Conservation of Energy

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- Energy cannot be created or destroyed.
- Energy can be transformed from one form to another (PE→KE or KE→PE), but the **total amount of energy (PE + KE) never changes**.

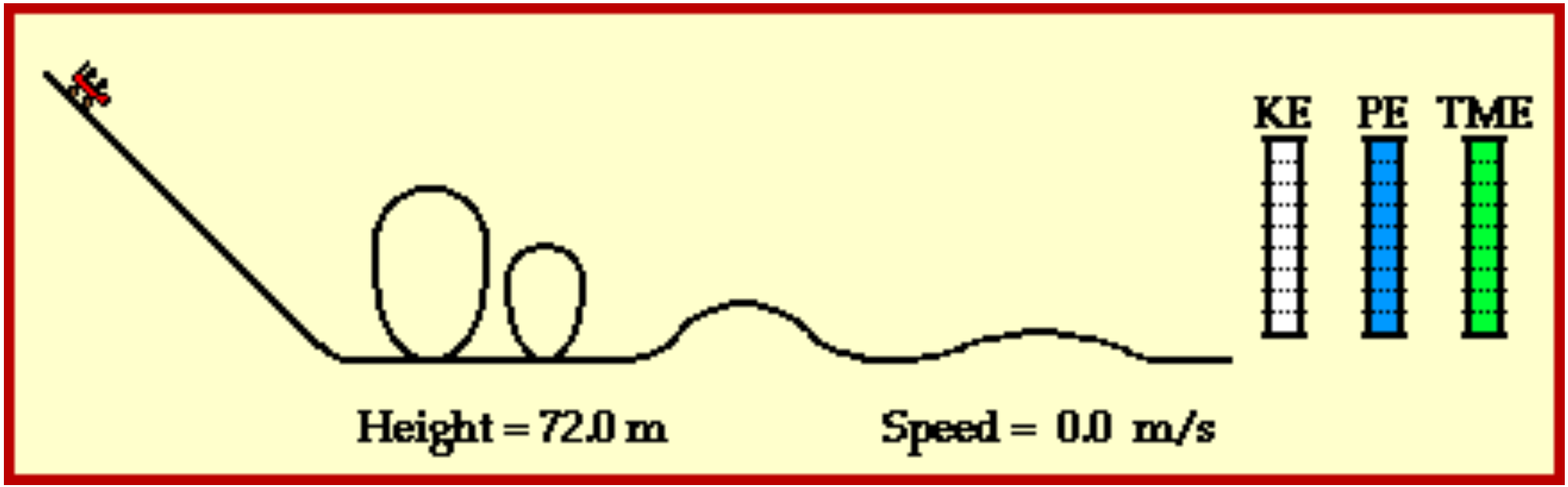
$$KE = \frac{1}{2}mv^2$$

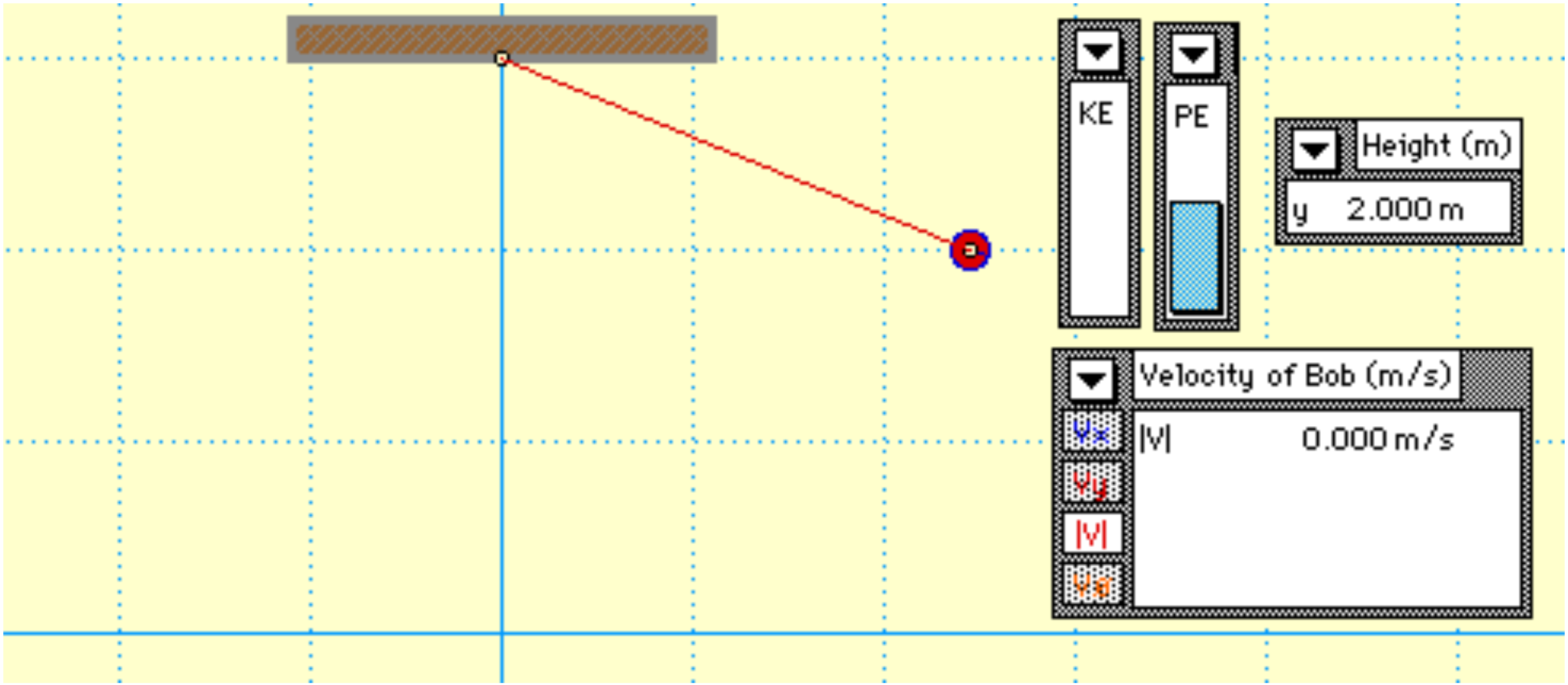
$$PE = mgh$$

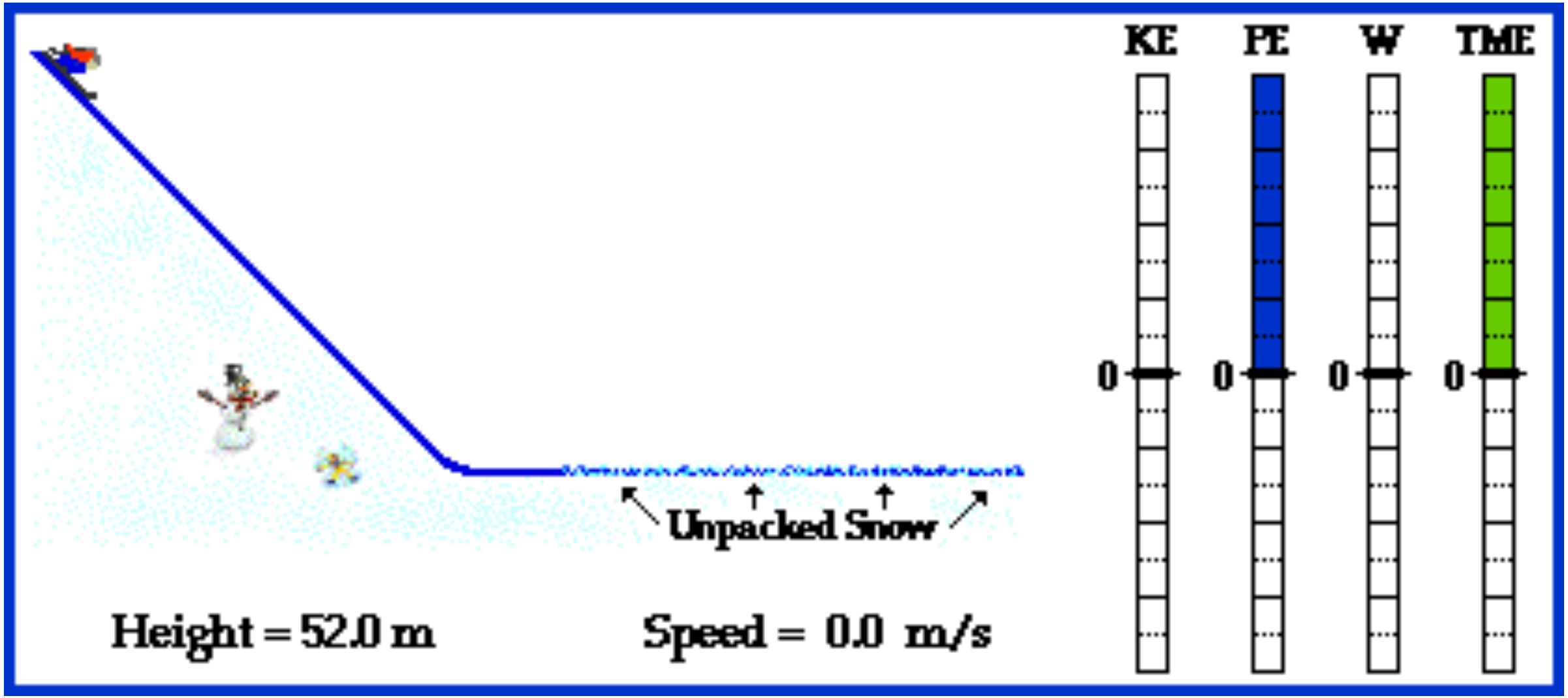
$$TE = KE + PE$$

$$TE_0 = TE$$

$$KE_0 + PE_0 = KE + PE$$


KE
PE
TME
Height = 72.0 m
Speed = 0.0 m/s


KE
PE
Height (m)
y 2.000 m
Velocity of Bob (m/s)
|V| 0.000 m/s


KE
PE
W
TME
0
0
0
0
Unpacked Snow
Height = 52.0 m
Speed = 0.0 m/s

Ex: A 10 kg skier is at a height of 25 m and moving with a speed of 3 m/s. What is her speed when she is 10 m off the ground?

$$KE = \frac{1}{2}mv^2 \quad PE = mgh \quad TE_0 = TE$$

Speed	Height	KE	PE	TE

Ex: A 3 kg baseball is fired straight up from a height of 10 m with a speed of 5 m/s. What is the maximum height of the baseball? What is the speed of the baseball just as it hits the ground?

$$KE = \frac{1}{2}mv^2 \quad PE = mgh \quad TE_0 = TE$$

Speed	Height	KE	PE	TE