2.3: Work and energy

<u>Energy</u>

- When a force acts on a moving body, energy is transferred although the total amount of energy remains constant.
- An object can possess energy because of its motion (kinetic energy), position (gravitational energy) and deformation (elastic energy).

<u>Work</u>

- a measure of energy transfer
- work = force × distance
- work = energy transfer (in the absence of thermal transfer)

<u>Kinetic energy</u>

• kinetic energy = $\frac{\text{mass} \times \text{velocity}^2}{2}$; KE = $\frac{mv^2}{2}$ Change in gravitational potential energy • gravitational potential energy = mass × gravitational field strength × change in height ; PE = mg/n

Springs

• force = spring constant × extension; F = kx

Force extension (F-x) graphs

• area under graph = work done in stretching; $W = \frac{Fx}{2}$ (in a linear relationship)