Particle Detectors

Label the diagram of the detector, and describe what the different sections do below.

Inner detector: ____________________________________________________________
__________________________________________________________________________

Electromagnetic calorimeter: _________________________________________________
__________________________________________________________________________

Hadronic calorimeter: _______________________________________________________
__________________________________________________________________________

Muon spectrometer: _________________________________________________________
__________________________________________________________________________

Magnet: ___________________________________________________________________
__________________________________________________________________________
Label the different particle tracks, and describe how you know it’s that particle.

Electron:  
________________________________________________________________________________
________________________________________________________________________________

Proton:  
________________________________________________________________________________

Neutron:  
________________________________________________________________________________

Photon:  
________________________________________________________________________________

Muon:  
________________________________________________________________________________
What would it look like if a neutrino (a particle that doesn’t interact with any of the materials) went through the detector? How would we know it had been there?

_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________
_________________________________________________________________________________

How can you tell the difference between a positively and negatively charged particle in the detector?

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_________________________________________________________________________________
_________________________________________________________________________________
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_________________________________________________________________________________

How does the example of a particle detector illustrate how scientists look for new things?

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_________________________________________________________________________________
_________________________________________________________________________________

Task: You need to design some type of key that helps non-scientists work out which particle has gone through the detector, without knowing anything about particle detectors. It could be a flow chart, a checklist, or something else altogether – the only criteria is that it needs to be able to identify all the particles shown on the last page. Once you’ve designed a key, try to see if you can ID which particles are which in a real ATLAS event!