Lesson 4, Engineering Sport – Energy Worksheet – Answers

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**Energy ?**

<table>
<thead>
<tr>
<th>Kinetic</th>
<th>OR</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>KE = ½ * m * v² = ½ * m * v * v (units are kg-m²/s²)</td>
<td></td>
<td>PE = m * g * h (units are kg-m²/s²)</td>
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<tr>
<td>and g = 9.81 (or ~10) m/s²</td>
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1. An Olympic skier is in the racing stalls waiting for the beginning of the downhill slalom race. He weighs 75kg, and the ski slope is 1,000 m high.
   a. Does he have potential or kinetic energy before the race?
      **Potential**
   b. What is his potential energy?
      \[ PE = m * g * h = 75kg * 10 m/s^2 * 1000m = 750,000kg\cdot m^2/s^2 \]
   c. When he skis down the hill, he reaches a speed of 20 m/s. What is his kinetic energy?
      \[ KE = ½ * m * v^2 = ½ * 75kg * (20m/s)^2 = 15,000kg\cdot m^2/s^2 \]

2. An Olympic sprinter is going for gold in the 100m dash. She weighs 64kg and runs at 10 m/s.
   a. What type of energy does she have?
      **Kinetic**
   b. What is her kinetic energy?
      \[ KE = ½ * m * v^2 = ½ * 64kg * (10m/s)^2 = 3,200kg\cdot m^2/s^2 \]