Potential and Kinetic Energy
Essential Questions:
1. Compare and contrast potential and kinetic energy
Energy

- The ability to do work
- The ability to move or cause change in matter
- Two types of mechanical energy
  - Potential - stored
  - Kinetic - moving
Potential Energy

- Stored energy in an object due to position
- Ready to be used, but not being used
- Can be transformed into other types of energy
- SI unit Joule (J)
- Distance (height) and mass determine its measure
- Found in all objects
Potential Energy (Gravitational)

• The amount of potential energy is determined by its height and mass.

• The higher an object, the greater its potential energy.
Potential Energy

The greater the mass, the greater the potential energy.

Which ball has the greatest potential energy?
Potential and Kinetic Energy

Potential Energy (Elastic)

• The energy stored in elastic materials as the result of their stretching or compressing.
• The amount of energy stored is related to the amount of stretch applied.
• The more stretch, the more stored energy

Which bow has the greatest elastic potential energy?
Potential and Kinetic Energy

**Kinetic Energy**

- The energy of motion
- Formed or caused by motion
- Can be transformed into other types of energy
- SI unit Joule (J)
- Speed/velocity and mass determine its measure.
- Found in all objects
Kinetic Energy

- The amount of kinetic energy is determined by its speed/velocity and its mass.
- The faster an object moves the greater its kinetic energy.

Which object has the greatest speed?
Potential and Kinetic Energy

**Kinetic Energy**
The greater the mass the greater the kinetic energy.

Which ball has the greatest kinetic energy?
Transformation of Energy

Bouncing Ball

Several energy transformations happen when a ball is dropped on surface and bounces up again.

Potential Energy (PE)
- maximum
- decreasing
- none

Kinetic Energy (KE)
- none
- increasing
- maximum
Transformation of energy

Pendulum

Several energy transformations take place as the pendulum bob swings.

A – PE maximum - KE minimum
B – KE maximum - PE minimum
C – PE maximum - KE minimum
Potential and Kinetic Energy

Transformation of energy
Roller coaster

Kinetic Energy: 0
Potential Energy: 100

KE: 50
PE: 50

KE: 100
PE: 0

KE: 75
PE: 25
Transformation of Energy

Roller coaster

- PE = 100%
- KE = 100%
- PE = 75% KE = 25%
- KE = 75% PE = 25%
Potential and Kinetic Energy

<table>
<thead>
<tr>
<th>Situation</th>
<th>Potential</th>
<th>Kinetic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standing on the end of a diving board.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Falling from the top of a ladder.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>A rubber band pulled back as far as it can go.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Water in a lake behind a dam.</td>
<td>X</td>
<td></td>
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<tr>
<td>Baseball just before it is released by the pitcher</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
Can you...

Compare and contrast potential and kinetic energy?