In Professor Brian Cox and Jeff Forshaw's book 'Universal', they talk about how we are able to use 'back-of-the napkin' measurements to make rough estimates at massive measurements. This includes the weight of Earth, the distance to the stars, and the age of Planet Earth. The isochron method of sampling the age of rubidium and strontium is a form of geochronology. From this, we are able to create a graph showing the line of the isochron plot moving away with time and as the sample decays.

By knowing the half-life of a radioactive sample, we are able to date the rock right back to the time at which it was formed by using the gradient of the line. The most ancient rocks in our world date back to 4.404 billion years ago (with an uncertainty of ±0.008 billion years). This ingenious, self-checking radiometric method allows scientists to confidently put the age of Earth at around 4.4 billion years.

Geochronology and more precise calculations can predict the ages of other planets, such as Mars, Jupiter, Venus and Mercury. It may give accurate insight into the composition and early life of the planets. We may then be able to make closer estimates of things such as the ages and stages Late Heavy Bombardment and the Big Bang. By looking at the volcanic eruptions of these planets, we could begin to understand the composition of their cores better. Scientists may be able to build up a better image of our early universe, an astonishing fete.

Volcanoes are also crucial in the field of tephrochronology, which involves the study of the spread of volcanic ash to build up a 'tephra horizon'. A 'tephra horizon' is a unique map to the spread of the ash of each volcano, using their unique chemical structure. Tephrochronology in Iceland has allowed geologists to build up an image of the volcanic, geological and archaeological activity there. This allows them to study the changing climate and the effects of agriculture on the environment. They can observe how this has changed the Icelandic ecosystems. Additionally, geologists can calculate the spread, impact and timing of supervolcano eruptions, helping us to understand the aftermath of events such as the Toba eruption on early humans and our current genomes. This can be done by using cores of rock extracted from around the world and using dating. This is vital in understanding human past and the impact if it were to happen again.

By observing the 'tephra horizons' from volcanic ash clouds, scientists can predict the occurence of ash clouds. They have now put them at roughly 44 years. This is vital in the modern world because ash clouds pose massive disruptions to airlines through the clouds of ash and dust created. They also pose health risks. Being able to expect them allows insurance companies, airlines and the public to accomodate for them, reducing economic loss. They are also able to study the long term effects of volcanic eruptions and human impact.

By Jessie D