

# ‘Kitchen Oceanography’

**HYPOTHESES AND EXPERIMENTS IN THE COVID-19 ISOLATION-KITCHEN**

**Helen McGregor, SMAH**



UNIVERSITY  
OF WOLLONGONG  
AUSTRALIA

# Kitchen Oceanography context

- Subject: 2<sup>nd</sup> year MARE200 Introduction to Oceanography
- 33 students (inc. 6 international)
- Physical oceanography (e.g. currents, circulation), marine biology, marine chemistry
- My first time teaching and coordinating in the subject –
  - Run the subject as is to evaluate if the subject was fine as is or needed revisions

**AND THEN ALONG CAME COVID-19!!!**



# The COVID-19 challenge

**Translate a hands-on chemistry experiment on ocean salinity (the Ice Cube Challenge) for pandemic remote delivery**

Fundamental concepts in the original practical:

- Formulating and revising hypotheses
  - Seawater is not just salty water - salt changes the water density and drives global ocean circulation
  - Seawater temperature differences - lead to convection
- 
- Can show a bunch of slides instead but far better to make the observations yourself and go through the process of revising a hypothesis
  - Lightbulb moment: We all have more or less have everything we need to run the experiment in our kitchens....**the COVID-19 Isolation-Kitchen was born!**



A MARE200 GUIDE IN THE TIME OF COVID-19

# *Kitchen Oceanography*

WITH ASSOCIATE PROFESSOR HELEN MCGREGOR

ICE CUBE CHALLENGE EXPERIMENT



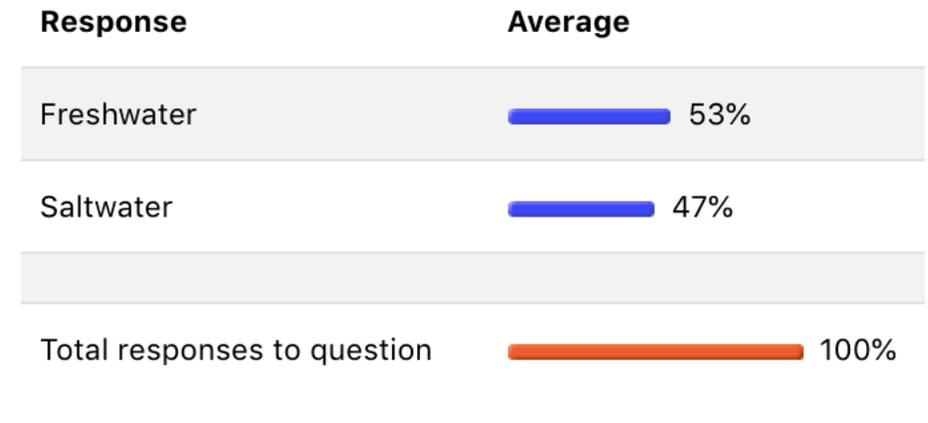
# Ice cube challenge experiment workflow

**YouTube channel:**

<https://www.youtube.com/channel/UCf649MUfVLc5sOIqUvSRTug?app=desktop>

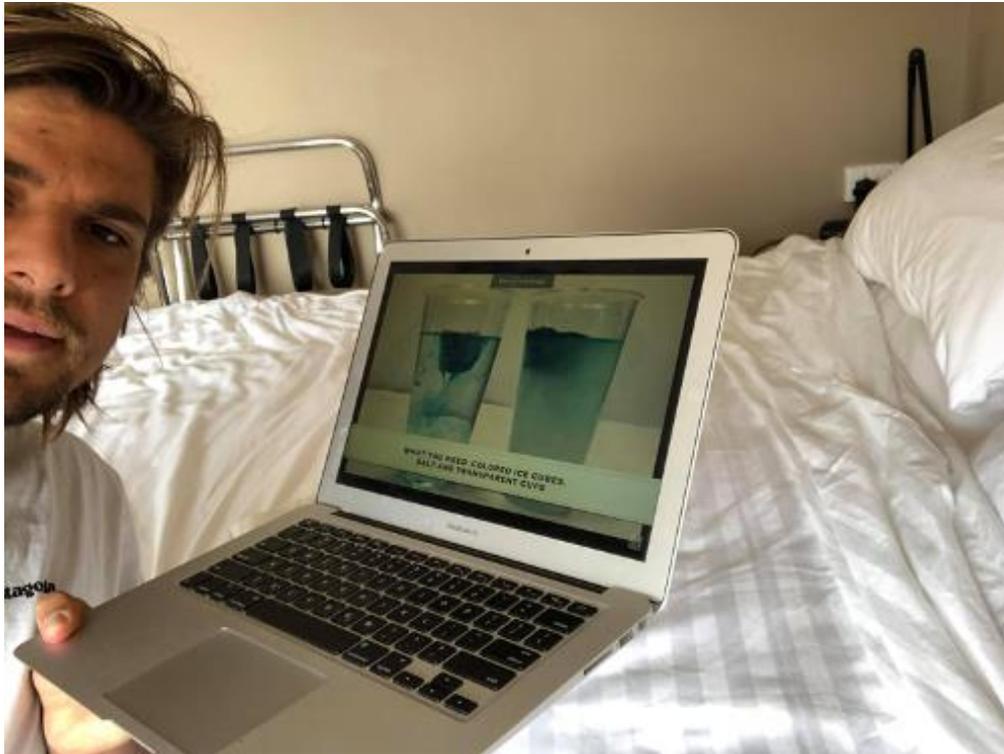
- Watch video on experimental setup
- Moodle questionnaire 1a:
  - Watch video of experimental setup
  - Which ice cube would melt first, the one in seawater or the one in freshwater?
  - Why?
- Conduct experiment & make observations
- Moodle questionnaire 1b:
  - Record observations
  - Refine hypothesis
  - Repeat experiment with food dye to see what's going on
  - Refine hypothesis a second time
- Relate to ocean circulation - discuss in groups

**Which ice cube will melt first, the one in seawater or the one in freshwater?**



# Kitchen Oceanography in action

**INCLUDING FROM QUARANTINE**



# Conclusions & open questions

## Challenges translating this back into the classroom

- The formal structure from the Moodle questionnaire helped the students crystallise their initial hypothesis and then refine their hypotheses
- It got them away from their computer screens, element of fun
- Other science concepts could be open to this approach e.g. serial dilution (e.g. make own hand sanitiser, surfactants, viscosity, materials properties (cornflour))
- How to translate into in-person classroom?
  - Back in the lab - much more formal e.g. inductions, technical support resources etc - seems overkill
  - Possibly a combo of pre-work, experiment station, more in-depth investigation of application to oceanography

