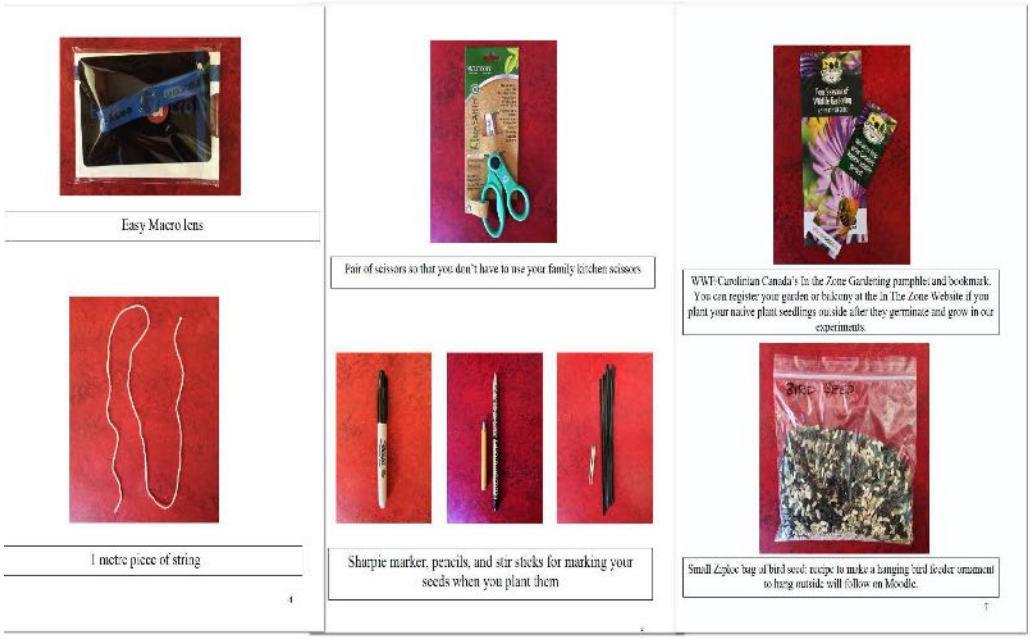
Large Ziploc bag of stratified seeds of five plant species: common milkweed (*Asclepias syriaca*), yellow giant hyssop (*Agastache nepetoides*), flowering onion (*Allium hollandicum* 'Purple Sensation'), bottlebrush grass (*Elymus hystrix*), blazing star (*Liatris spicata*)
Question: Which of these are native/indigenous species? Which are introduced/non-native species?
Question: What does the term stratification mean when applied to seeds?

Small Ziploc bag of live SCOBY in Kombucha starter

Small Ziploc bag of unstratified seeds (5 species: common milkweed, Giant yellow hyssop, flowering onion, bottlebrush grass, blazing star), sugar packets, a teabag, and a small piece of dried SCOBY
Question: What does the acronym SCOBY stand for?
Question: What is an acronym?

Zippered pouch containing Foldscope kit components, LED magnifier, spare batteries, and microscope slides

What was in the kit?



Easy Macro lens

1 metre piece of string

Pair of scissors so that you don't have to use your family kitchen scissors

Sharpie marker, pencils, and stir sticks for marking your seeds when you plant them

WWF/Canadinian Canada's In the Zone Gardening pamphlet and bookmark. You can register your garden or balcony at the in The Zone Website if you plant your native plant seedlings outside after they germinate and grow in our experiments.

Small Ziploc bag of bird seed: recipe to make a hanging bird feeder ornament to hang outside will follow on Moodle.

What was in the kit?

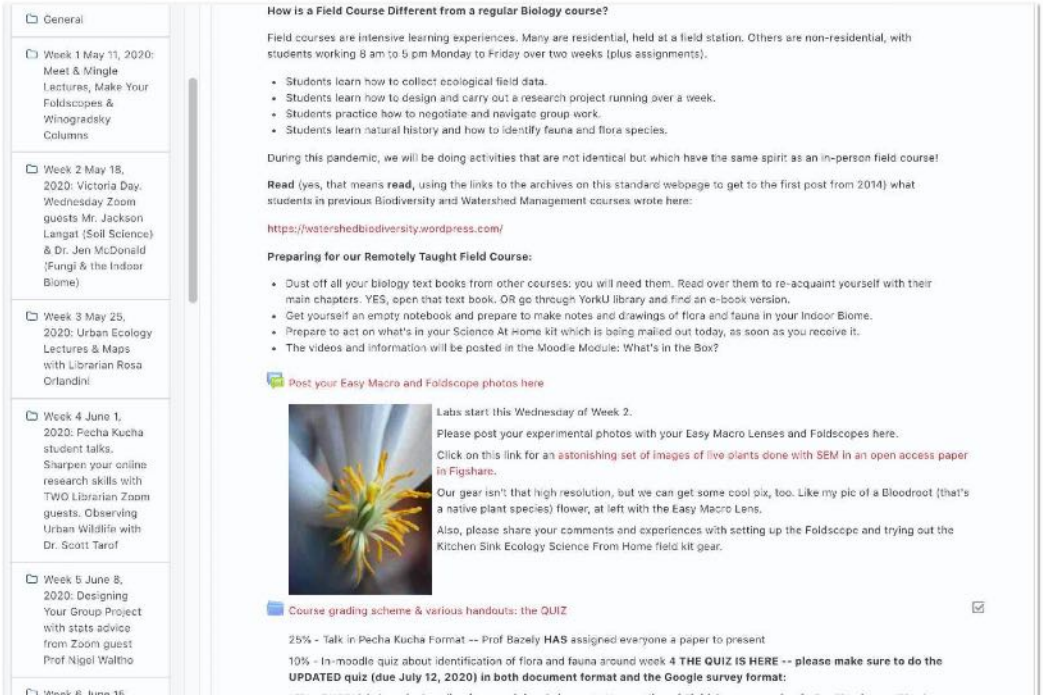
those scissors were appreciated!

9) Ask for help!

I asked my husband, Dr. Pete Ewins, who was WWF Canada's Senior Species Specialist until the end of June 2020 to help, former TA of the field course, Dr. Scott Tarof and Ms. Grace Costantino, the Outreach Manager of the Open Access Consortium, the Biodiversity Heritage Library and other colleagues, to help me by giving online talks and lab

exercise supports.

The virtual field course e-class



The virtual field course e-class

The virtual field course e-class

I made iPhone instructional videos

- they were easy to film
- BUT making them small enough files for students to watch without eating up wifi data was time-consuming work
- I stopped at 2 sets!
- The students kit contained bags of dry potting soil from the YorkU greenhouse
- here, my husband explains seed-planting:
- https://vimeo.com/423763404
- https://vimeo.com/423763733
- https://vimeo.com/423764862
- ps I was thrilled to have the JoVE Winogradsky video

10) Hallowe’en Uncertainty

I designed a Trick or Treat Kit for young neighbours & friends & colleagues’ children

I used paper, inexpensive candy, markers and wool scraps — each box cost about $5 plus time

Double-sided tape was really useful

Questions?

Thank you to Alex Winzenread, Spandan Sharma and Olga Karanikos from Jove for allowing me to share my pedagogical work and teaching.

Time for questions!

1) A crisis isn't the time to learn new skills

2) Remember: Technology is just a Tool

3) Remember your own journey to STEM

4) Review course learning outcomes

5) Set up your Home Workspace

6) Mind map your ideas

7) Frugal Innovation to Reduce Cost

8) Figure out what works at home

9) Ask for help!

10) My approach applied to a Hallowe'en Kit for Kids to Trick or Treat at Home

bit.ly/remotelearningwebinars