Heat loss from a building

PROJECT

1

Students can estimate the Total Heat Loss from their own dwellings using the data below for U-values / Air Change Rates.

The thermal transmittence (U-values) of the various elements of a building which complies with current building regulations are as follows:

Element	**U-value** (W/m^2K)
Walls	0.35
Floor	0.25
Roof	0.25
Glazing	2.2
Doors	0.8

The Air Change Rate of the building is 0.5 air changes per hour.
Winter internal and external air temperatures are 21^oC and -4^oC respectively.

2

Students could then re-calculate the Total Heat Loss from their own dwellings using their own estimate of actual U-Values from the Additional Data to the right.

The difference between the two results will give an indication of how improvements to the fabric of their dwelling might reduce energy consumption and running costs for their space heating.

ADDITIONAL DATA

Dwellings constructed pre-2002 may have significantly higher U-values and Air Change Rates relative to those constructed more recently.

The following data is an extract taken from
CIBSE Guide A, Environmental Design, Section 3

Building Element	**U-value** (W/m^2K)
Stone walls	1.23
Solid brick / Plaster	2.14
Brick / Brick cavity walls	1.47
Brick / Concrete cavity walls	1.75
Flat concrete roof (uninsulated)	2.05
Pitched roof (uninsulated)	1.67
Pitched roof (50mm insulation)	0.53
Solid ground floors on soil	0.8
Carpet / Chipboard on joists (insulated)	0.3
Suspended timber floor (uninsulated)	1.5
Windows (wood, single glazed)	4.7
Windows (wood, double glazed)	3.0

Typical Air Change Rates are 1 to 2 air changes per hour, depending on the extent of the draught proofing.