Knowledge

1. thermal, kinetic, gravitational potential, nuclear, electrostatic, magnetic, chemical, elastic potential
2. One where neither matter or energy can enter or leave
3. By heating or doing work
4. KE = 1/2mass x velocity^2
5. GPE = mass x height x gravitational field strength
6. E= 1/2constant x compression/extension^2
7. The amount of energy needed to raise the temperature of 1Kg of a substance by 1°C
8. E = SHC x mass x temperature change
9. Power of heater, time of heating, surface area of substance, insulation

Application

1. Electrical energy is transferred to the water by heating. Some energy is wasted as sound.
2. GPE = 150 x 50 x 9.8

   GPE = <u>73, 500J</u>

3. It is transferred into the objects kinetic energy store
4. KE = $1/2mv^2$

   $V^2 = KE/0.5m$

   $V^2 = 73500/75$

   $V^2 = 980$

   <u>V= 31.3 m/s</u>

5. Not all GPE will be transferred to KE – some will transferred to the thermal store of the environment because of friction and air resistance.

- 6.
- Measure 100g of water into a polystyrene cup
- Take the starting temperature with a thermometer
- Use the 50W heater to heat the liquid for 5 minutes and retake the temperature. Calculate the temperature change
- Calculate the energy provided to the liquid (E=pxt)
- Put the values for temperature change and energy supplied into the SHC equation
- Repeat for oil, making sure to use 100g mass and 5 minutes to heat with the same heater

7. If heater of known power is used – energy = power x time

If not, connect a joulemeter to the circuit to count the number of joules supplied.

8. SHC = E/ mass x temp change

SHC = 50000/ 30 x 2.5

SHC = 666.67 J/Kg/°C

To 3 sig figs = 667 J/Kg/°C

9. $E = 1/2\ K \times e^2$

$E = 1.5 \times 30^2$

E = 1350J