

Lesson 4, Engineering Sport – Energy Worksheet – **Answers**

— Kinetic OR Potential Energy ?

Remember: **Kenetic Energy:** $KE = \frac{1}{2} m * v^2 = \frac{1}{2} * m * v * v$ (units are $kg \cdot m^2/s^2$)
Potential Engergy: $PE = m * g * h$ (units are $kg \cdot m^2/s^2$)
and $g = 9.81$ (or ~ 10) m/s^2

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?

$$PE = m * g * h = 75kg * 10 \text{ m/s}^2 * 1000m = 750,000kg \cdot m^2/s^2$$

- c. When he skis down the hill, he reaches a speed of 20 m/s. What is his kinetic energy?

$$KE = \frac{1}{2} m * v^2 = \frac{1}{2} * 75kg * (20m/s)^2 = 15,000kg \cdot m^2/s^2$$

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?

$$KE = \frac{1}{2} m * v^2 = \frac{1}{2} * 64kg * (10m/s)^2 = 3,200kg \cdot m^2/s^2$$