**11.2 Muscles and movement**

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|  | **Assessment statement**  | **Obj**  | **Teacher’s notes**  |
| 11.2.1  | State the roles of bones, ligaments,  | 1  |  |
|  | muscles, tendons and nerves in  |  |  |
|  | human movement.  |  |  |
| 11.2.2  | Label a diagram of the human elbow joint, including cartilage, | 1  |  |
|  | synovial fluid, joint capsule, named |  |  |
|  | bones and antagonistic muscles  |  |  |
|  | (biceps and triceps). |  |  |
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|  | **Assessment statement**  | **Obj**  | **Teacher’s notes**  |
| 11.2.3  | Outline the functions of the structures in the human elbow joint named in 11.2.2.  | 2  |  |
| 11.2.4  | Compare the movements of the hip joint and the knee joint.  | 3  | **Aim 7:** Video analysis of motion is possible here.  |
| 11.2.5  | Describe the structure of striated muscle fibres, including the myofibrils with light and dark bands, mitochondria, the sarcoplasmic reticulum, nuclei and the sarcolemma.  | 2  |  |
| 11.2.6  | Draw and label a diagram to show the structure of a sarcomere, including Z lines, actin filaments, myosin filaments with heads, and the resultant light and dark bands.  | 1  | No other terms for parts of the sarcomere are expected.  |
| 11.2.7  | Explain how skeletal muscle contracts, including the release of calcium ions from the sarcoplasmic reticulum, the formation of cross-bridges, the sliding of actin and myosin filaments, and the use of ATP to break cross-bridges and re-set myosin heads.  | 3  | Details of the roles of troponin and tropomyosin are not expected. **Aim 7:** Data logging could be carried out using a grip sensor to study muscle fatigue and muscle strength.  |
| 11.2.8  | Analyse electron micrographs to find the state of contraction of muscle fibres.  | 3  | Muscle fibres can be fully relaxed, slightly contracted, moderately contracted and fully contracted.  |