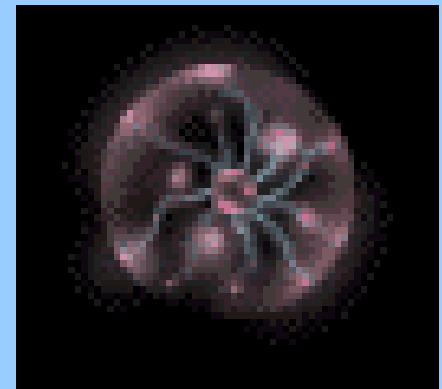
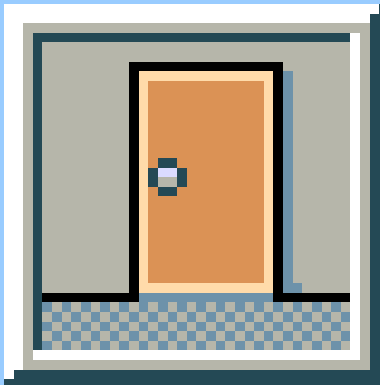


Energy

- **Kinetic Energy (K)** – Energy of Motion
- **Potential Energy (P)** – Stored up Energy
- **Total Energy (T)**– Kinetic plus Potential Energy



Energy

- **Kinetic Energy (K)**– Energy of Motion

**Which ball has
Kinetic Energy?**



Energy

- **Kinetic Energy (K)**– Energy of Motion

No Kinetic Energy



Kinetic Energy



Energy

- **Kinetic Energy (K)**– Energy of Motion

**Which ball has more
Kinetic Energy?**



Energy

- **Kinetic Energy (K)**– Energy of Motion

Less Kinetic Energy



More Kinetic Energy



Energy

- **Kinetic Energy (K)**– Energy of Motion

$$K = \frac{1}{2} m v^2$$

Less Kinetic Energy



More Kinetic Energy

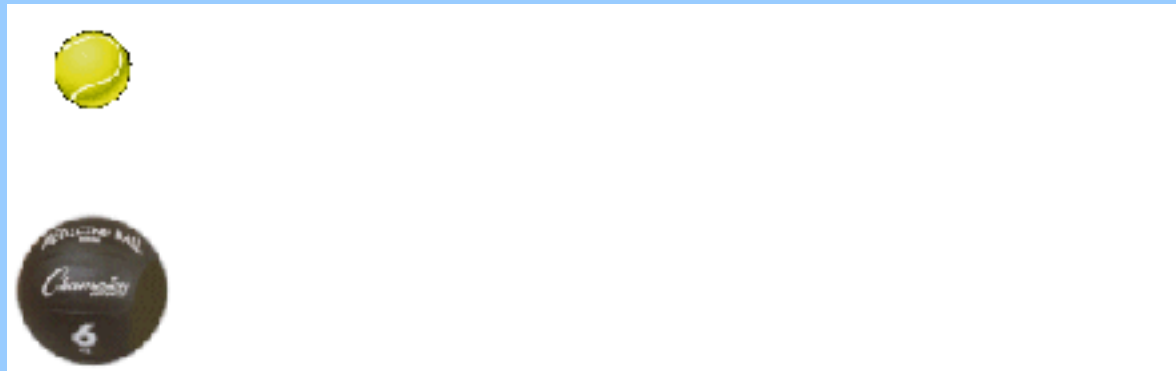


If the lower ball is moving twice as fast, how much more kinetic energy does it have?

Energy

- **Kinetic Energy (K)**– Energy of Motion

**Which ball has more
Kinetic Energy?**



Energy

- **Kinetic Energy (K)**– Energy of Motion

Less Kinetic Energy



More Kinetic Energy



Energy

- **Potential Energy (P)**– Stored up Energy

Potential Energy

Potential Energy

Potential Energy

Potential Energy

Potential Energy



Energy

- **Potential Energy (P)**– Stored up Energy

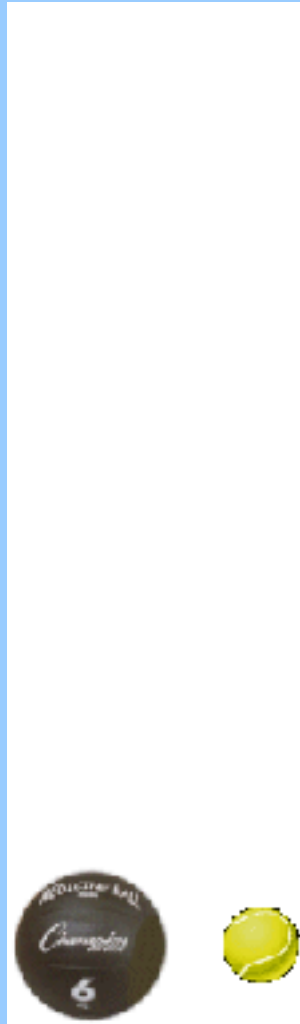
Which ball has more **Potential Energy (P)**?

Weight \swarrow Height \swarrow

$$\mathbf{P} = W h$$

$$W = 10$$

$$\mathbf{P} = ?$$



$$h = 2$$

$$W = 1$$

$$\mathbf{P} = ?$$

Energy

- **Potential Energy (P)**– Stored up Energy

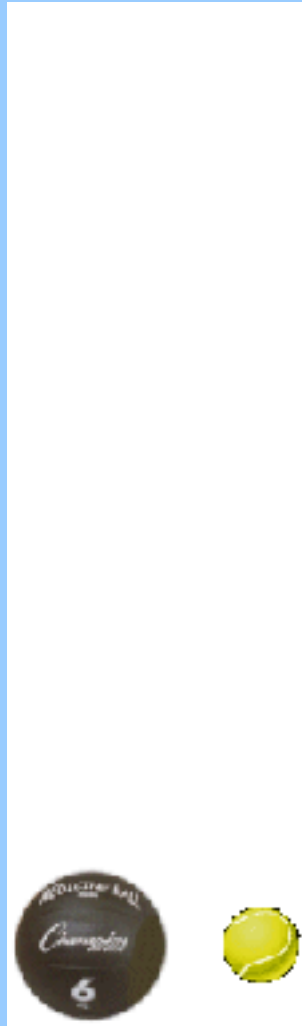
Which ball has more **Potential Energy (P)**?

Weight \swarrow Height \nwarrow

$$\mathbf{P} = W h$$

$$W = 10$$

$$\mathbf{P} = 20$$



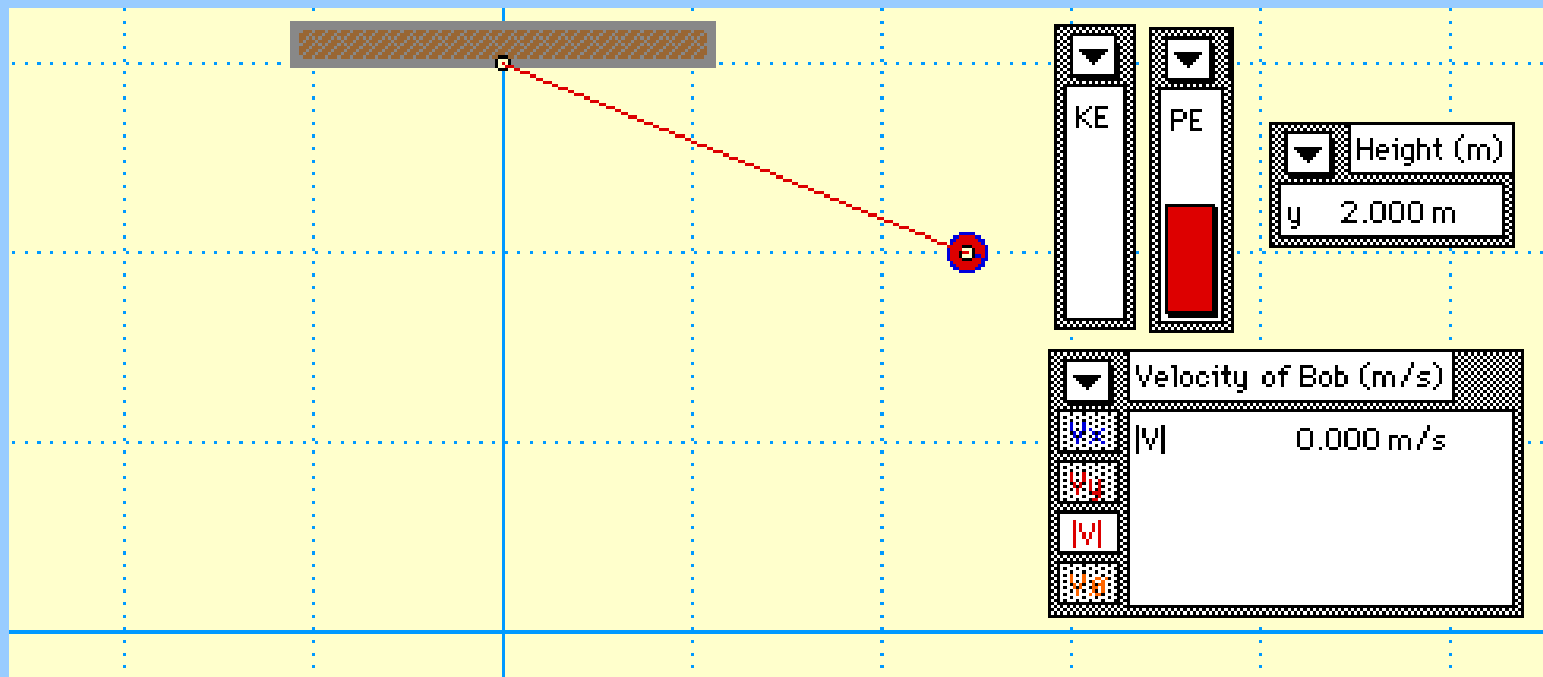
$$h = 2$$

$$W = 1$$

$$\mathbf{P} = 2$$

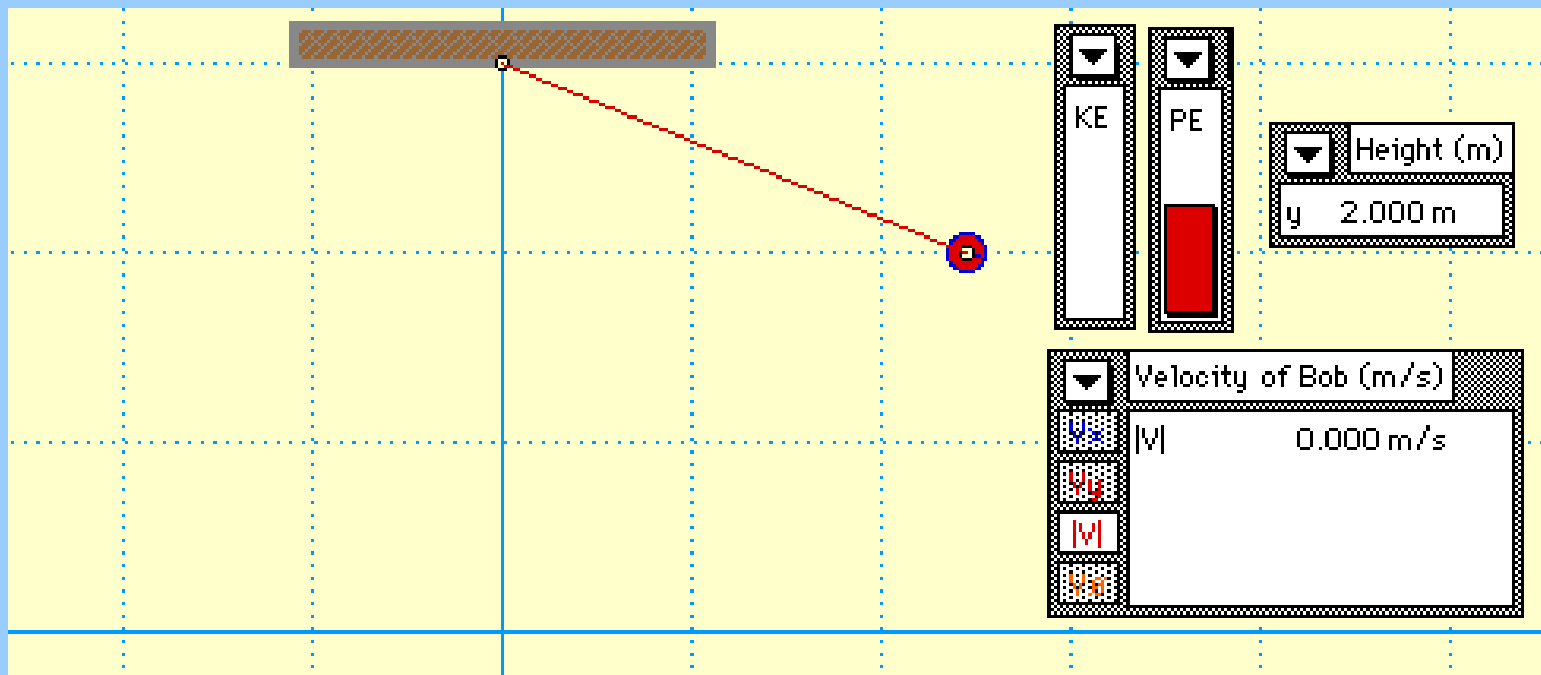
Energy

- **Total Energy** – **Kinetic** plus **Potential** Energy



Energy

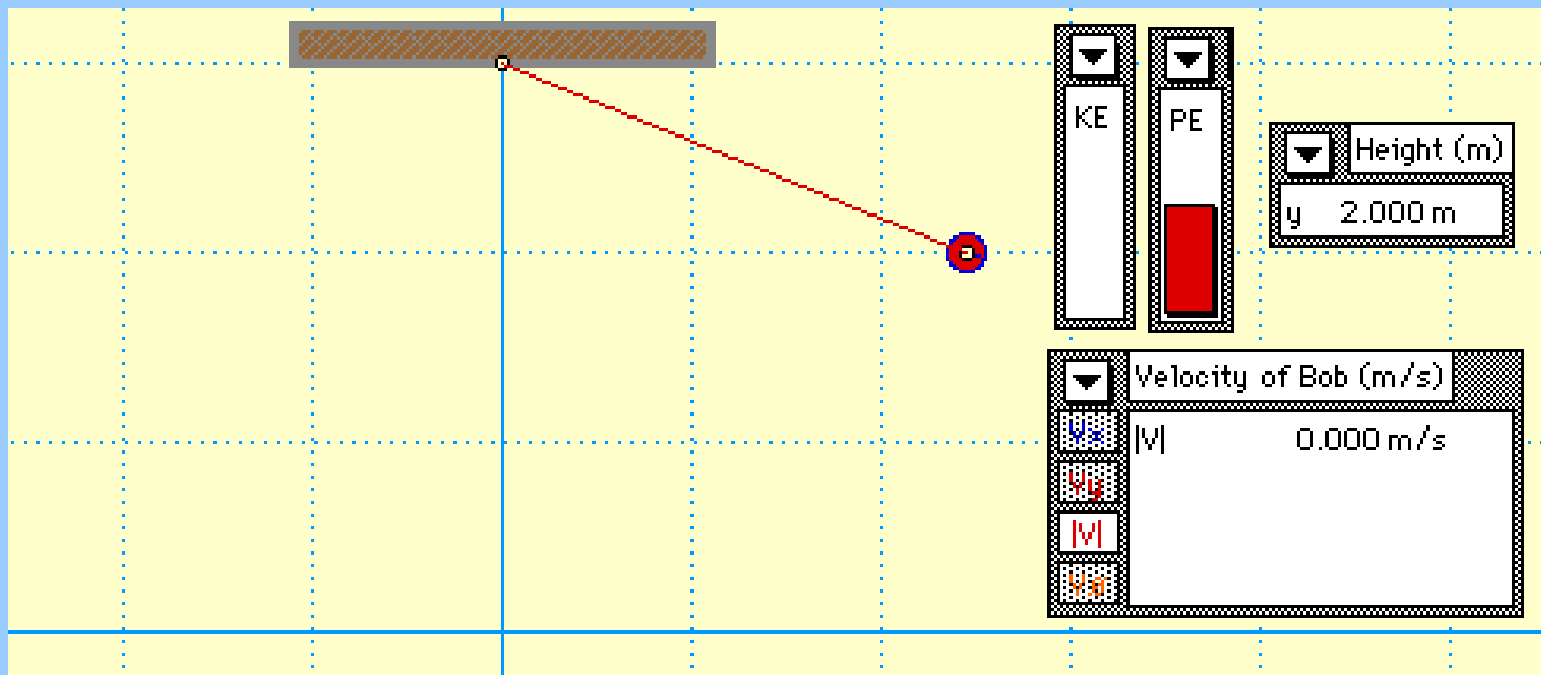
- **Total Energy** – **Kinetic** plus **Potential** Energy



$$\begin{array}{rcl} T \text{ (at top)} & = & T \text{ (at bottom)} \\ P + K & = & P + K \\ 100 + 0 & = & ? + ? \end{array}$$

Energy

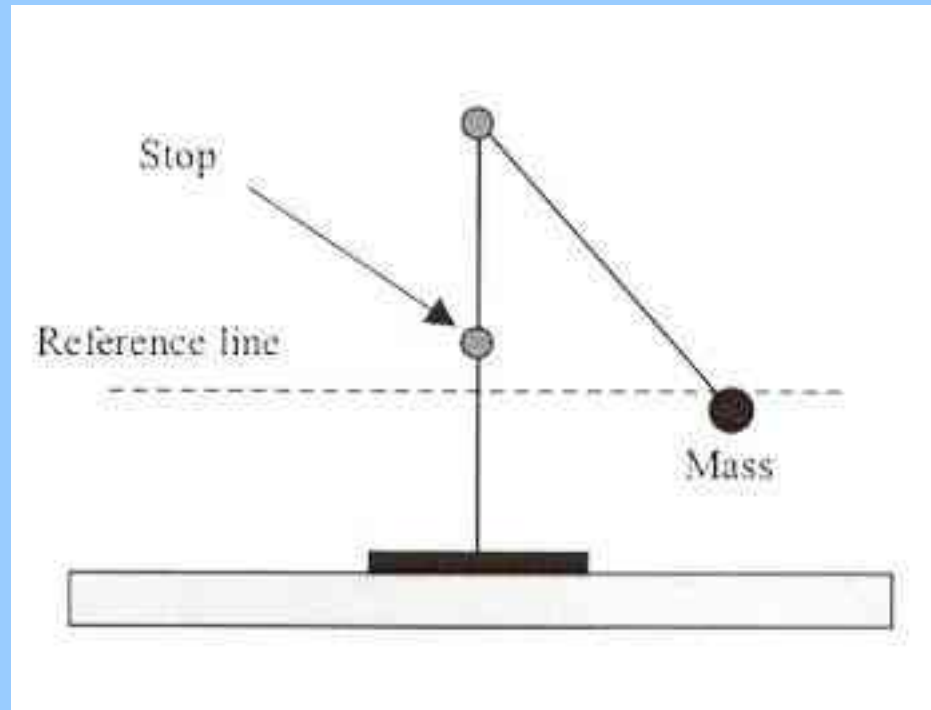
- **Total Energy** – **Kinetic** plus **Potential** Energy



$$\begin{array}{rcl} T \text{ (at top)} & = & T \text{ (at bottom)} \\ P + K & = & P + K \\ 100 + 0 & = & 0 + 100 \end{array}$$

Energy

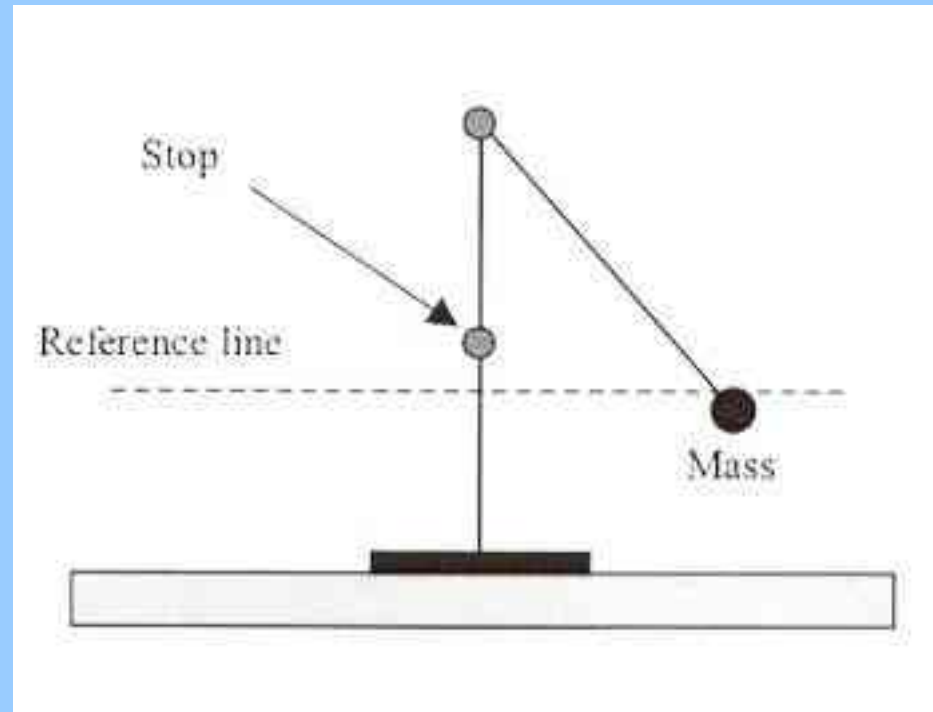
- **Total Energy** – **Kinetic** plus **Potential** Energy



How high will it go?

Energy

- **Total Energy** – **Kinetic** plus **Potential** Energy

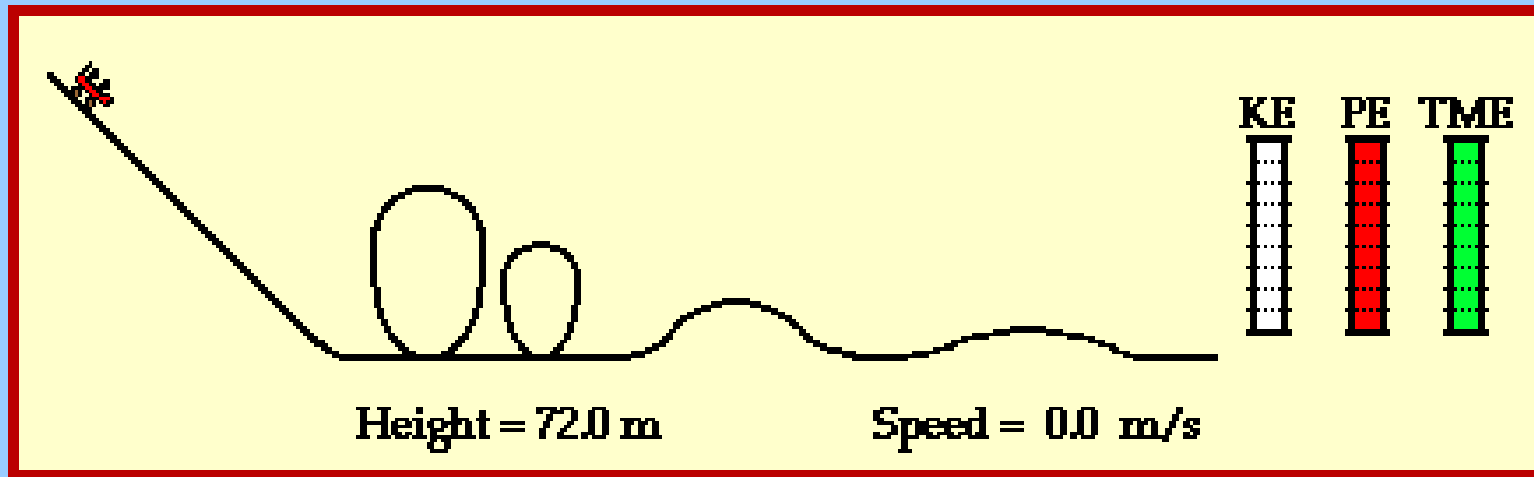


$$\text{Total}_{\text{initial}} = \text{Total}_{\text{final}}$$
$$(\text{P} + \text{K})_{\text{initial}} = (\text{P} + \text{K})_{\text{final}}$$

The equation shows the conservation of total energy. In the first equation, 'Total' is in green. In the second equation, 'P' is in red and 'K' is in blue. Arrows indicate that the 'initial' and 'final' subscripts in the second equation correspond to the 'initial' and 'final' subscripts in the first equation. Additionally, there are blue '0' characters with arrows pointing to the 'K' terms in both equations, indicating that kinetic energy is zero at both the initial and final states.

Energy

- **Total Energy** – **Kinetic** plus **Potential** Energy



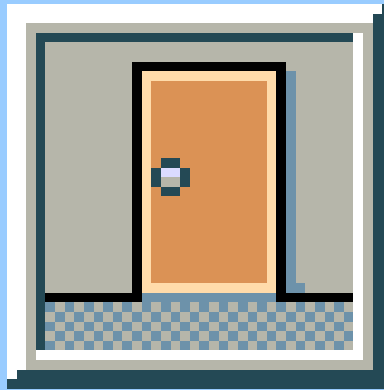
Loop – The - Loop

Where to Start?

Energy

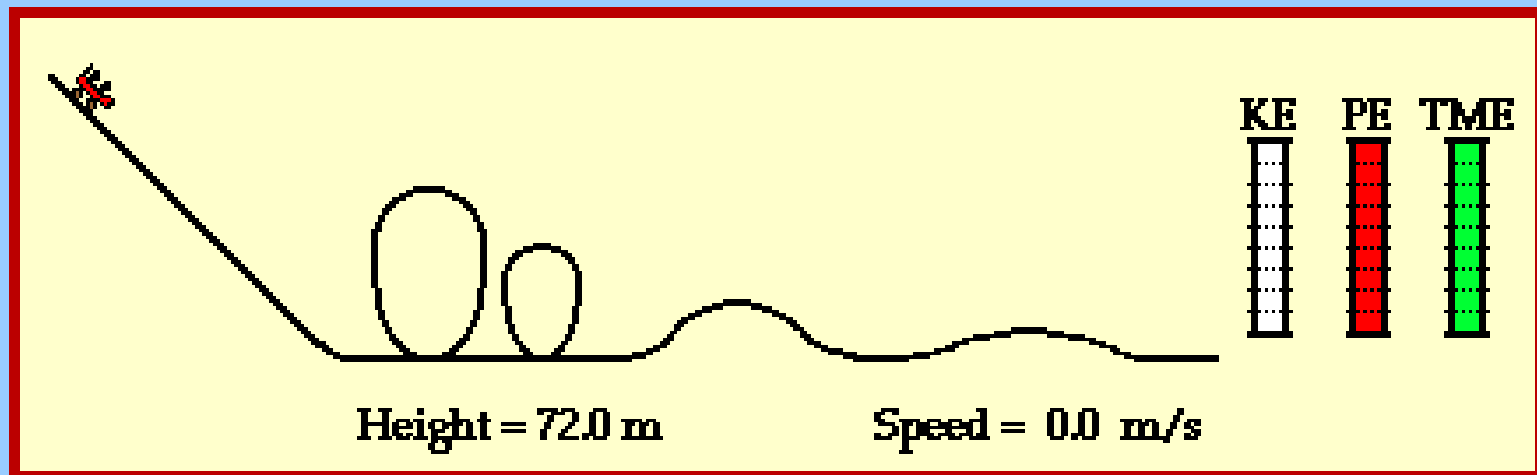
- **Total Energy** – **Kinetic** plus **Potential** Energy

The Bomb!



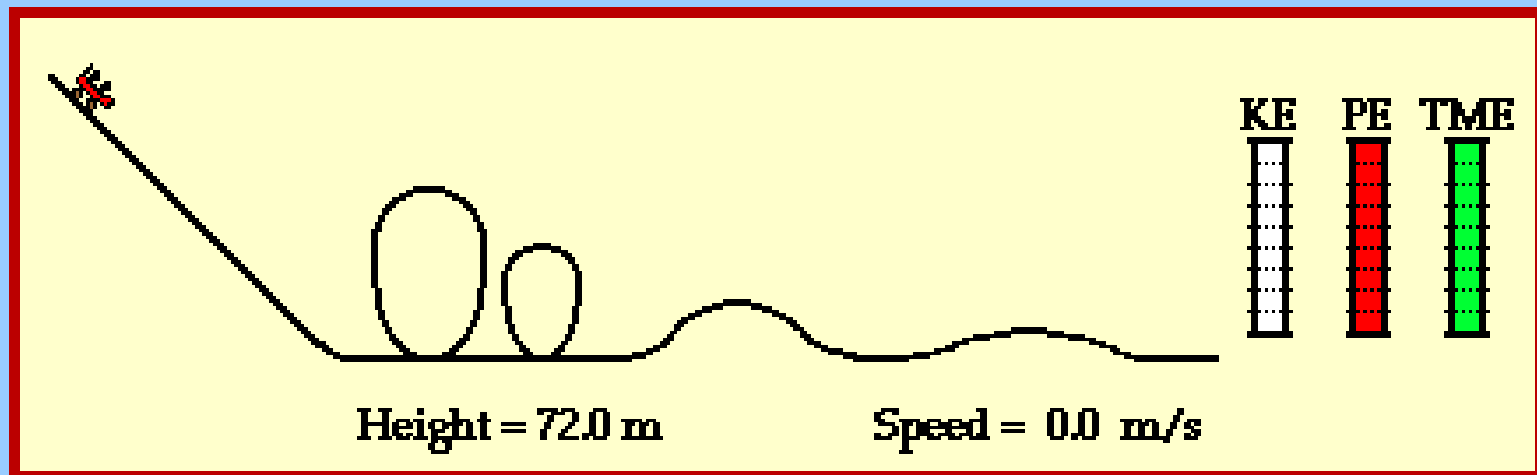
Energy

- **Kinetic Energy** – ???



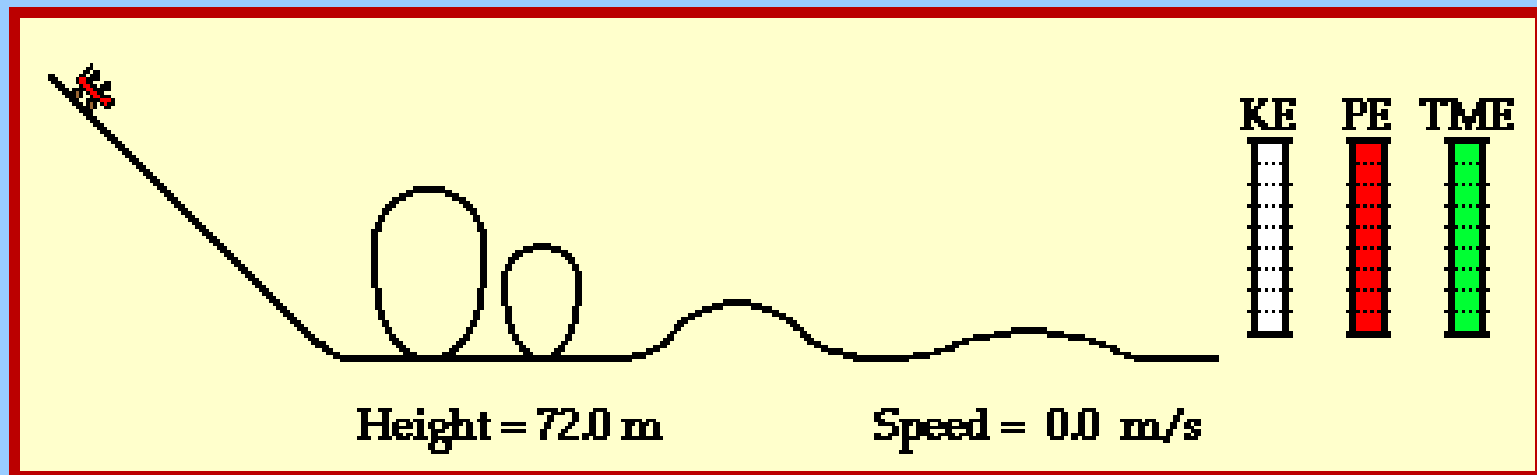
Energy

- **Kinetic Energy** – Energy of Motion
- **Potential Energy** – ???



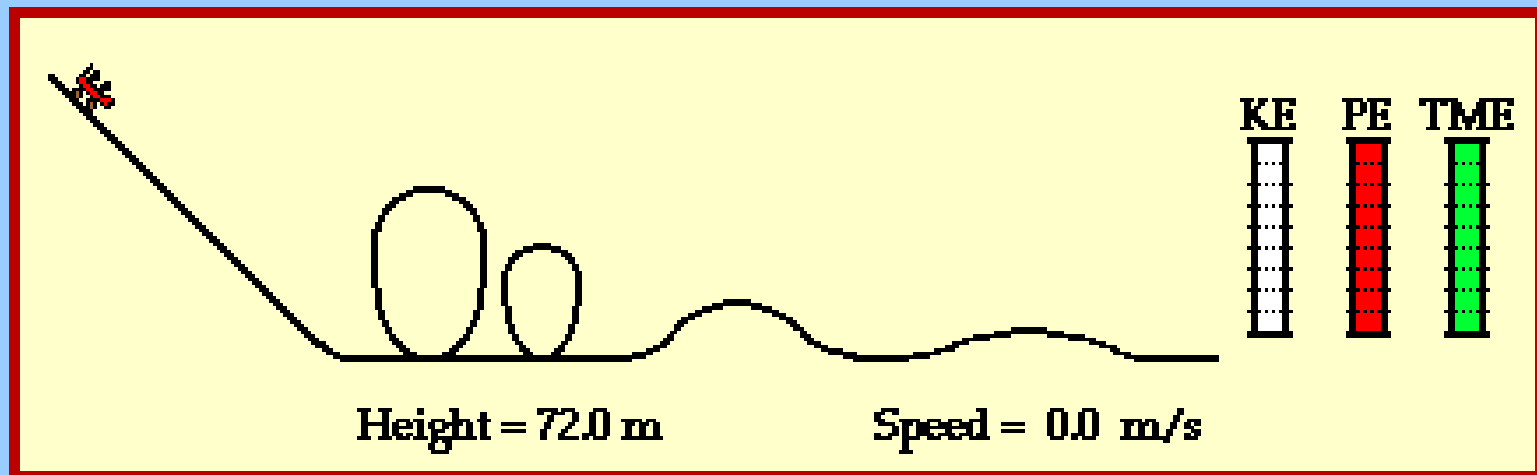
Energy

- **Kinetic Energy** – Energy of Motion
- **Potential Energy** – Stored up Energy
- **Total Energy** – ???



Energy

- **Kinetic Energy** – Energy of Motion
- **Potential Energy** – Stored up Energy
- **Total Energy** – Kinetic plus Potential Energy



Energy