ST PANCRAS GARDENS: GRAVESTONE WEATHERING

Gravestone weathering is a big problem, particularly in cities like London

Define the term "weathering":

_____

_____

There are three types of weathering:

- *Chemical Weathering* – e.g dissolving by acid rain
- *Physical Weathering* – e.g. freeze thaw action
- *Biological Weathering* – e.g lichen growth

Which type of weathering do you think is dominant in London? What is the primary cause?

_____

_____

_____

Name three factors that might affect the weathering of a rock:

① _____

② _____

③ _____

Raised Lead Lettering

Some of the gravestones have inscriptions depicted by lead lettering. When the lettering was first placed onto the stone it would have been flush with (at the same level as) the stone surface. Can you see how the gravestones here have lead lettering that stands away from the gravestones?

This indicates that the stone has been weathered away, leaving the lettering at the original level that the stone would have been at.

Go to The Tate Family Grave, (see map)…

What is the date of the gravestone (take it as the youngest date on the stone)

Measure the gap between the stone and the lettering.

From physics you will have used the simple equation:

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

If you take the gap between the stone and the lettering as **Distance** and the time period from the date on the gravestone to now as **Time** then the **Speed** should give you the rate of weathering.

AREA FOR WORKING:

What is the rate of weathering per year? _____

The calculation you have just carried out is for a gravestone composed of MARBLE. Now go to the lettering on The John Walker Memorial (see map). This is a LIMESTONE. Use the same method of calculation as before.

AREA FOR WORKING:

What is the rate of limestone weathering per year? _____

Compare your answer with the marble weathering rate above.

Which rock weathers faster? _____

Why do you think this is?

_____

_____

_____

Carved Lettering

Compare the letters on The Jane Grundy Memorial (pink granite) with those on William Jones' Gravestone (orange sandstone).

How do they differ?

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Using the basic classification table below, describe the carved lettering at the top, middle and bottom of the gravestone.

⇩ Increase in weathering ⇩	① Lettering is sharp and distinct
	② Lettering is slightly rounded but still legible and clear.
	③ Lettering is legible but rounded with some edges clearly removed.
	④ Lettering is rounded with all or most original edges removed. It is still legible, but becoming more indistinct from the surface of the grave.
	⑤ Lettering is still just about legible, but now almost indistinguishable from the surface of the gravestone.
	⑥ Lettering has virtually disappeared.

TOP _____

MIDDLE _____

BOTTOM _____

Why do you think there is this variation across the gravestone?

_____

_____

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_____

Raised Fossils

Fossils in limestone, particularly Portland Limestone, are harder than the surrounding rock, and therefore weather more slowly. This means that over years of exposure, the fossils end up protruding from the surface of the gravestones. As with the lead lettering, this allows us to measure roughly how much of the limestone has weathered away, and how fast it has weathered.

Have a look at the front of St Pancras Church at the freshly cut Portland Limestone blocks. Can you see how the fossils are flush with the limestone?

Now have a look at ……. Grave. Here the fossils obviously protrude.

How old is the gravestone? _____ years

Using the same method that you did for the raised lead lettering, work out the rate of weathering of the limestone.

AREA FOR WORKING:

What is the rate of weathering per year? _____

Remember, this method will be more inaccurate than the raised lead lettering since lead is much more resistant to weathering than the lime fossils.

Final thoughts…

If you wanted to ensure your gravestone was still legible in a few hundred years time, what type of stone would you choose for your headstone? Why?

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_____

If you wanted everyone to forget you as soon as possible, what stone would you use then? What could you do to ensure maximum weathering potential?

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