**Activity 2 Worksheet: Analysing heat loss through a wall**

In this activity, you will work in pairs to calculate heat loss through a wall.

1. Locate a brick/block cavity wall in your school and estimate the age of its construction.   
   Look up its age in the reference table and determine its U-value.

|  |  |
| --- | --- |
| **Built** | **Assumed U-value** |
| Pre-1970 | 2.00 |
| In the 1970s | 1.60 |
| In the 1980s | 1.00 |
| In the 1990s | 0.60 |
| In the 2000s | 0.45 |
| In the 2010s | 0.30 |
| In the 2020s | 0.18 |

1. Measure the temperature on both the inside and outside of your chosen wall using thermometers. One student should take temperature readings **inside** the building, while the other takes readings **outside**.   
   It is important that you both record the temperatures **at the same time**, every 20 minutes, at least 4–7 times. You can use the table on the last page to record your data.
2. Enter your temperatures into a spreadsheet. Calculate the temperature difference between inside and outside at each time interval.
3. Plot this data on a scatter graph, with time on the x-axis and the temperature difference on the y-axis.
4. Use the spreadsheet to generate a best fit line and display its equation.
5. Finally, integrate the equation to find the total area under the best fit line, which represents the total heat loss over the time period studied.

You will need to prepare a four-page report that summarises your findings. You should include:

* an estimated date of construction for your wall and your reasons for this estimate;
* the U-value of the wall and what this means;
* a completed table of the temperature readings taken both inside and outside of the wall, as well as the calculated temperature differences for each time interval;
* a graph that plots the temperature difference over time, with the equation of the best fit line displayed on the graph;
* the steps involved in the integration calculation, showing how you used the equation of the best fit line to calculate the total heat loss over the time period studied.Make sure to include the final result for the total heat loss in watt-hours (H).

## Data collection table

|  |  |  |
| --- | --- | --- |
| **Time** | **Temperature inside (°C)** | **Temperature outside (°C)** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |