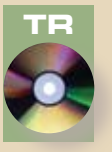
FROM QUANTA TO QUARKS: REVIEW QUESTIONS



Verb scaffolds
Sample answers and marking criteria

Working with the HSC verbs

1. Define 'nuclear fission'.
2. Identify one feature of the stand model of matter.
3. Wolfgang Pauli proposed the existence of the neutrino in 1934; however, it was not until 1954 that their existence was proven. Identify two reasons for this.
4. Explain how the law of conservation of momentum and the law of conservation of energy were used by James Chadwick in his discovery of neutrons in 1932.
5. Outline Niels Bohr's postulates that led to the development of his model of the atom.
6. One of the inadequacies of Bohr's model of the atom was that it used a mixture of classical physics and quantum physics without any clear rules or indications. Justify this statement.)
7. Discuss the use of particle accelerators in developing the standard model of matter.
8. Assess the significance of the Rutherford alpha particle scattering experiment on the development of the model of the atom.
9. Evaluate the significance of Davisson and Germer's experiment on our understanding of matter waves.
10. Discuss the issues surrounding the continuous and rapid development of nuclear technologies.
11. Compare and contrast the conditions required for a controlled fission reaction and an uncontrolled fission reaction.
12. During your study, you have researched the use of a radioisotope used in the medical field.
    (a) Identify your researched radioisotope.
    (b) Describe its use in medicine. In your answer, you should include any relevant nuclear equations.
    (c) Describe how you would ensure that the information you obtained was accurate.
13. Since the discovery of the neutron by James Chadwick, our understanding of the neutron is becoming more complete. Evaluate the impacts of the increase in knowledge of the properties and behaviour of the neutrons.
14. Critically analyse how nuclear reactions can be used to produce useful materials as well sustained energy for society.
15. The model of the atom has been refined and improved historically by many scientists. Assess the major contributions made by Rutherford, Bohr, de Broglie and Pauli towards the development of the model of the atom.
16. The internal structure of the nucleus was a mystery for a long time. Analyse how the work by Rutherford, Chadwick and Fermi have increased our understanding of the structure and the properties of the nucleus.