Kinetic Energy

(Acc)

1. Kinetic Energy (KE) is energy in _____.

2. Potential Energy (PE) is _____ energy.

3. All forms of energy are measured with the SI unit *joule*. The symbol for joule is *J*. To figure out how many joules of kinetic energy a moving object has, use this formula:

   $KE = ½ \times mass \times speed^2$, but here's an easier way to write it:

   KE = mass x speed x speed
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   So, if you know the mass of an object in kilograms (kg) and its speed in meters per second (m/s), you can figure out how many joules (J) of kinetic energy it has. Here's an example:

   A girl who weighs 30 kg is inline skating at a speed of 5 m/s.   What is her kinetic energy?

   Use the easier formula above and plug in the numbers:

   KE = 30 kg x 5 m/s x 5 m/s *(multiply speed by itself—that's called "squared"; it's what the little ^{2} means)*
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   30 x 25 = 750

   750 = 375   So, the skating girl has 375 J of kinetic energy.
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4. Rodger Maris swung a bat which had a mass of 2 kg at a speed of 45 m/s. How many joules of kinetic energy could he give to a ball?

5. Barry Bonds swings a bat which has a mass of 1.5 kg at a speed of 55 m/s. How many joules of kinetic energy could he give to a ball?

6. Which is more important to hitting a home run: a heavier bat or a faster swing?

7. New England Patriots linebacker Jermaine Cunningham (mass: 116 kg) hit Philadelphia Eagles quarterback Michael Vick (7) at 8 m/s. How many joules of kinetic energy did Cunningham have as he hit Vick?

8. Which is more important to a linebacker if he wants to hit the quarterback as hard as possible: his mass or his speed?