Separate Sciences GCSE

Physics PLC January 2023 Assessment

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| **AQA Physics (8463) from 2016 Topics P4.4. Atomic structure** | | | | |
| **TOPIC** | **Student Checklist** | **R** | **A** | **G** |
| **4.4.1 Atoms and isotopes** | Describe the basic structure of an atom and how the distance of the charged particles vary with the absorption or emission of electromagnetic radiation |  |  |  |
| Define electrons, neutrons, protons, isotopes and ions |  |  |  |
| Relate differences between isotopes to differences in conventional representations of their identities, charges and masses |  |  |  |
| Describe how the atomic model has changed over time due to new experimental evidence, inc discovery of the atom and scattering experiments (inc the work of James Chadwick) |  |  |  |
| **4.4.2 Atoms and nuclear radiation** | Describe and apply the idea that the activity of a radioactive source is the rate at which its unstable nuclei decay, measured in Becquerel (Bq) by a Geiger-Muller tube |  |  |  |
| Describe the penetration through materials, the range in air and the ionising power for alpha particles, beta particles and gamma rays |  |  |  |
| Apply knowledge of the uses of radiation to evaluate the best sources of radiation to use in a given situation |  |  |  |
| Use the names and symbols of common nuclei and particles to complete balanced nuclear equations, by balancing the atomic numbers and mass numbers |  |  |  |
| Define half-life of a radioactive isotope |  |  |  |
| **HT ONLY: Determine the half-life of a radioactive isotope from given information and calculate the net decline, expressed as a ratio, in a radioactive emission after a given number of half-lives** |  |  |  |
| Compare the hazards associated with contamination and irradiation and outline suitable precautions taken to protect against any hazard the radioactive sources may present |  |  |  |
| Discuss the importance of publishing the findings of studies into the effects of radiation on humans and sharing findings with other scientists so that they can be checked by peer review |  |  |  |
| **4.4.3 Hazards and uses of radioactive emissions and of background radiation** | *PHY ONLY: State, giving examples, that background radiation is caused by natural and man-made sources and that the level of radiation may be affected by occupation and/or location* |  |  |  |
| *PHY ONLY: Explain the relationship between the instability and half-life of radioactive isotopes and why the hazards associated with radioactive material differ according to the half-life involved* |  |  |  |
| *PHY ONLY: Describe and evaluate the uses of nuclear radiation in exploration of internal organs and controlling or destroying unwanted tissue* |  |  |  |
| *PHY ONLY: Evaluate the perceived risks of using nuclear radiation in relation to given data and consequences* |  |  |  |
| *PHY ONLY: Describe nuclear fission* |  |  |  |
| *PHY ONLY: Draw/interpret diagrams representing nuclear fission and how a chain reaction may occur* |  |  |  |
| *PHY ONLY: Describe nuclear fusion* |  |  |  |