

GEOSCIENCE EDUCATION WITH DR GLENN DOLPHIN

MAKING MODELS

Glenn's article mentions virtual outcrop models. Check out his website for examples:

<https://live-ucalgary.ucalgary.ca/tamaratt-teaching-professorship/projects/visual-representation-science>

And here are a few links for earthquake models:

<https://www.youtube.com/watch?v=21SPVqMY0uE>

Using a slinky to model seismic waves:

https://www.youtube.com/watch?v=BxtiKodKq_E

Using spaghetti to model asperities within a rupturing fault:

https://www.youtube.com/watch?v=llx-NQnGYv0&feature=emb_logo

Glenn recommends this site for getting started with models. This site also has virtual lessons for students to do at home:

<https://serc.carleton.edu/teachearth/index.html>

USING HISTORICAL CASE STUDIES

Glenn has a number of fascinating case studies on his website that offer a historical narrative to geoscience concepts.

<https://live-ucalgary.ucalgary.ca/tamaratt-teaching-professorship/projects/tamaratt-case>

For example:

US seismology: In the early 1900s, San Francisco was a thriving and populous city. In 1906, it was hit by a magnitude 7.8 earthquake. Jack London and William James, two American authors, wrote about this experience that devastated the city. The Mayor of San Francisco ordered military and law enforcement personnel to use dynamite to try to extinguish burning areas. After nearly a week of trying to contain the disaster, the fires eventually subsided, but about 80% of the city had either burned down or been blown up, and some 3,000 people were dead. The total cost of the disaster came to about 400 million US dollars, a price tag equivalent to the entire national budget at that time.

This resource links to the elastic rebound theory and has lots of earthquake-related activities for students to do, including making a model of the different forces at play.

OTHER USEFUL LINKS FOR HISTORICAL CASE STUDIES

National Centre for Case Study Teaching in Science:
<https://sciencecases.lib.buffalo.edu/>

SHiPS Resource Centre:
<http://shipseducation.net/modules/index.htm>

HIPST case study resources:
<http://hipstwiki.wikifoundry.com/page/hipst+developed+cases>



PUTTING THE DRAMA INTO GEOSCIENCE

Glenn is collaborating with Christine Brubaker from the University of Calgary's School of Creative and Performing Arts, Canadian playwright Meg Braem, historians, philosophers and scientists to create a dramatisation of four famous women geologists.

Eunice Foote (1819-1888) was the first to discover that CO₂ in the atmosphere would cause warming of the atmosphere.

Dollie Radler Hall (1897-1995) was the first to discover oil using seismic energy.

Marie Tharp (1920-2006) mapped the world's oceans and discovered the mid-oceanic rifts, which helped usher in the theory of plate tectonics.

Florence Bascom (1862-1945) was the first woman to work for the US Geological Survey. She is most known for teaching the next generation of women geologists.

Glenn also worked with students to dramatise a 19th century debate on the age of the Earth, with geologists and biologists arguing that Earth was billions of years old, while physicists and chemists claimed it was 10s or hundreds of millions years old:

https://www.youtube.com/watch?v=RLZfh2cFsMI&feature=emb_logo

Could your students act out a geological concept?

MORE ACTIVITY IDEAS FROM GLENN

VISIBLE GEOLOGY

To emphasise the idea of Earth as an historical object, get students to use the web-based programme Visible Geology to construct a history of a section of rock:

<https://app.visiblegeology.com>

Once they have explored and used this programme, students can take screen shots of different angles of the section of rock, which they can then present to the rest of the class.

MAKING MODELS OF A BILLION

A very important concept in geology, which can be difficult for students to grapple with, is the age of the Earth. This is a well-documented problem and is because the numbers involved (millions and billions of years) are numbers well outside everyday, concrete experience. To help bring such numbers into context, challenge your students to develop a scale model. For instance, a billion dimes (or coins) could make a circle with a radius of about 160 km! The circumference of such a circle, drawn on a map and centred on Calgary in Canada, would lie on Red Deer and Lethbridge. Check this out on Google Maps!

CONTACT GLENN

"I am ALWAYS available as a resource for any questions teachers might have. I will always be willing to help those trying to better their teaching."

To contact Glenn, email: glenn.dolphin@ucalgary.ca

"I would also encourage prospective and practicing teachers to join the ESPRIT listserv: <https://suny.oneonta.edu/oneonta-mentor-network-initiative/listservs>. You can get real-time answers to questions by other practising teachers of Earth science."