

## Conservation of Mechanical Energy

Learning Target	Description
11.2	I can define, interpret, and solve problems involving the Law of Conservation of Energy.



## Mechanical Energy

**Mechanical Energy** is the sum of the potential and kinetic energies of an object.

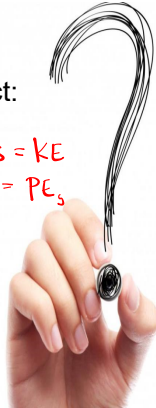
$E = K + U$

### Identifying the Mechanical Energy

Three important questions to ask when identifying the mechanical energy of an object:

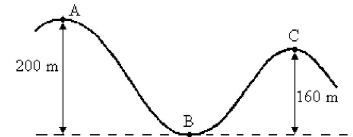
1. Is the object moving? yes = KE
2. Is the object at  $y = 0$ ? NO = PE<sub>s</sub>
3. Is there a spring being stretched or compressed?

YES = PE<sub>s</sub>



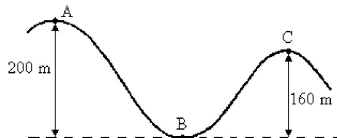
### Mechanical Energy Example

A roller coaster of mass 80.0 kg is moving with a speed of 20.0 m/s at position A as shown in the figure.



### Mechanical Energy Example

A roller coaster of mass 80.0 kg is moving with a speed of 20.0 m/s at position A as shown in the figure.

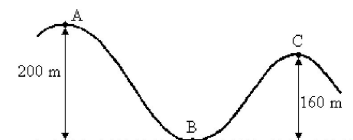


1. Is the object moving? yes  $\rightarrow K = \frac{1}{2}mv^2 = 16,000J$
2. Is the object at  $y = 0$ ? NO  $\rightarrow U_g = mgh = 156,800J$
3. Is there a spring being stretched or compressed? NO

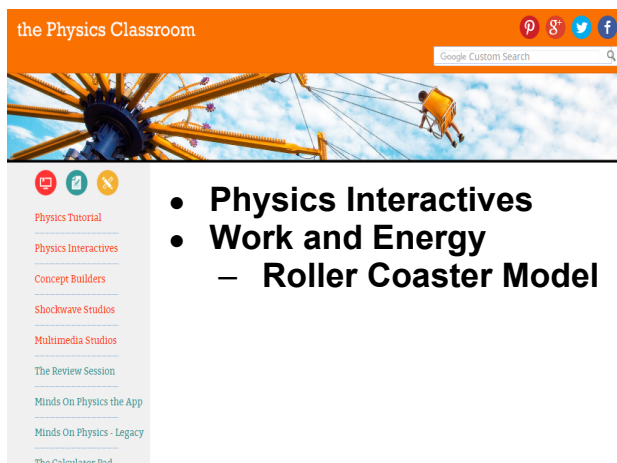
$$E = K + U = 172,800J$$

### Mechanical Energy Example

A roller coaster of mass 80.0 kg is moving with a speed of 20.0 m/s at position A as shown in the figure.



What happens to the mechanical energy as the coaster moves to point B and C?



The screenshot shows the top of the Physics Classroom website. The header is orange with the text "the Physics Classroom" on the left and social media icons (Pinterest, Google+, Twitter, Facebook) on the right. Below the header is a banner image of a roller coaster. A navigation menu on the left lists various resources: Physics Tutorial, Physics Interactives, Concept Builders, Shockwave Studios, Multimedia Studios, The Review Session, Minds On Physics the App, Minds On Physics - Legacy, and The Calculator Pad. To the right of the menu, a list of resources is displayed:

- **Physics Interactives**
- **Work and Energy**
  - **Roller Coaster Model**