

Non-useful energy stores **Energy stored in a way that is not useful** Most 'wasted' energy is transferred into the thermal energy stores of the surroundings.

Mechanical process **An object moving due to a force acting upon it** EG: push, pull, stretch, squash.

Pushing an object along a rough surface and work is done against frictional forces.

Energy is transferred to the kinetic energy store of the object as it starts to move.

Gravitational force doing work **Objects dropping from a height** Energy transfers mechanically from the object's GPE energy store to the object's KE store.

Dissipation **Thermal energy is transferred to the surroundings** The transfer of thermal energy into the thermal energy store of the surroundings causes the temperature to rise.

Some energy is also transferred to the thermal energy store of the object, the surface and the surroundings due to friction.

The temperature of the object and surroundings increases.

$\Delta GPE = m \times g \times \Delta h$

Change in Gravitational Potential Energy = mass X gravitational field strength X change in height.

Energy transfer = Work done

Work done = force X distance moved in the direction of the force

Work done **Energy transferred by a force** Energy is transferred when things happen

Energy transfer involves the way energy is stored when systems change

Energy in a system can be changed

- By:
- Work done by forces
 - In electrical devices
 - In heating

$E = F \times d$

Kinetic Energy = $\frac{1}{2} \times \text{mass} \times \text{velocity}^2$

$KE = \frac{1}{2} \times m \times v^2$

A force doing work **Objects thrown upwards** Energy transfers mechanically from the initial force exerted by the person, to the KE store of the object to the object's GPE store.

Work

EDEXCEL Topic 8 ENERGY – FORCES DOING WORK

System	A group of objects
Closed	Energy cannot enter or leave the system
Open	Energy can enter or leave the system

Total energy remains the same (No net change).

Energy transfer diagrams An easy way to see the energy transfers between different energy stores.

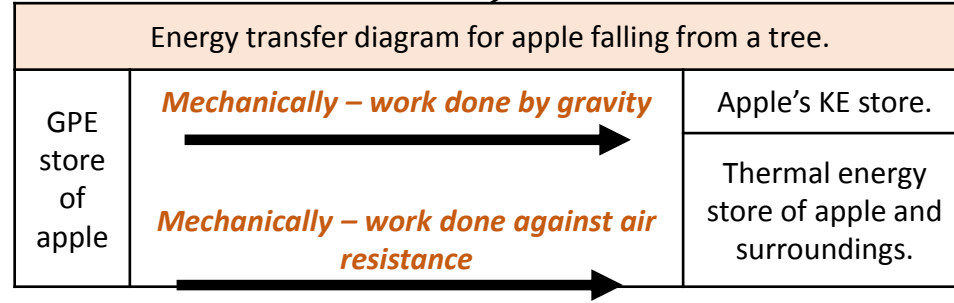
Energy transferred	Joule (J)
Force	Newton (N)
Distance	Meter (m)
Gravitational Potential Energy (GPE)	Joule (J)
Mass	Kilogram (Kg)
Gravitational field strength (gfs)	Newton per kilogram (N/Kg)
Height	Meter (m)
Kinetic Energy (KE)	Joule (J)
Velocity	Meter per second (m/s)
Power	Watt (W)
Work done	Joules (J)
Time	Seconds (s)

Power

One Watt **One joule per second**

Power **The rate at which energy is transferred**
A more powerful crane will lift a box up a certain height, quicker than a less powerful crane.

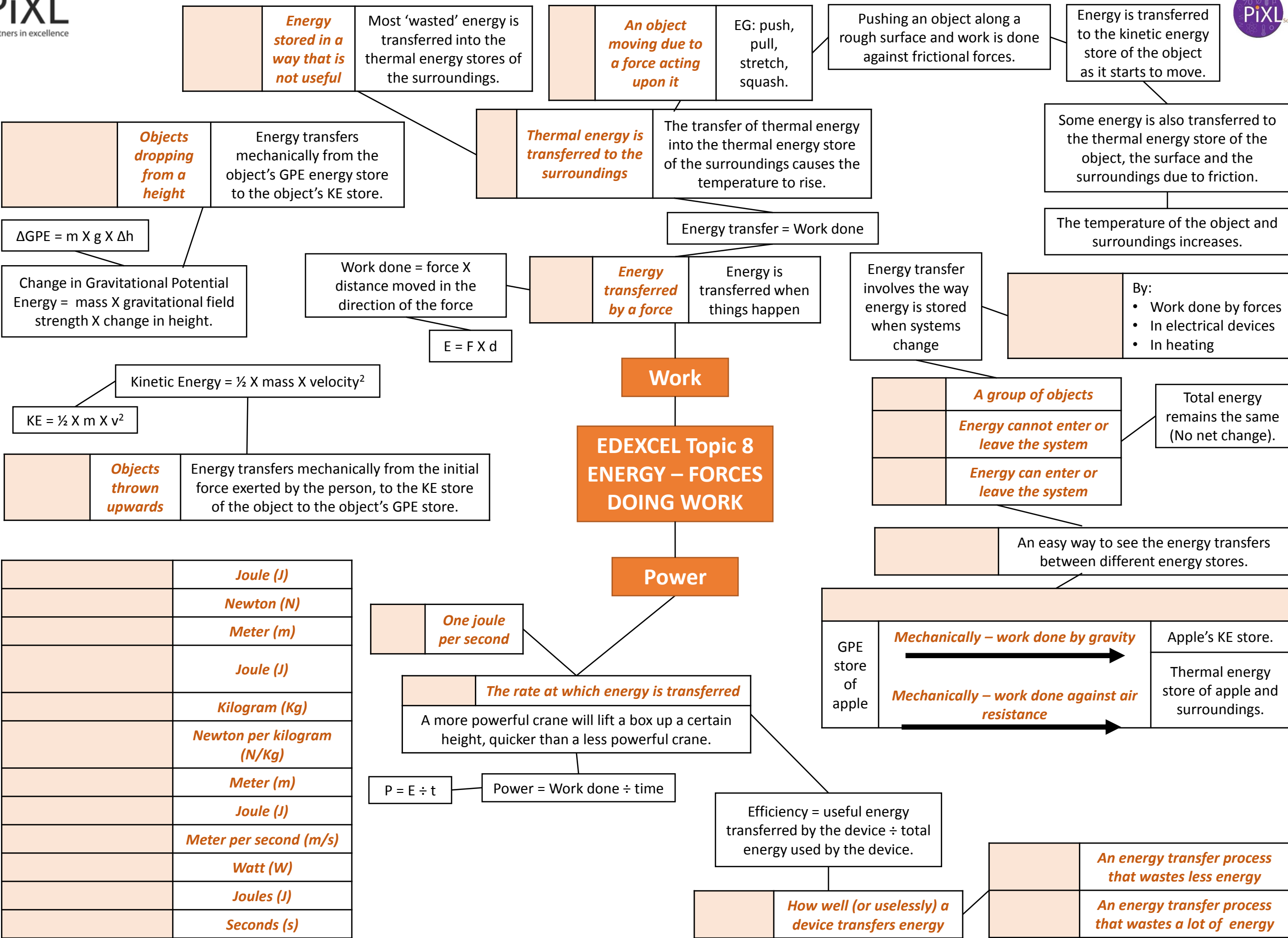
$P = E \div t$ Power = Work done \div time

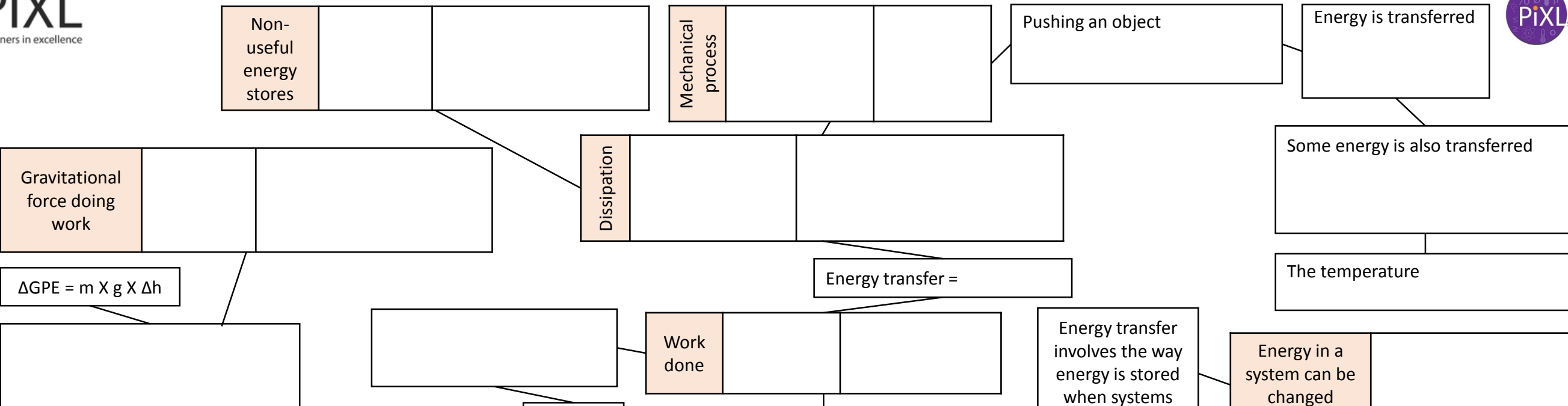


Efficiency = useful energy transferred by the device \div total energy used by the device.

Efficiency **How well (or uselessly) a device transfers energy**

High efficiency	An energy transfer process that wastes less energy
Low efficiency	An energy transfer process that wastes a lot of energy





$\Delta GPE = m \times g \times \Delta h$

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$E = F \times d$

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$KE = \frac{1}{2} \times m \times v^2$

A force doing work

Work

**EDEXCEL Topic 8
ENERGY – FORCES
DOING WORK**

System		Total energy
Closed		
Open		

Energy transferred	
Force	
Distance	
Gravitational Potential Energy (GPE)	
Mass	
Gravitational field strength (gfs)	
Height	
Kinetic Energy (KE)	
Velocity	
Power	
Work done	
Time	

Power

One Watt

Power

$P = E \div t$ Power = Work done \div time

Efficiency

Efficiency

High efficiency	
Low efficiency	

Energy transfer diagrams

