**Particle Physics Research**

You will have heard about the LHC – but what is it? Why is it made in a circle? What other options could they have chosen instead? How do the scientists working on this make the particles go in a circle? Is this efficient? Why can we not accelerate the particles above the speed of light? How do the scientists know what is created from a particle collision? What particles can be detected? What is the standard quark-lepton model? What are anti-particles? All of these are questions which you will find the answers to in the particle physics and nuclear physics modules.

Your task is to do some research into Particle Physics – you may wish to use the internet, books etc to find out the required information. Remember to reference any information you find, and do not copy and paste (unless it is a picture, in which case you can copy and paste, but it must be referenced!)

***You will present your findings in the form of a presentation (lasting 2-10 min). There are a lot of questions on this page. You may decide to explore a few of them in detail, or all of them in less detail. The choice is yours, and this may be influenced by the research you do, or the interest you have.***

**Some extra things to think about (in addition to those above), that link to your specification:**

What is nucleon number (mass number), and what is proton number (atomic number) – How do these relate to particles?

How are particles accelerated?

What is the different between a **fixed target** and a **colliding beam** experiment? Why are both used?

What is the different between the **electric and magnetic fields** in a: **linear accelerator** (linac), **Cyclotron** and a **Synchrotron**? i.e. What is the difference between these accelerators?

How do the scientists detect the particles? What are elastic and inelastic collisions? Does it matter which one is observed?

**Any questions or queries email me** (I will check email a couple of times over the summer break)**:** [**jlyons@eggbuckland.com**](mailto:jlyons@eggbuckland.com)

**If you would like to use a presentation (PowerPoint / Prezi / etc) ensure to have this with me the day before so I can ensure it opens.**

**Prompt questions:**

* What is the LHC?
* Why is the LHC made in a circle?
* What are the main types of particle accelerator?
* How do the scientists working on the LHC make the particles go in a circle? Is this efficient?
* Why can we not accelerate the particles above the speed of light?
* How do the scientists know what is created from a particle collision?
* What particles can be detected? Can they all be? How do we know particles that aren’t detectable exist?
* What is the standard quark-lepton model?
* What are anti-particles?
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