

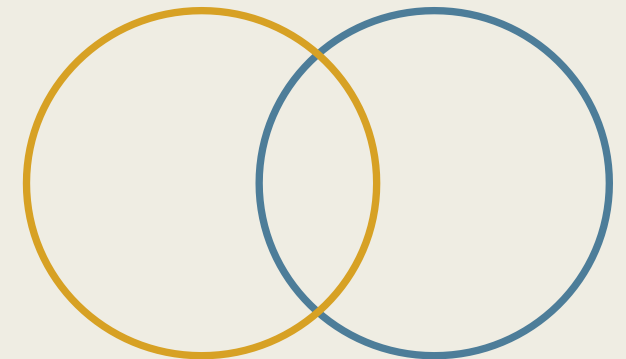
Teaching Geoscience Out-of-Field with Digital Technologies: Understanding Agency through Positioning Theory

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Professional Expectations

- Develop professional capacity to use digital technologies (AITSL, 2011);
- Build students' skills in authentic science contexts (ASTA, 2002);
- Equip students for '21st century' by teaching ICT through inquiry (ACARA, 2014); and
- Integrate digital technologies curriculum into science (VCAA, 2016)



Personal and pedagogical beliefs:

- Digital technologies (e.g. Ertmer, 1999, 2005; Ertmer et al., 2014 Tondeur et al., 2017);
- Science education (e.g. Chen et al., 2014; Kind, 2016; Mansour, 2009, 2013)

Reality: Highly accomplished in some areas but not others (Carlsen, 1992; Nixon et al., 2016; Sanders et al., 1993);

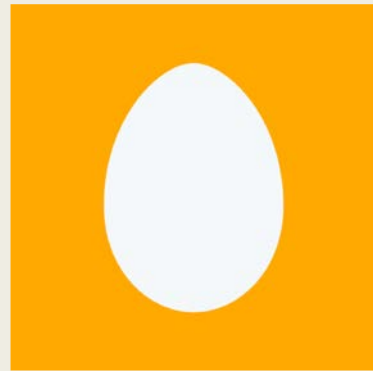
Geoscience: Largely taught by non-specialists (King, 2008, 2013, 2015)



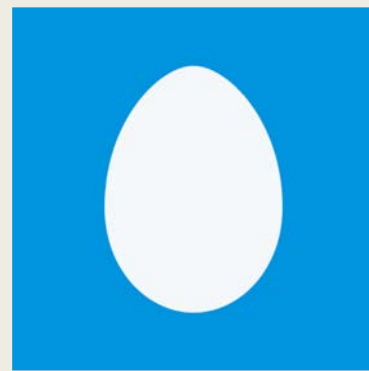
(Hobbs, 2015; Hobbs & Törner, 2019; Ingersoll 1990, Price et al., 2019)

To what extent do secondary science teachers' perceptions of their agency change as they are supported to teach an out-of-field area of the curriculum with digital technologies?

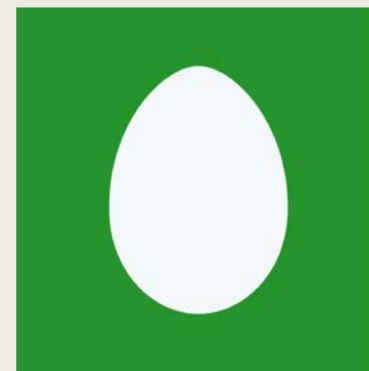
- 10 teachers



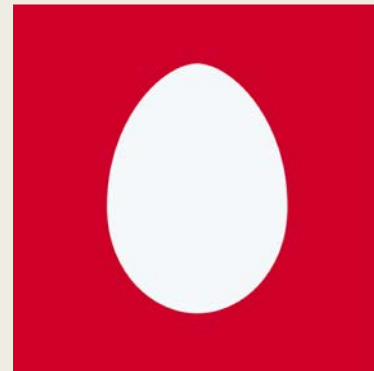
Rachel



Charlotte

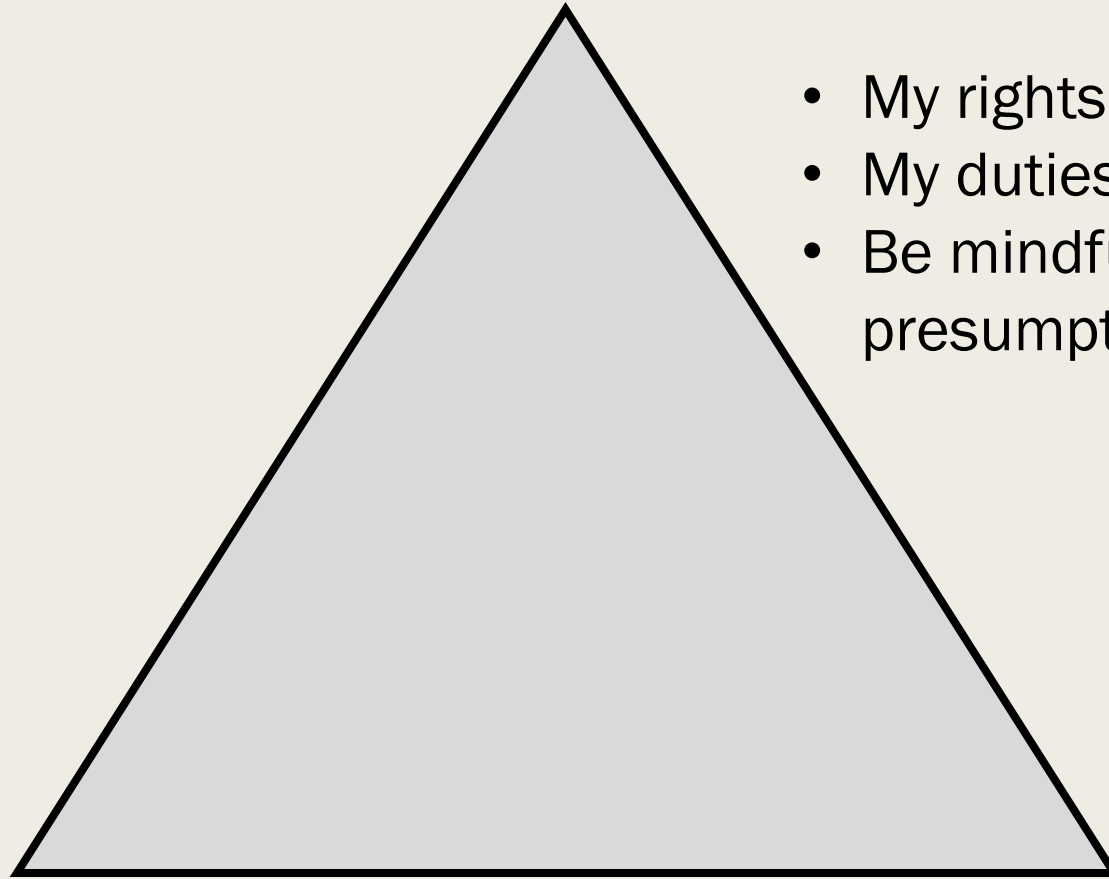


Ethan



Isabelle

Rights/Duties: Positions



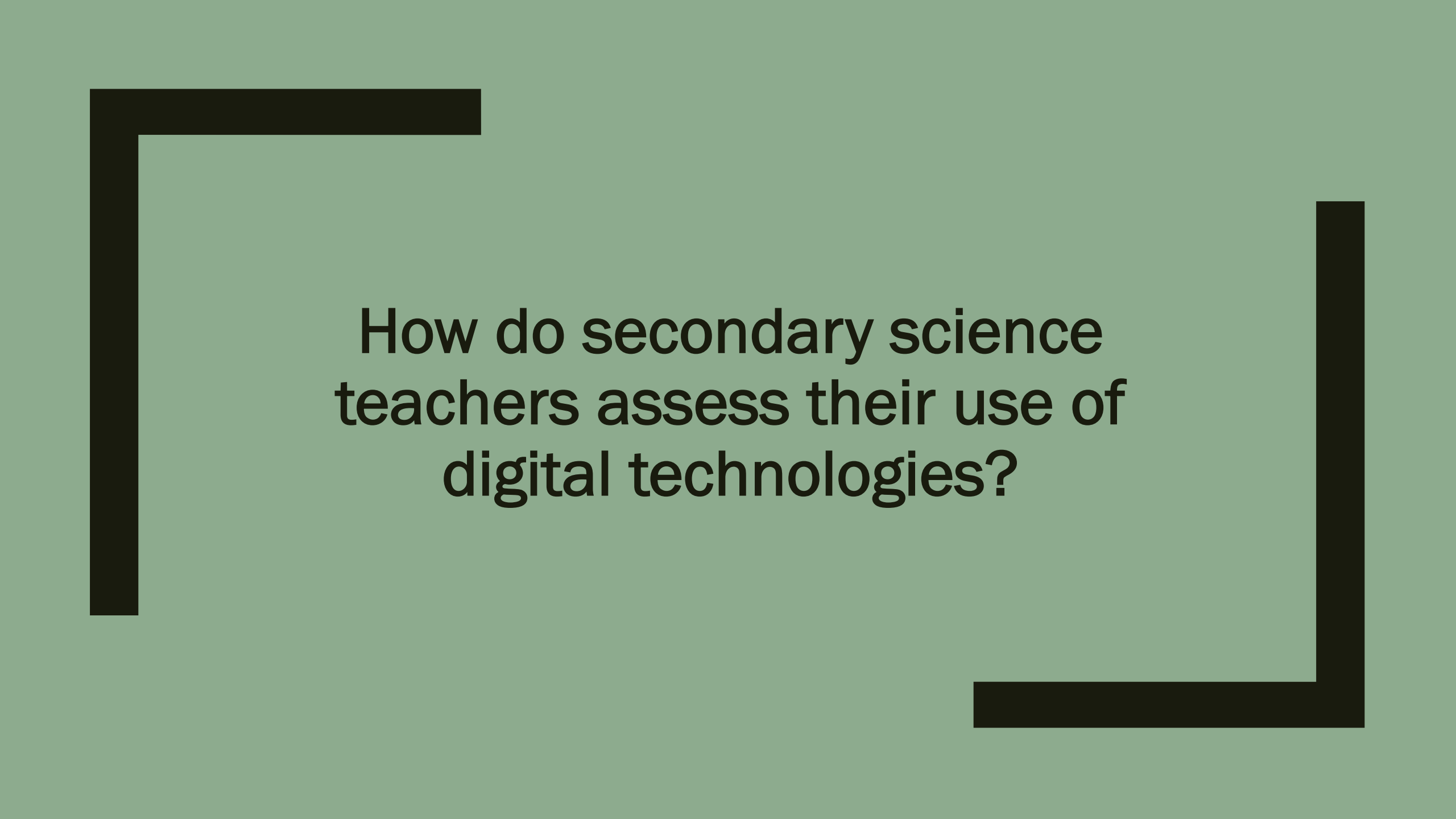
- My rights are what you must do for me
- My duties are what I must do for you
- Be mindful of the symmetry presumption (Harré 2012)

Say/Do:
Discursive
Practices

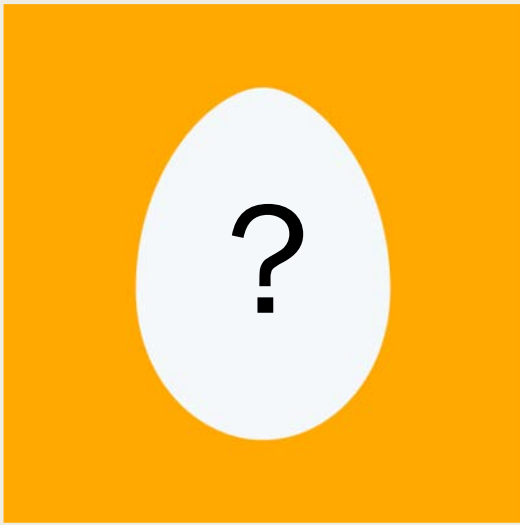
- Assumptions inform behaviors
- Expectations arise out of assumptions

Storylines

- Cover, Sacred and Secret Stories (Clandinin & Connelly, 1996)



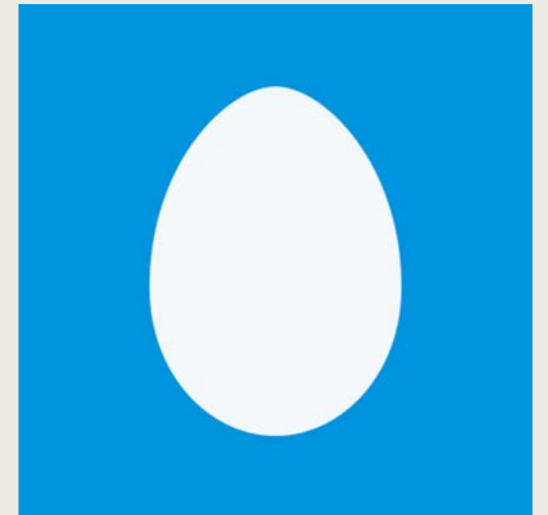
**How do secondary science
teachers assess their use of
digital technologies?**



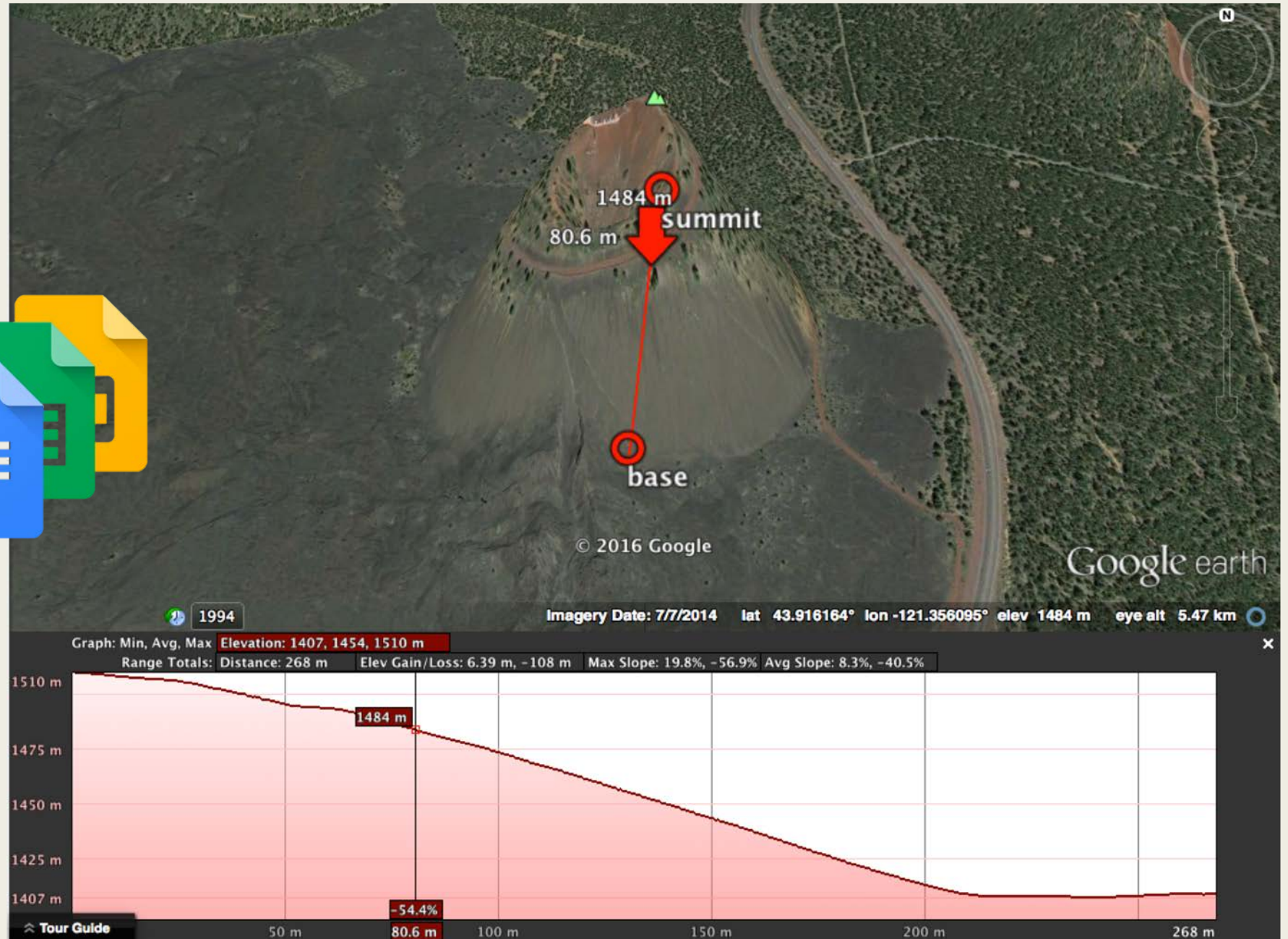
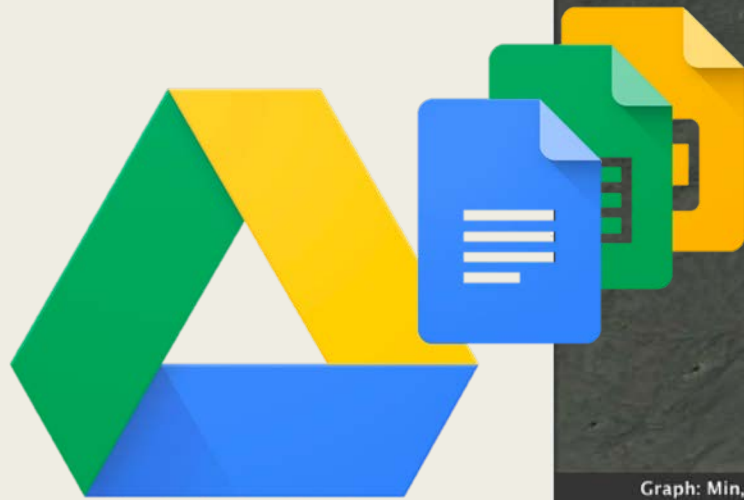
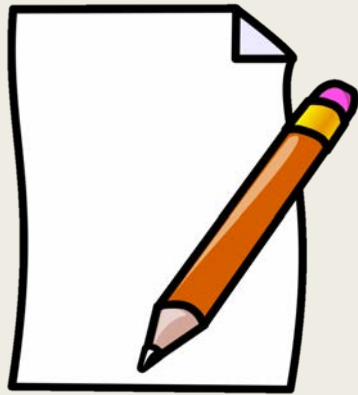
Rachel

[W]ell, in terms of, like, data loggers, something that can reliably, um, acquire information? Accurately acquire information. Um, good use of technology, so it's not-it's not too complicated to use that it's affecting how you're doing your experiment.

[W]hen someone [Charlotte] said to me: 'Use the data loggers,' I was like: 'Hunh? I don't want to use them!' and then I used them and I was like: 'Oh, this is easy! It's simple to use.' So, um, it has to be that way.



Charlotte

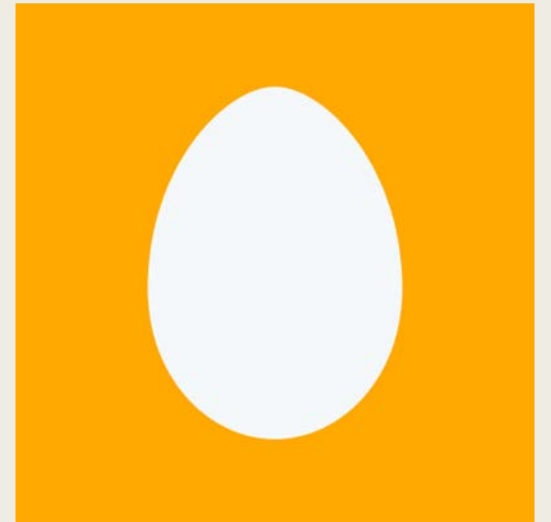


1994 Imagery Date: 7/7/2014 lat 43.916164° lon -121.356095° elev 1484 m eye alt 5.47 km

Graph: Min, Avg, Max Elevation: 1407, 1454, 1510 m Range Totals: Distance: 268 m Elev Gain/Loss: 6.39 m, -108 m Max Slope: 19.8%, -56.9% Avg Slope: 8.3%, -40.5%



[...] I realized that collaborating really closely and having the time to work with colleagues [...] we kind of had time to sit together and think of and talk about the unit. That was really useful. So, it really showed me that, I knew that already, but, like, talking to colleagues and-and planning together is really, really beneficial to the students.



**Rachel
(2018)**