**Key Stage 3 - Particle Forensics**

**Footprints of the Higgs Boson**

**Pupil worksheet**

**Part 1: What footprints do particles make?**

These are the paths made by particles as they pass through the various layers of detectors in the CMS experiment at the LHC.

|  |  |  |
| --- | --- | --- |
| **Electron** | **Muon** | **Neutrino** |
| **Antielectron** | **Antimuon** | **Antineutrino** |

**Pupil worksheet**

**Part 2: What do the particles formed on collision of the protons break down into?**

Using Part 1 for reference, draw in below the paths of the particles formed on when collision products break down.

|  |  |  |
| --- | --- | --- |
| **Type of particle formed on collision** | **What it breaks down into** | **Drawing** |
| 1. W Boson | Electron + antineutrino |  |
| 1. W Boson | Muon + antineutrino |  |
| 1. Z Boson | Electron + antielectron |  |
| 1. Z boson | Muon + antimuon |  |
| 1. Black hole | Lots of particles |  |
| 1. Higgs Boson | 2x electron + 2x antielectron |  |
| 1. Higgs Boson | 2x muon + 2x antimuon |  |
| 1. Higgs Boson | electron + antielectron + muon + antimuon |  |

**Pupil worksheet**

**Part 3: Collision images from different particles**

|  |  |
| --- | --- |
| **Collision image** | **What particles do you think were present after the protons collided?**  **Why?** |
|  |  |
|  |  |
|  |  |