

A Journey to the Underworld - An investigation to analyse the soil around the school

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Introduction

Our school was inaugurated on 14th March 1943. At that time, and up till 1964, the school was housed in cramped rented rooms where space was very restricted, let alone the chance to have a field. This obstacle was remedied when the new, state sponsored school was inaugurated on the 14th March 1964. As the aerial photo indicates, the classrooms recede well away from the main street and are immersed and surrounded by large fields. In fact, an orchard surrounds all the classes from the back. When in the back classrooms, one can note the Mixta Caves which gave shelter to the first inhabitants of the Maltese Archipelago, well before the Ggantija Temple period.

Up until last year, the pupils were very much after the changing landscape which changes the colour and type over one complete year. This year, their curiosity was awakened about what actually lies beneath the surface of the orchard. The reason for this was that just by a visual check, the colour of the soil in various parts of the orchard is different. Some is quite black, other light cream; in other parts it is very reddish. The pupils started asking themselves whether the different colours mean different types of soil.

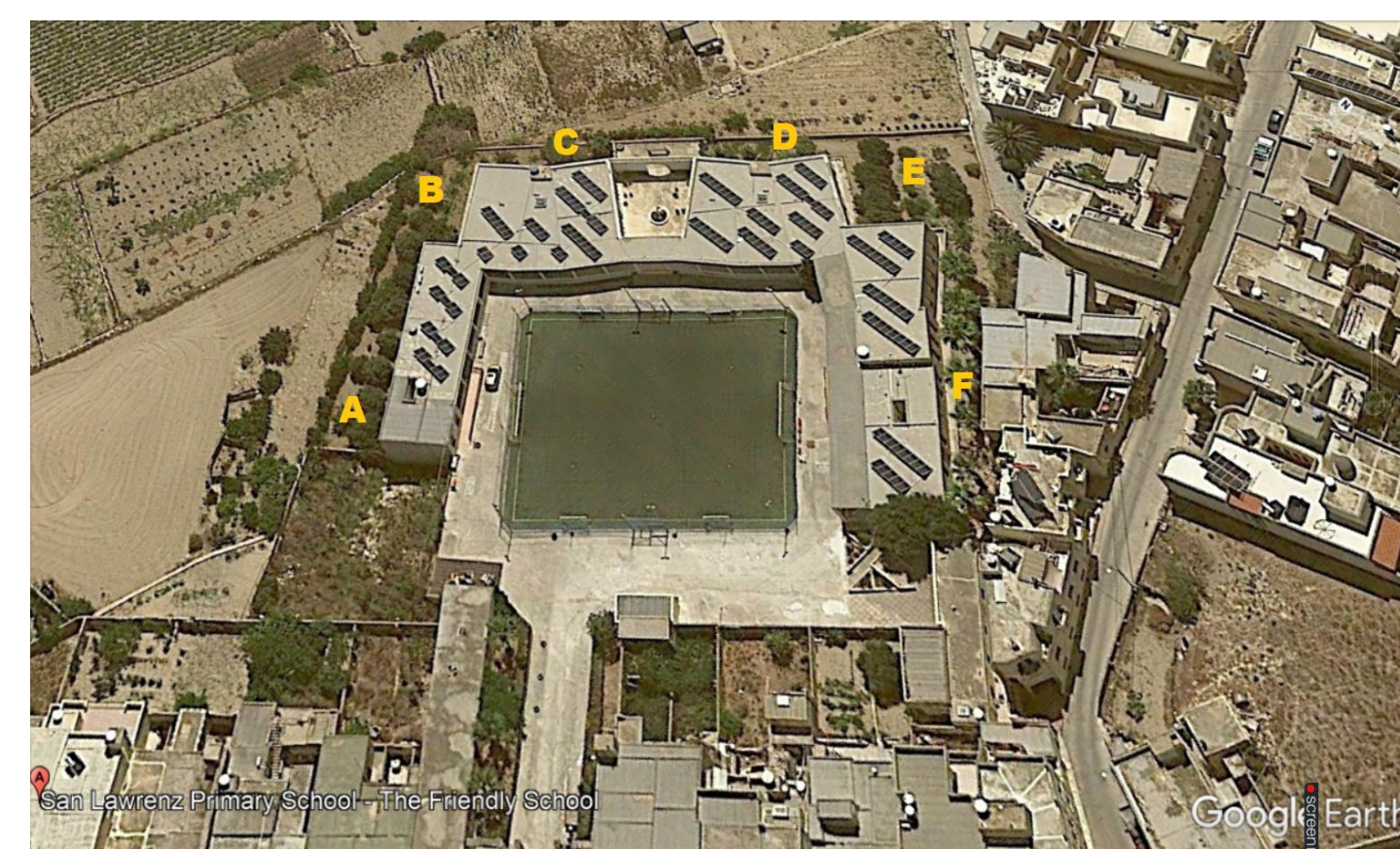
As a start, Ms Louise Refalo, their class teacher, showed them a very intriguing video about the soil and why it is important to investigate it. It contained information about the different types of soil and how best to investigate, compare and draw conclusions about it. The pupils carried out a brain storming session, asking and seeking answers to why there is soil in the first place, from where does the soil come, is it finite or is it continuously produced and why does the Planning Authority do not allow soil to be dumped in dis-used quarries. From this general introduction, the discussion proceeded to the particular, that is, the soil making up the school's orchard, its colour, temperature and texture. But how can one analyse the soil's texture?



Setting on a journey to the underworld to discover how important soil

Methods

the pupils were shown a large diagram (Figure 4) of the school orchard and six areas were identified from where samples had to be obtained (Figure 5). Area A = this area is sunny and trees grow in it. It is facing east. Area B = this is similar to Area A, except that this is more sunny. Area C faces South and is sunny during almost the whole day. Area D faces the South and is mainly used as a kitchen garden by the Kinder classes. Area E faces west and is not as sunny as the other areas. Area F also faces west but only gets diffused sunlight. At its deep end, it never gets any sun and is very cold.



Soil sample sites in the school orchard

Apparatus used

- Shovel
- Sealable plastic bag
- Digital Scale
- Glass jar with lid

The Sampling Method followed these steps: once the pupils were briefed, an area was allocated to each pupil. Six pupils were allocated one sampling area each (A, B, C, D, E and F). The pupils used a shovel to remove the soil. Then they put the soil in a sealable plastic bag. Later, each sample was weighed on a digital scale. The pupils used the scales to measure the same amount of soil to pour in the glass jars (around 350 grammes). The sample was later poured in a glass jar after which, water was poured. Each jar was closed tightly with a metal lid and shaken vigorously for two minutes to loosen all the particles contained within it. Then, the jar was placed on the desk of each pupil and left to settle.



Collecting and weighing soil samples

Results

It was found that immediately after the sample was shaken, the whole new solution was uniform and consisted of a mass of murky water and a few floating items on top. One could not distinguish one item from the other. However, after two minutes, it was evident that the organic material, like, small pieces of wood/branches were seen floating on the top. At the bottom, small stones could be seen while between these two extreme points, lay a brownish solution. After 10 minutes, the situation remained almost the same but showing gradual intensification of the observations done after two minutes – but for one exception. It was noted that there was no change in the floating material at the surface, i.e. particles which could float did so immediately after the shake-up. No change was registered in that aspect. But, it was noticed that at the bottom sediment started to settle over the small stones which had immediately dropped to the bottom. The solution decreased in its intensity but it was still opaque and one could not see through it.



The next day, the pupils were even more keen to see what has happened to this mass of 'dirty water'. They didn't know that they were in for a surprise! In fact, at first they could not realise what had happened overnight. The water was clear so much so that one could easily see through it and recognise what was in front of the bottle. At the surface, the number of floating organic items decreased. But the greatest change occurred at the bottom of the jar. Overnight, a multi layered sediment settled gently and formed layers in a fairly predictable manner. The heavier particles sank before the lighter ones and moved at a faster speed through the solution than the lighter ones. This gave rise to a number of layers of various thicknesses depending on the sample. It was also noticed that a fine brownish topmost layer was formed. It was concluded that this was the result of previously floating organic mass that overnight, it got soaked with water, thus becoming heavier and hence sank. As the latter process took more time to complete, it was the last layer to form.



Conclusions

This investigation proved to be very useful to our school and eye-opener to the pupils. Indirectly, it gave the pupils and the school management team an insight to what lies underground. It is a truly different world that exists underneath the pupils' feet.

For a start, it is evident that the area which is the least exposed to sunlight is also deficient in important organic material. The organic material, apart from the vitamins and minerals which it releases in the soil, is also helpful to make the soil more airy and hence, allows more worms to populate it, which in turn makes it ideal for the roots to increase and intensify their web of radicles to increase the uptake of water and minerals. In this way, the leaves become stronger, sending more food to the roots and eventually helping to increase the girth of the trunk. This will compensate for the lack of sunlight and can help to keep the soil's temperature constant.

When one compares the areas of samples A, B, C, D with those of samples E and F, one immediately realises that the former soil is soft to the touch while the latter is very compact and hard. This again can be deduced by looking at the glass jars and can be explained in terms of organic material present (*I-art hija merfugħa*) as against (*I-art hija mballta*). This means that more air is present in the former and hence more chance for growing and development of root networks in areas of samples A, B, C, and D than that in areas of samples E and F.

The soil from the area of Samples A, B, C and D drains easily, leaving the roots humid but not clogged with water, ensuring perfect growth conditions. At present, the kinder classes are manning the school's kitchen garden. One of the products are broad beans.



Bibliography

- GLOBE teacher guide <https://www.globe.gov/> (Accessed October 2021)
GLOBE Elementary Getting to Know Soils [Soils - Elementary GLOBE - GLOBE.gov](https://www.globe.gov/) (Accessed October 202)
Video about soils from YouTube [All About soil - YouTube](https://www.youtube.com/watch?v=...)