# Knowledge Organiser Key Stage 3

# Subject : Science Year: 7 Topic Title: Energy

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| **Key Facts**   1. Symbols and Units    1. Energy has the symbol E. The standard unit for energy is **joules (J)**    2. Time has the symbol t (not capital T). The standard unit for time is **seconds (s)**    3. Power has the symbol P. The standard unit for power is **watts (W)**    4. Power is **rate of transfer of energy**. Calculate power using **P=E/t** 2. There are five main energy **stores**    1. Kinetic energy is the energy an object has because it is **moving**.   The faster an object is moving, the more kinetic energy it has.   * 1. Gravitational potential energy is the energy an object has because it can **fall**.   The further the object could fall, the more gravitational potential energy it has.   * 1. Elastic potential energy is the energy an object has because it has been **stretched** or **squashed**. The more it has been stretched or squashed, the more elastic potential energy it has.   2. Thermal energy is the energy an object has because of its **temperature**.   The hotter an object is, the more thermal energy it has (but even objects which are cold to us like ice cubes have some thermal energy).   * 1. Chemical energy is the energy an object has because of what it is made from.   Some chemicals are used as **fuels** for vehicles (such as gas or petrol) or fuels for us (food and drink).   1. There are four ways that energy can be **transferred**    1. mechanically (when a force causes an object to move)    2. electrically (when a potential difference causes charges to move)    3. by heating (when there is a difference in temperature)    4. by radiation (when waves transfer energy e.g., by light or sound waves) 2. Energy supplied to your house costs money.    1. first work out how many **kW** of energy has been transferred (1kW = 1000W)    2. next work out how many **hours** this power has been transferred for   (1 hour = 60 minutes = 3600 seconds)   * 1. multiply kW x hours to work out the energy transferred in **kWh**.   kWh is a **non-standard unit** for energy used on your electricity and gas bill. |
| **Key words & definitions**   1. **The law of conservation of energy -** energy **cannot** be created or destroyed, only transferred or stored 2. **Conduction** - thermal energy transfer through a solid by vibrating particles 3. **Convection** - thermal energy transfer through a fluid (solids + gases) by moving particles 4. **Radiation** – thermal energy transfer from by waves of energy 5. **Fuel** – chemical energy source (usually for burning) 6. **Appliance** – a device or piece of equipment (often electrical) designed to perform a task 7. **Renewable** - energy source that can be continually replaced (e.g., wind, solar, tidal, hydroelectric, wave, geothermal) 8. **Non-renewable** - energy source that cannot be replaced (e.g., coal, oil, gas, nuclear fuel) 9. When energy is transferred, **work is done.** Work done has the same unit as energy – **joules (J)** 10. **Work done = Force x distance** |
| **Diagrams**  useful energy out  energy in  wasted energy out  Image result for simple sankey diagram |
| **Potential misconceptions to avoid / errors students often make**   * 1. **Never say that energy is used!** If an energy store has lost energy, this energy has been transferred to another store – often the thermal store of the air   2. Energy cannot be used, but it can be **useful** – what is useful energy depends on what you want from the appliance e.g., you want a fan to move (kinetic) but not get hot (thermal)   3. Energy tends to spread out and become less useful e.g., hot objects eventually cool down |