Review sheet chapter 5 – Work, Power and Simple machines

- Recognize that in order to do scientific work, an object needs to be in motion and moved a certain distance. It also must be moved with a force that is acting in the SAME direction as the object is moving
- Scientific meaning of "Work" is not the same as the everyday meaning of "Work". Make sure you know the difference!
- SI unit for work is Joules
- The formula for work is **W = F x d**
- Be able to also calculate the force used and the distance, using this formula
- Power is the rate at which work is done
- **Power = Work/time** Time must be in seconds!
- Be able to calculate power, time and work by manipulating the equation
- If the force moving an object is at an angle, you must use the other formula to calculate work **W = F x d (cos angle)**
- **The SI unit for all energy is Joules (J)**
- Recognize that Mechanical energy is the sum of kinetic energy of motion and the sum of all the potential energy of an object together. Recognize that potential energy can be further divided into gravitational potential energy (based on an object's position relative to a gravitational force) and Elastic potential energy (spring)
- Gravitational potential energy or **GPE = mass x gravity x height (**measured from a zero level)
- $\mathbf{PE_{Elastic} = ½\ kx^2}$ Where k = the spring constant (the measure of a spring's resistance to being stretched or compressed) and x = the distance the spring was compressed or stretched
- The law of conservation of energy states that the initial mechanical energy must equal the final mechanical energy <u>in a closed system</u> because energy is never created nor destroyed. The ME stays constant

  $ME_I = ME_{Final}$ *Remember the FORM or TYPE of energy can change, though. i.e. GPE to KE or KE to GPE etc Even though it changes form, the amount of ME stays constant!

  *Friction forces affect the conservation of mechanical energy

- Kinetic energy is the energy of motion. **<u>KE = 1/2mv²</u>**
- **Work- Kinetic energy theorem: $W_{net} = \Delta KE$** (remember W = F x d so the W_{net} can be converted into F x d in calculations)
- Non- mechanical types/forms of energy include nuclear, chemical, electrical