

Syllabus content for the Unit **SPORTS SCIENCE** [SS]

This unit deals with the concepts of kinetic and potential energy, in the contexts of sporting activities (e.g. pole vaulting). The concept of work as a measure of energy transfer is introduced, also the concept of power as rate of energy transfer, related to athletic performance.

<u>Work and Power in Sport</u>	<u>Kinetic Energy and Potential Energy</u>
<p>know appropriate units for force, energy, work and power understand that when a force moves an object, energy is transferred and work is done know that the work done is a measure of the energy transferred know and be able to use the equation: Work done (J) = force (N) x distance moved in the direction of the force (m) understand that power is the rate of doing work: Power (W or J/s) = work done (J) / time taken (s)</p>	<p>know that falling objects are accelerated downwards by gravitational attraction know that air resistance increases as the velocity of an object increases understand the difference between mass and weight understand the law of conservation of energy and be able to use it in problems involving kinetic and gravitational energy</p> <ul style="list-style-type: none"> • know and be able to use the relationship $KE = \frac{1}{2}mv^2$ for the kinetic energy associated with movement • know and be able to use the relationship $PE = mgh$ for gravitational potential energy changes
<u>Respiration in Cells</u>	<u>Levers</u>
<p>understand the difference between breathing and respiration understand that cellular respiration involves oxidation of food to release energy know the overall chemical equation for aerobic respiration of glucose know the role of mitochondria in respiration know the difference between aerobic and anaerobic respiration understand how breathing-volume or pulse-rate measurements of recovery after exercise indicate a person's level of fitness</p> <ul style="list-style-type: none"> • understand the concept of 'oxygen debt' 	<p>know examples of levers used as force multipliers and as distance multipliers understand how to calculate the moment of a force about a fixed point understand the law of moments</p>