



Playing with Protons

Introduction to Cosmology

'Modelling the History of the Universe with a till roll'

Materials per group

- Till Roll
- Scissors
- Tape Measure/metre stick
- Pencil
- Ruler
- 'Events in the History of the Universe' cards (or stickers)

Instructions

1. Teams work collaboratively to carefully measure out a 13.8 metre length of till roll. This represents a timeline of the history of the Universe and each mm is 1 million years.
2. Ask the pupils to mark one end of the till roll (left) 'THE START OF TIME' and then mark the other end (right) 'NOW!'
3. Give the teams the set of cards and ask them to decide where they think they should fit on the timeline – the children can mark their predictions on the till roll lightly in pencil.
 - First human civilisation
 - The first humans
 - The first dinosaurs to walk the planet
 - The last dinosaurs to walk the planet before mass extinction
 - The first stars are formed
 - The first galaxies are formed
 - The first life on Earth
 - Formation of planet Earth
4. Groups share their ideas with the class – looking for similarities and differences between where they think events took place. It would be interesting to discuss what sort of evidence they think humans have found that allow them to say when these things happened (this will generate a lot of questions).
5. Share the positions that the event should be placed with the class – the children can then use stickers and/or coloured pens to create their timeline of the History of the Universe.
6. This is a create resource to take out on the playground on a dry day with no wind – perhaps when it is complete the children could explain what they have created to a younger class of children in the school to share the awe and wonder.



The Solution

- First human civilisation - 0.0122mm from the right hand end
- The first humans – 0.2mm from the right hand end
- The first dinosaurs to walk the planet – 2.3cm from the right hand end
- The last dinosaurs to walk the planet before mass extinction – 6.5cm from the right hand end
- The first stars are formed - 10cm from the left hand end
- The first galaxies are formed – 20cm from the left hand end
- The first life on Earth – 4m from the right hand end
- Formation of planet Earth – 4.6m from the right hand end

Other useful links

- **The Big History Project**

<https://school.bighistoryproject.com/bhplive>

Designed for middle and high school pupils – has some great resources, particularly the interactive timeline of the Universe PDF.

- **TED Talk Animation – Introduction to Cosmology and The Big Bang**

<https://vimeo.com/71852454>

Short and not too complicated and a fantastic introduction to cosmology and the work of particle physicists

- **Cosmic Times Newspaper Posters and resources**

https://cosmictimes.gsfc.nasa.gov/online_edition/1919Cosmic/index.html

A fantastic resource from NASA that has posters from different times in history that help understand how ideas have formed over time. Fantastic for research focused enquiry.

