For any calculation that you carry out below, make sure to

- Write the **formula** that you will use to solve the problem
- Re-write the formula, substituting known values **with units**
- Write the answer using the proper **unit**
- Check you answer for the proper number of **significant figures**
- Check you work for accuracy

1. A 4.0 kg laptop computer is lifted to a height of 1.7 m. How much PE does the laptop now have?

$PE = mgh$

$PE = (4.0\,kg)(9.8\,N/kg)(1.7\,m) = \underline{67\,J}$

2. The same laptop falls to the floor, tragically. How much KE does the laptop have in the instant before it hits the floor?

$\underline{67\,J}$

3. What happens to most of the KE that the laptop has (just before hitting the floor) after the laptop contacts the floor?

transmitted to laptop materials

4. How much PE does the laptop have when it has fallen halfway to the floor? (assume air friction is so small that we can ignore it)

$\underline{33.5\,J}$

5. A 1600. kg car is moving at 40. m/s. How much KE does the car have?

$KE = \frac{1}{2}mv^2 = \frac{1}{2}(1600.\,kg)(40.\,m/s)^2$

$= 1,300,000\ J.$

6. If the car increases its speed to 80. m/s, how much KE does the car now have?

$KE = \frac{1}{2}mv^2 = \frac{1}{2}(1600.\,kg)(80.\,m/s)^2$

$= 5,100,000\ J.$

7. Does doubling the speed of the car double the KE of the car? Why or why not?

NO! 4x the KE

8. How much longer would it take to stop the car moving at 80. m/s compared to the distance it would take to stop the car moving at 40. m/s?

4x as long

9. Assuming the car has conventional friction brakes (and not regenerative braking that is a feature of many hybrid electric cars nowadays), what happens to the KE of both cars when the car is braked to a full stop?

"lost" to system as HEAT