To do:

1. Calculate the gradient
2. Inverse of the gradient to calculate the specific thermal capacity of the object
3. What are the units of specific thermal capacity?

Plenary

Material	Specific Thermal Capacity / J/kg^{0}C
Water	4200
Air	1000
Copper	385
Glass	840

Which of these materials is the best conductor and best insulator?

How much energy would it take to heat 1kg of water by 3^{0}C?

How much energy would 1kg of copper loose to fall by 5^{0}C?

Which materials would be best to use in a car cooling system? Why?

Question 1

- What are the 4 equations that we need to know?
  - Thermal Energy =
  - Kinetic Energy =
  - Gravitational Potential Energy =
  - Elastic Energy =

Question 2

- What do the following symbols mean?
  - Δ
  - E
  - e
  - m
  - θ
  - v
- Extension: What units are they measured in?

Question 3

- What experiment would you do to calculate the elastic energy stored in a spring?

- What experiment would you need to do to calculate the specific thermal capacity of a material?

Calculate:

1. A horse of mass 400kg is travelling at a velocity of 2m/s. a) What is the horses kinetic energy?
2. A apple of mass 0.1kg falls from a branch 1.5m above the ground.

   a)Was it's gravitational potential energy before it fell?

   b) What would it's velocity be at when it hit the floor?

Calculate:

1. A spring has a spring constant of 25N/m. How much energy is stored in it when it is extended 30cm?

   a) If it has a 300g mass attached to the spring, how much potential energy has it lost as it extended?

2. How much energy is required for a kettle to boil 2kg of water from 20^{o}C, if the specific thermal capacity is 4200J/kg/^{o}C?

Voltage current resistance

- Voltage is the push in the circuit, it's the amount of energy each unit of charge has
- Current is the flow of electrons
- Resistance is what slows the current down

Rules

- Voltage in series adds up, so 2 batteries in series of 3V equals 6V.
- Remember all the voltage added by the batteries is given to the resistors.
- The more resistance a resistor has the more voltage it gets.

Rules

- Voltage in parallel stays the same, so 2 batteries in parallel of 3V still has a total voltage of 3V.
- All the branches in a Parallel circuit have the same amount of Voltage lost across them

rules

- Current is the same everywhere is series
- Current splits in parallel, the higher the resistance in a branch the less the current

Equations

- PIVVIRQIT
- Power= current x voltage
- Voltage = current x resistance
- Charge = Current x time

Ohms law

- For a fixed resistor the current is proportional to the voltage
- For a thin wire it starts off proportional but eventually the graph curves because the resistance increases
- Diode have infinite resistance one way and zero resistance the other.

LDR, Thermistors

- Variable resistors change their resistance dependant on a factor.
- LDR as the light increases more free charge carries are released so the resistance decreases
- Same with a thermistor, the hotter it is the more free charge carriers there are.
- It is all to do with FREE CHARGE CARRRIERS

Density

- REMEMBER equation
- Density= mass / volume
- Don’t muck up units.
- Irregular objects volume can be calculated by using a Eureka can.

Particles

- Solid- particles fixed, and vibrate
- Liquids- Particles touching but free to slide past each other
- Gases- particles move around randomly and are not bonded

Kinetic and potential energy

- As the Heat a substance you give it more energy.
- If the temperature increases you are increasing the Kinetic energy of the particle(they move around faster or vibrate more)
- Energy=mass x SHC x Change temp
- SHC unit is J/Kg/C

Kinetic and potential energy

- When the substance is changing state the temperature doesn't change so neither does the kinetic energy.
- The energy is going in to breaking bonds
- You are increasing the potential energy of the substance.
- The particle move further apart.
- Energy = Mass x Latent heat
- Latent heat units = J/Kg