Student 3: Low Merit

Note: This student evidence comes from student work related to the task FAQs. The following is a snippet of the complete report that was written by the student.

How was Thomson's Plum Pudding model disproved?
This model was disproved by the 1909 gold foil experiment, done by Ernest Rutherford. Thomson's model said that the whole of an atom was solid - the pudding. If the atom was solid, when the alpha particles were fired at the gold foil they would have bumped into the atoms and been knocked off course. They weren't – most went straight through and so the atom cannot be solid. This could only have happened if there was a lot of empty space. Rutherford's suggestion, that an atom consists of a small central nucleus surrounded by mostly empty space, explained why they went straight through. [1]

What did we learn about atoms after the gold foil experiment?
That most of the atom consisted of empty space, because most of the fired alpha particles went straight through (see above).
The atom must have a small mass that contains positively charged particles (protons). This is because some of the positively charged alpha particles were repelled and scattered away.
The atom must have a lot of mass in a very tiny area because it was able to reflect some of the fast moving alpha particles back by almost 180 degrees. [2]
The gold foil experiment proved that the nucleus of the atom was very small and contained a high positive charge. This model of the atom contradicted the plum pudding model, as it suggests that the negatively–charged "plums" were surrounded by the positively–charged "pudding".

How does carbon dating relate to radioactive decay?
All living things have some carbon-14 in them. Carbon-14 has an unstable nucleus and so it will decay over time. When living things die no more carbon-14 is produced so to find out how old a substance is, they find the amount of carbon-14 that is left in it. They can do this because they know the half-life of carbon-14 – it is about 6000 years. If a graph of amount of carbon-14 against time is drawn, the amount left in the dead substance will give the number of years it has been dead. [3] If the material has a less amount of carbon14, it is old and if it has a lot, it is young.