**Information for Geology/Computer Science Presentation**

**What is Geology?**

* Geology is the study of the Earth
* It includes understanding the structure, evolution and dynamics
* Geologists also study natural minerals and energy resources on Earth
* Geologists can study rocks and minerals to understand the past about an area
* Geologists can influence building decisions by understanding the highest risks of things such as landslides, earthquakes, floods, and volcanic eruptions
* They also study extinct organisms on the planet such as dinosaurs from fossils found in rocks

**Logging**

* Geologists study rocks extracted by drilling
* This study allows geologists to describe the environment underneath the rocks
* Logging of sedimentary or volcanic rocks help understand past environmental changes
* Types of logging:
  + Rock core logging for mining and exploration companies
  + Mud logging for oil and gas exploration
  + Geotechnical logging to assess strength of rocks below ground

**Computer Science and Geology**

* Before the technological revolution geology was limited to things the human eye could see and find
* With the help of devices sending waves/signals, geologists detect the ground beneath us, formations, etc.
* Time in studying Earth has also been reduced by merging Computer Science with Geology

**GIS**

* GIS is the process of using a computer-based tool to capture, manage, analyze, and display geographical data
* Produces digital database of field data acquired by geologists
* GIS is mostly used to create maps for areas
* Before GIS maps were hand drawn by cartographers

**Modelling**

* 3-D modelling is very important for geologists in the current world
* Due to the evolution of technology most geologists are required to be trained in a specialist software or programming
* The use of modelling programs helps geologists present data in an efficient and effective manner
* Modelling Programs Include:
  + Modelling geological processes (mostly for research)
  + Creating a 3-D model of mineral deposits, oil fields or aquifer
  + Modelling subsurface geology for engineers to use

**Ocean Floor Mapping**

* Satellite Altimetry
  + Use of satellites to find permanent differences in sea surface height
  + Low resolution (2-5km)
  + Global accuracy
* Multi-beam Sonar
  + Use of ships or AUV’s to map smaller sections (Up to 10km)
  + Limited coverage
  + Good resolution (25-100m)
* [Mapping the ocean floor video](https://www.youtube.com/watch?v=bADFB199KIc)

**Ore Deposits**

* This is a mining application in which technology is used to find mineral or ore deposits
* By sending seismic waves through the ground and receiving them geologists can get data about deposits underneath
* They can then use programs such as modelling software to create a representation of the deposit

**Current Developments**

* By analyzing brachiopod fossils that are barely a millimeter-long scientist found out more information about the climate of the world about half a billion years ago
* GEDI (Global Ecosystem Dynamics Lidar) is a laser instrument sent to space to map the forests in 3-D which can help scientists understand things such as how much carbon is stored in the world’s forests and how much potential there is for ecosystems to absorb the rising amounts of carbon in Earth
* Researching GPS-based methods to model earthquake induced tsunamis in places like Japan which is prone to tsunamis and earthquakes