

Energy in the Home

Heat Transfer

- Objects hotter than their surroundings will transfer heat to the surroundings
- Conduction - quickest in metals, slower in non-metals, slower in liquids and very slow/hardly at all in gases
- Convection - occurs in liquids and gases (known as fluids), hot fluid rises because it is less dense and is replaced by colder more dense fluid
- Radiation - heat radiation also known as infra red can travel through a vacuum (no particles), is absorbed by black surfaces, reflected by shiny ones, emitted best by black surfaces and least by shiny ones, hotter objects emit shorter wavelength heat radiation

Insulating Homes

- Heat is lost through the roof, walls, windows/doors and floor
- Heat loss can be minimised (not completely stopped) by loft insulation, cavity wall insulation, double glazing and thick carpets/floor insulation
- All except double glazing work as follows:
 - Material itself is a poor conductor
 - Pockets of air trapped in the material prevent convection since hot air cannot rise now
 - Air is a very poor conductor so the heat cannot conduct through it
- Double glazing has much of the air between the panes removed and this cuts down on both conduction and convection

Payback Time

- The time it takes to recover the money spent on insulation
- Example: it costs £300 to install loft insulation and saves you £50 on your heating bills every year, therefore it takes 6yrs to recover the amount spent ($300/50 = 60$)
- Some insulation takes longer than others for you to recover the costs

Efficiency

- Efficiency = $\frac{\text{useful energy transferred}}{\text{total energy input}} \times 100 \%$
- Example: a television transfers 200J of electrical energy into 100J of light, 80J of sound and 20J of heat
Efficiency = $\frac{(100+80)}{(200)} \times 100 = 90\%$
- More efficient equipment means: less energy wasted as heat, less electrical energy wasted and therefore less fuel burned at the power station helping to preserve supplies of non-renewable energy (gas, oil and coal), less carbon dioxide produced and therefore a reduction in the greenhouse effect

Which fuel is best for heating homes?

- A choice will have to be made between the most efficient and the cheapest
- Always give clear reasons for your choice
- Electricity is the most efficient but the power station that supplies it is very inefficient
- Using more efficient heating systems mean you burn less fossil fuels and produce less carbon dioxide. This means less greenhouse gases enter the atmosphere.

