

**PENANG SANGAM HIGH SCHOOL**  
**YEAR 11 PHYSICS**  
**WEEK 13**

<b>Strand</b>	ENERGY
<b>Sub Strand</b>	Work Power And Energy.
<b>Content Learning Outcome</b>	At the end of the lesson students should be able to <ul style="list-style-type: none"> <li>define energy and distinguish it from the concept of work.</li> </ul>

### Lesson Notes

**Total energy  $E_T$  – is the sum of all the forms of energy a object has. Energy is a scalar quantity so just add the size.**

### Conservation of energy

Energy can not be created nor can it be destroyed, however its form can change.

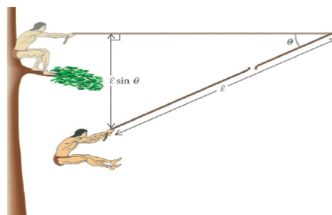
The total energy  $E_T$  of a system always remains the same.

<b>WORD</b>	<b>Forms of energy</b>
Velocity, speed	Kinetic, $E_K$
Height	Potential , $E_P$
Extension or compression	Potential , $E_S$

**Energy is only stored in the spring if there is a compression or extension. There is no energy stored in the spring if the spring is at its original length.**

Always write expression of total energy first.

Tarzan sits on a branch that is 40m above the ground. He swings down as shown.



If Tarzans mass is 95kg

a. Find his total energy when he sits on the branch

$$E_T = E_P$$

$$E_T = mgh$$

2

$$= (95)(10) (40 )$$

$$= 38,000\text{J}$$

b. Find his total energy at the bottom of the swing

38,000J ( total energy remains the same )

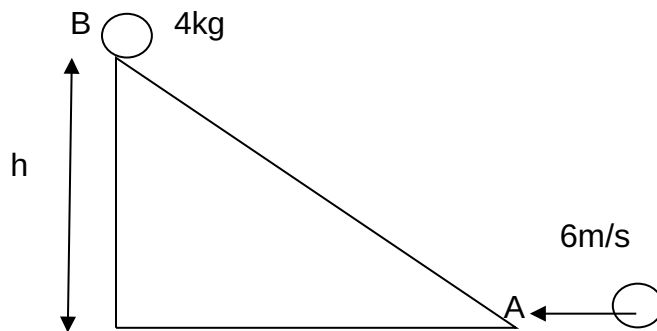
c. His velocity at the bottom of the swing

$$E_T = E_k$$

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

$$38\,000 = \frac{1}{2} (95 )v^2 \quad \text{and solve for } v$$

2. A 4kg mass rolls towards a incline plane as shown.

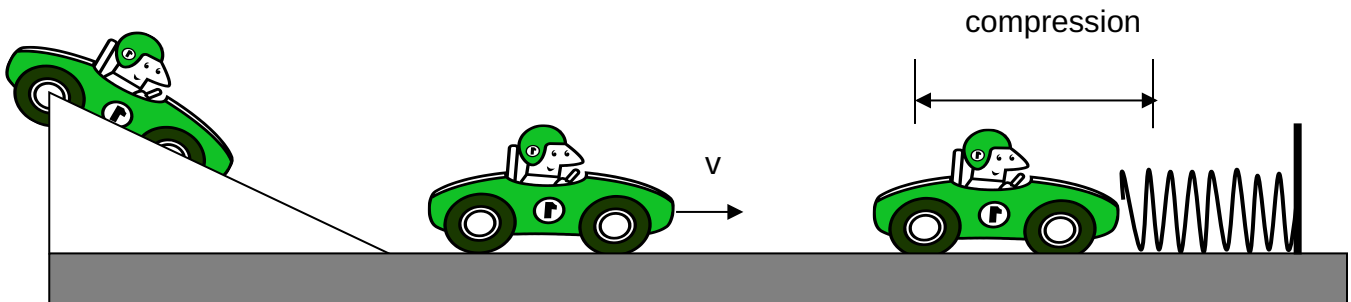


i. Find the total energy at A

ii. Find the total energy at B

iii. Find the height reached at B

2. A toy car of mass  $0.5\text{ kg}$  rolls down from a ramp of height  $4\text{ m}$  as shown. It then comes in contact with a spring of spring constant  $300\text{ N/m}$ . It compresses the spring and becomes stationary.



- i. Find the total energy of the toy car when it is at the top of the ramp.
- ii. Find the velocity of the toy car at the bottom of the ramp.
- iii. Find the compression in the spring as the toy car compresses the spring.

