

Kinetic and Gravitational Potential Energy

- Kinetic energy
- Work-Energy Theorem
- Gravitational Potential Energy
- Conserving Energy
- Application of Energy Conservation

$$\begin{aligned}W_{total} &= \frac{1}{2}mv_f^2 - \frac{1}{2}mv_i^2 \\&= E_{Kf} - E_{Ki} \\&= \Delta E_K\end{aligned}$$



$$E_g = mgh$$

$$E_K = \frac{1}{2}mv^2$$



Preview File

Please enjoy this preview of your Student Version of the presentation. Please note within this sample file:

- Some slides appear blank because they have been removed
- Student versions have portions of the text removed which is given in the teacher version and appear as _____ which the students are to fill in
- Other slides may have on them, this represents writing that has been removed on this sample

**The paid full version of your resource includes
both Google Slides and PowerPoint and is
Google Classroom Ready**



Kinetic Energy

- _____
- When we do work on an object, energy is transferred into the system
- When the object gains energy, it begins to move
- If you do work on a rollercoaster by pulling it to the top of a hill, it will gain kinetic energy and begins to go down the track



Kinetic Energy

- Kinetic energy (E_k or KE) can be found using:

$$E_K = \frac{1}{2}mv^2$$

- E_K is the kinetic energy of the object in joules, m is the mass of the object in kilograms, and v is the speed of the object in metres per second
- E_K is a scalar quantity

**This Slide Has Been
Removed**

Check Your Understanding

What total work, in megajoules (10^6), is required to cause a cargo plane of mass 4.55×10^5 kg to increase its speed in level flight from 105 m/s to 185 m/s?

$$\begin{aligned} W_{total} &= \frac{1}{2}mv_f^2 - \frac{1}{2}mv_i^2 \\ &= E_{Kf} - E_{Ki} \\ &= \Delta E_K \end{aligned}$$

**This Slide Has Been
Removed**

Gravitational Potential Energy

- _____
- The potential energy at a height “h” above that point is equal to the work which was required to lift the object to that height
- Like charging a battery, you put energy into a system which can be used at a later time



Gravitational Potential Energy

- Because gravity acts vertically, we will use h rather than Δd for the magnitude of the displacement
- The force applied to the box to raise it is in the



- _____

**This Slide Has Been
Removed**

Energy is Conserved

- Work is done to move an object upwards giving it E_k (because it is moving) and E_g (because it is gaining height)
- Once no more Work is applied, the object stops moving up and $E_k = 0$. The energy from E_k is completely converted to E_g at its peak
- _____



Check Your Understanding

A diver, of mass 57.8 kg , climbs up a diving board ladder and then walks to the edge of the board. He then steps off the board and falls vertically from rest to the water 3.00 m below. Determine the diver's gravitational potential energy at the edge of the diving board, relative to the water.

Application

Hydroelectric plants convert the E_g of the water at higher elevations into E_k as water rushes down via gravity to spin turbines. As the turbines spin, electricity (another form of energy) is created.

