**Aspects of science used:**

• Science can test hypotheses about events that happened long ago.  
• Scientific ideas are tested with multiple lines of evidence.  
• Science relies on communication within a diverse scientific community.  
• The process of science is non-linear, unpredictable, and ongoing.  
• Science often investigates problems that require collaboration from those in many different disciplines.

**How the dinosaurs went extinct:**

It all started out with a scientists named Walter Alvarez who was researching plate tectonics but made an observation leading a journey across geology, chemistry, paleontology, and atmospheric science. **What happened to the dinosaurs?**

While in Alvarez’s study of the plate tectonics he found out something very peculiar, as plates are moving away from each other they record the direction of the magnetic field of earth. Alvarez realized that the magnetic field irregularly flips over long periods of time. They then used this knowledge to look for verification of the timing of magnetic flips. This lead them to the 65 million year old Apennine mountains. Where Alvarez made another observation, a distinct sequence in the middle of the Cretaceous and Tertiary period.

He then started researching around the distinct sequence and realized the lower layer of rocks contained a wide variety of marine fossils but the upper half had much less fossils. This then got Alvarez back to thinking again, why such a sharp decline in fossils from the lower layer to the upper layer?

He now is intrigued with why the dinosaurs went extinct, and he thought it was sudden, contradictory to the past thoughts. To answer his question he had to measure how long it took to deposit the clay layer, but he had to find a way to do that with 65 million year old rocks. He then found out about Beryllium which could be in the rocks and serve as a timer because of their long half life and constant rate at being laid down. This investigation turned out dead because all of the Beryllium would of gone away but this didn’t stop here, Alvarez now started thinking about the rare Iridium as a replacement.

They started hypothesizing they might of died by meteors and meteors would of brought bunches of Iridium along and if they saw a spike in Iridium they would figure this to be the solution. There were two possibilities, there were going to be no detectable Iridium, or there would be around .1 atoms/billion in the clay. Both were wrong though, there were 3 atoms/billion, 30x more than their expected value. Clearly something unusual was up here. But now they had to test their results, and to keep the testing controlled they went to other geological study sites and tested the results there but the results were sadly only broad in scale, that meant back to the drawing board.

Then they started to get thin­­king, what if a supernova occurred and wiped the dinosaur, because this was before the Iridium discovery 10 years later they thought that if there were high levels of iridium then a supernova must of occurred. They saw high levels and thought, hooray, we are done. Then 10 years later they realized that the Iridium was a local occurrence and they thought that if a supernova occurred there would have been Plutonium, the test results also came back positive, but after a second result they concluded it not to be the supernova and the results were contaminated in other experiments in a nearby lab.

Alvarez took all of these observations and made another hypothesis, a meteor hit the earth and launched bunches of dust into the air, blocking the sunlight and causing photosynthesis to stop, breaking the food web. It had fit all three observations, after multiple other groups tested the Iridium anomaly they concluded it to be world spread and that Iridium was one of the causes of the extinction. But don’t worry they aren’t done yet, they we’re still contradicting on how the Iridium anomaly and the KT boundary intertwined.

**This is what is great about science.** Even though we still do not know the answer to how the dinosaurs went extinct other scientists can now use this data to expand their branches’ knowledge, further expanding out understanding of science. It is amazing how many more questions we have from one simple question