Year 10 Physics Checklist
P1 Heat and Temperature

Heating Houses
Describe temperature as a measurement of hotness on a chosen scale. Describe heat as a measurement of energy on an absolute scale. State that temperature is measured in ^{o}C. State that energy (heat) is measured in J.

Recognise energy flows from a hot body to a cooler one. Hotter bodies will cool and cooler bodies will warm.

Recognise that the specific heat capacity of materials is:
• a measure of how much energy they can hold;
• energy needed to raise the temperature of 1kg by 1^{o}C;
• different for different materials.

State and use the equation:
energy = mass x specific heat capacity x temperature change.

Recognise that the specific latent heat of materials is:
• a measure of the energy needed to melt or boil them;
• the energy needed to melt or boil 1kg of them;
• different for different materials and states.

State and use the equation:
energy = mass x specific latent heat.

Explain that energy supplied during a change of state is used to break inter-molecular bonds and this explains why temperature does not change.

Keeping Houses Warm
Apply the fact that air is a very good insulator to its use in keeping homes warm:
• fibreglass or mineral wool is used as loft insulation;
• double glazing in windows;
• cavity-wall insulation foam;
• reflective foil in or on walls;
• draught-proofing.
• payback time.

State and use the equation:
efficiency = useful energy output / total energy input

Explain using the ideas of conduction, convection and radiation (absorption and emission) in terms of:
• the design features of the home;
• the design and use of everyday appliances in the home;
• energy saving strategies.

How Insulation Works
Describe how energy is transferred by:
• conduction - transfer of KE between particles;
• convection - change of density causes (bulk) fluid flow;
• radiation - infrared radiation needs no medium.

Explain that, unless air is trapped in foam, there will still be energy loss by convection in a cavity wall.

Cooking With Waves
Recognise that infrared radiation is absorbed by the surface of an object causing an increase in temperature:
• black surfaces are good absorbers of radiation.

Recognise that microwaves cause heating when absorbed by water and this is the basis of the microwave oven.

State that mobile phones use microwave signals.

Describe properties of microwaves:
• penetrate (about 1cm) into food;
• are reflected by metal;
• can cause burns when absorbed by body tissue;
• go through glass and plastics.

Describe properties of infrared radiation:
• heats the surface of the food;
• is reflected by shiny surfaces.

Explain how microwaves and infrared transfer energy to materials:
• microwaves absorbed by water particles in outside layers increasing their KE;
• infrared is absorbed by all particles on the surface increasing their KE;
• energy transferred to centre of food by conduction or convection.

Describe how the energy associated with microwaves and infrared depend on their frequency and relate this to their potential danger.
Describe how diffraction and interference of microwaves can cause signal loss:
• limited distance between transmitters;
• high positioning of transmitters;
• nuisance of obstacles affecting signals.

Do not keep saying to yourself, if you can possibly avoid it, 'But how can it be like that?' because you will get 'down the drain' into a blind alley from which nobody has yet escaped. Nobody knows how it can be like that.

Richard Feynman