



GLOBE Europe and Eurasia Regional Meeting and Training

11 – 15 November 2024, Ljubljana, Slovenia

Workshop B4 | Thursday, Nov 14, 2024

**“Exploring the Hidden World Beneath
Our Feet: The Soil Project Experience”**

Ms. Ramona Mercieca

Post Graduate Researcher,
University of Malta

GLOBE Deputy Country Coordinator

Mr. Yashraj Patil

Assistant Professor,
SNJB's College of Engineering
GLOBE GIsN Scientist/Researcher



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Workshop Outline

- 1. Lead and Co-Lead Introductions**
- 2. What is Soil and why it is important**
- 3. Soil in the UN SDGs**
- 4. Case Study - Soil Project in Gozo, Malta**
- 5. Soil Protocol - Data Collection Part 1**
- 6. Hands On Activity**
- 7. Soil Protocol - Data Collection Part 2**
- 8. GLOBE and beyond**



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Ms. Ramona Mercieca

Lead

- **Deputy Country Coordinator for Malta**
- **Member of the GLOBE Europe and Eurasia Regional Board**
- **Volunteer with Nature Trust-FEE Malta and member of the Wildlife Rescue Team Gozo Section**



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Mr. Yashraj Patil

Co-Lead

- Assistant Professor at SNJB's College of Engineering, Chandwad, (Nashik) India
- In-charge of The GLOBE Lab at SNJB COE, India
- PhD Scholar at Symbiosis International University, Pune, India
- GLOBE GIsN Scientist/Researcher, GLOBE Program
- UNITAR Global Diplomacy Fellow, UNITAR New York
- UN General Assembly Science Summit Distinguished Speaker



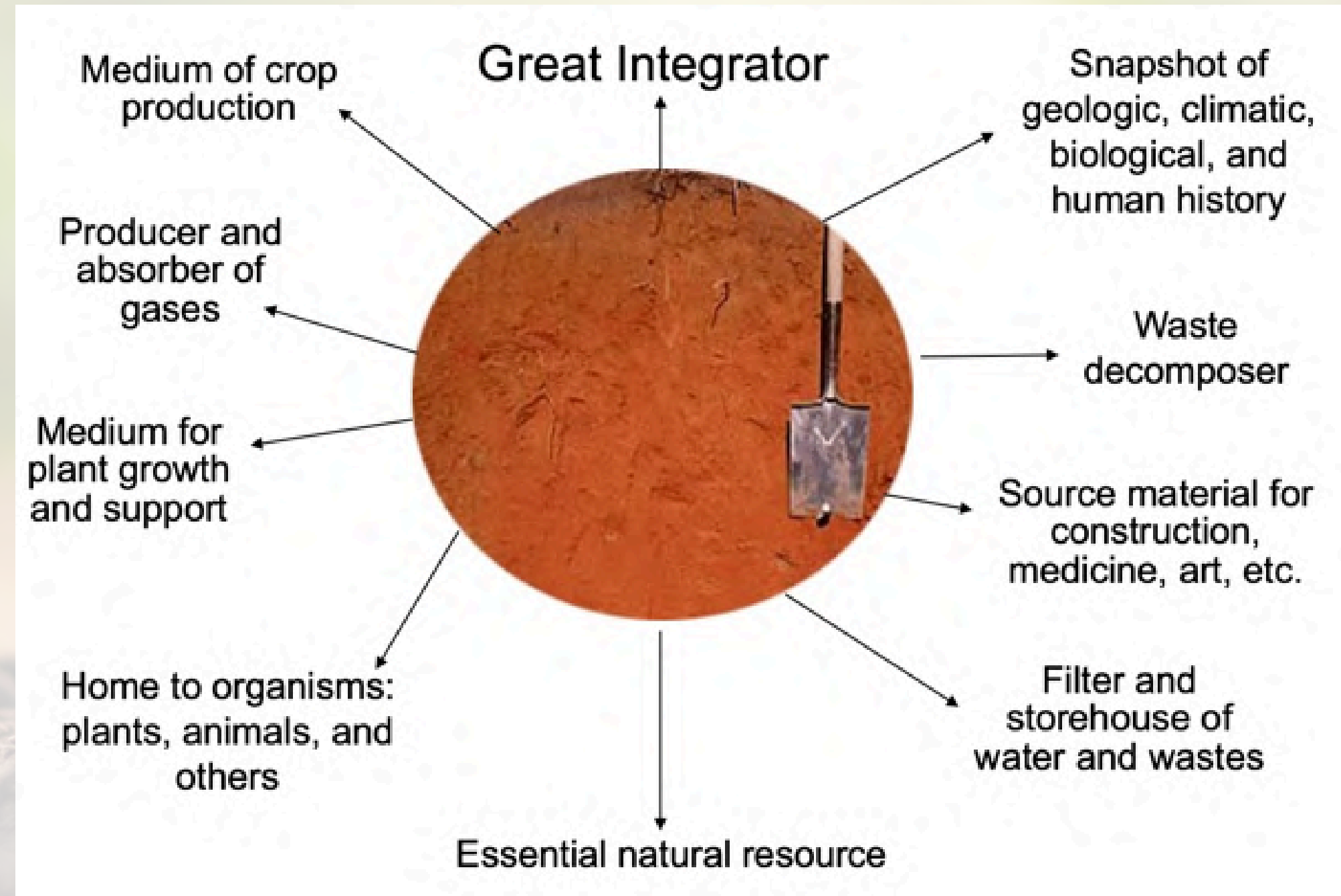
“ Research demands Resilience and the Courage to follow Curiosity wherever it leads ”



What is Soil & Why it is important

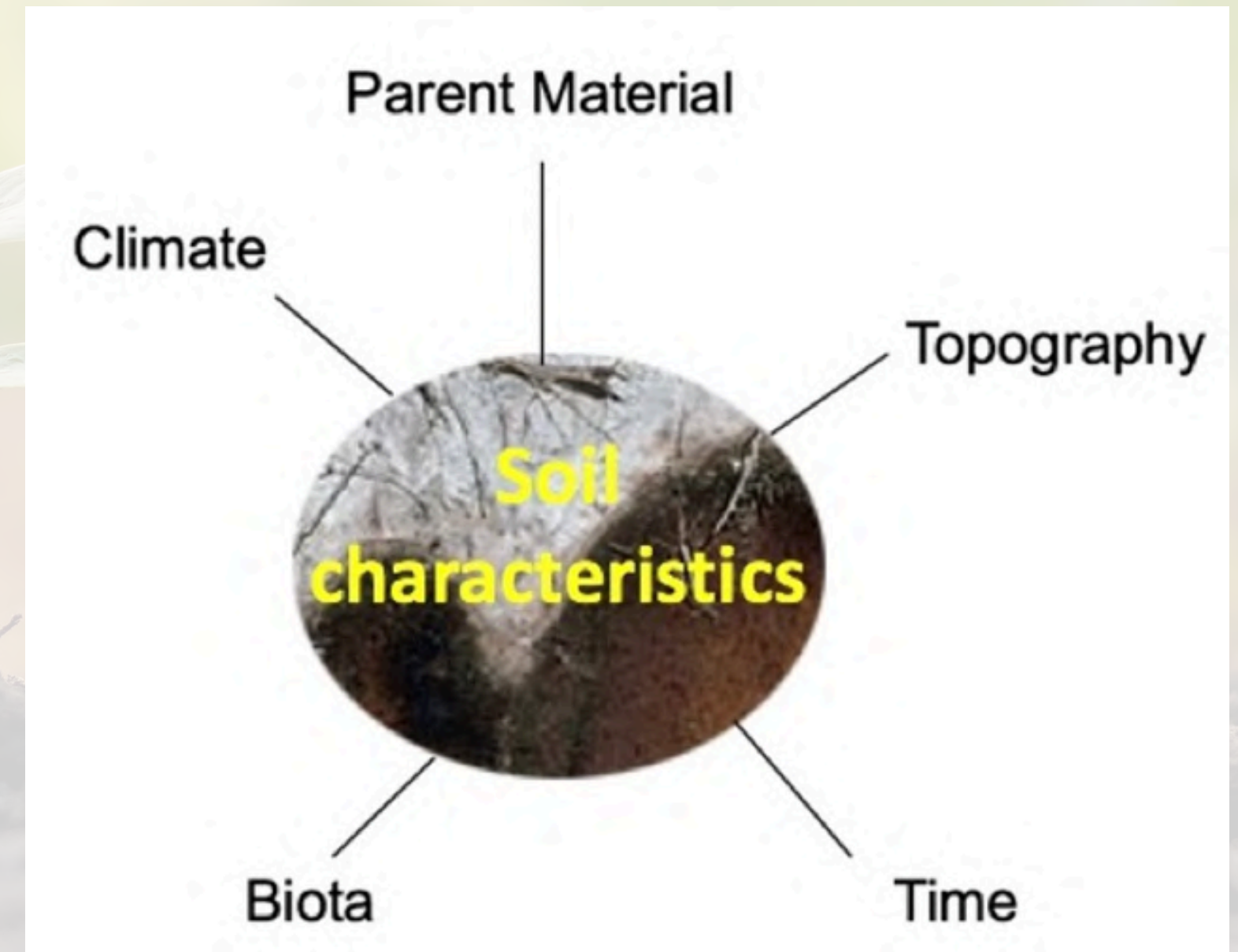


Soil is important because it is the



Factors affecting Soil Formation

- **Five main factors influence soil formation** and create a unique soil profile with layers called horizons.
- These factors are responsible for the characteristics and story each soil profile tells.
- This information is crucial for studying soil moisture and understanding the broader ecosystem.





Soil in the UN SDGs



Soil conservation boosts food security by preserving soil health for sustainable agriculture.



Healthy soils improve air and water quality, supporting public health.



Soil conservation keeps water clean by preventing erosion and sedimentation



Soils help combat climate change by storing carbon and reducing emissions



Soil conservation protects biodiversity and prevents land degradation.

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GLOBE Soil Project - Exploring the Hidden World, a year-long soil investigation campaign in Gozo.

- Participants: Seven schools across Gozo.
- Organizers: GLOBE Malta in collaboration with Europe Direct Gozo.
- Purpose: To uncover soil's secrets and highlight its essential role in sustaining life.



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Students collected soil samples, measured soil moisture, soil surface temperature, and weather parameters following GLOBE protocols.



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International Soil Day Webinar – 5th December 2024

Key Presentation: Mr. Yashraj Patil on soil's importance and climate change impacts.

Guest Speaker: Mr. Stephen Mifsud discussed the use of rubble walls in the Maltese Islands, highlighting their benefits for soil health and as habitats for diverse species.

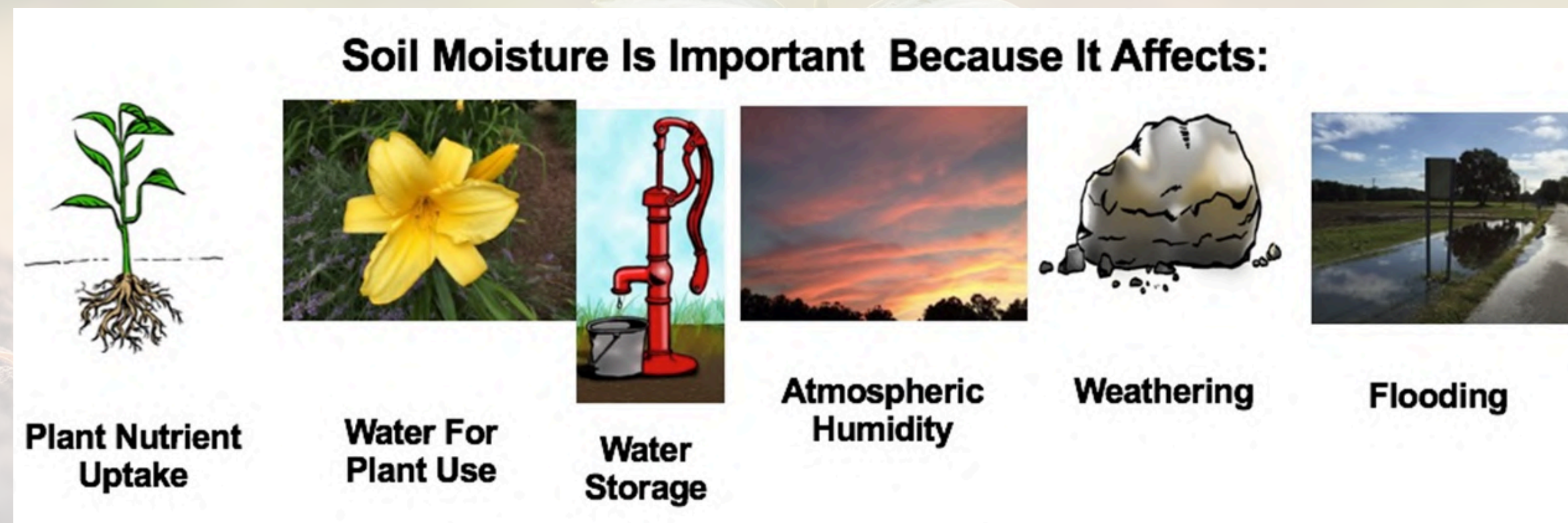
The poster is titled "European Soil Project WORLD SOIL DAY". It features the logos of the European Union (EUROPE DIRECT Gozo) and The GLOBE Program. The main text reads: "Join us for an exciting Webinar celebrating World Soil Day 'Exploring Earth's Soil' December 05, 2023, 11 am Malta Time (CET)". Below this, there are two featured speakers: Stephen Mifsud, a Botanist & Mycologist at EcoGozo, and Yashraj Patil, a GLOBE GISN, Global Diplomacy Fellow, and M.Tech. Research Scholar. At the bottom, there is an illustration of five children in various outfits standing in a field.





The Role of Soil Moisture in the Environment

Soil acts like a sponge spread across the land surface. It absorbs rain, slows run-off, and helps to control flooding. The absorbed water is held on soil particle surfaces and in pore spaces between particles. This water is available for use by plants. Some of this water evaporates back into the air; transpired by plants; while some drains through the soil into groundwater.





Summary of Protocol

Where	GLOBE Soil Moisture Site
Frequency	1 soil moisture reading per week Daily weather and surface soil temperature readings
Time required	<ul style="list-style-type: none">• 5-10 minutes to collect soil sample, measure weather and surface temperature readings• 3 minutes to weigh the wet sample• Sample left on window sill to dry for 7 days• 3 minutes to weigh the dry sample
Needed Documents	<ul style="list-style-type: none">• Soil Moisture Data Sheet• Cloud Type, Atmospheric Conditions & Soil Surface Temperature Data Sheet



Taking Soil Sample at 10cm depth

- Remove all the soil from the hole down to a depth of 8 cm.
- Take a soil sample that contains the soil between 8 and 10 cm.
- Remove any rocks larger than a pea (about 5 mm), large roots, worms, and other insects/animals.



Place sample in plastic bag

- Use your trowel to fill a soil container with at least 100 g of loose soil.
- Immediately seal the container to hold in the moisture.

You are done!



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Outdoor Session!

Time to go out and explore Soil :)



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Weighing Soil Sample

- If using an electronic balance, check that the balance measures in grams and is zeroed properly.
- Get the mass with the bag closed.
- Weigh the sample and record the mass to the nearest 0.1 g as the Wet Mass.
- Enter data in the Soil Moisture Data Sheet under the Wet Column.



Open the bag and empty the sample in a tray.

Put the sample on a window sill facing the sun.

Let the sample dry for a week.

Put soil sample in the bag and weigh. Record the mass to the nearest 0.1g as the Dry Mass.

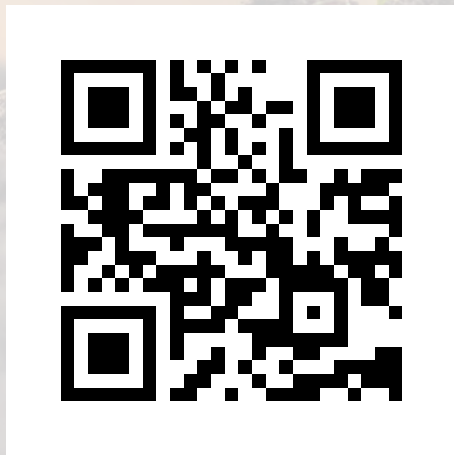
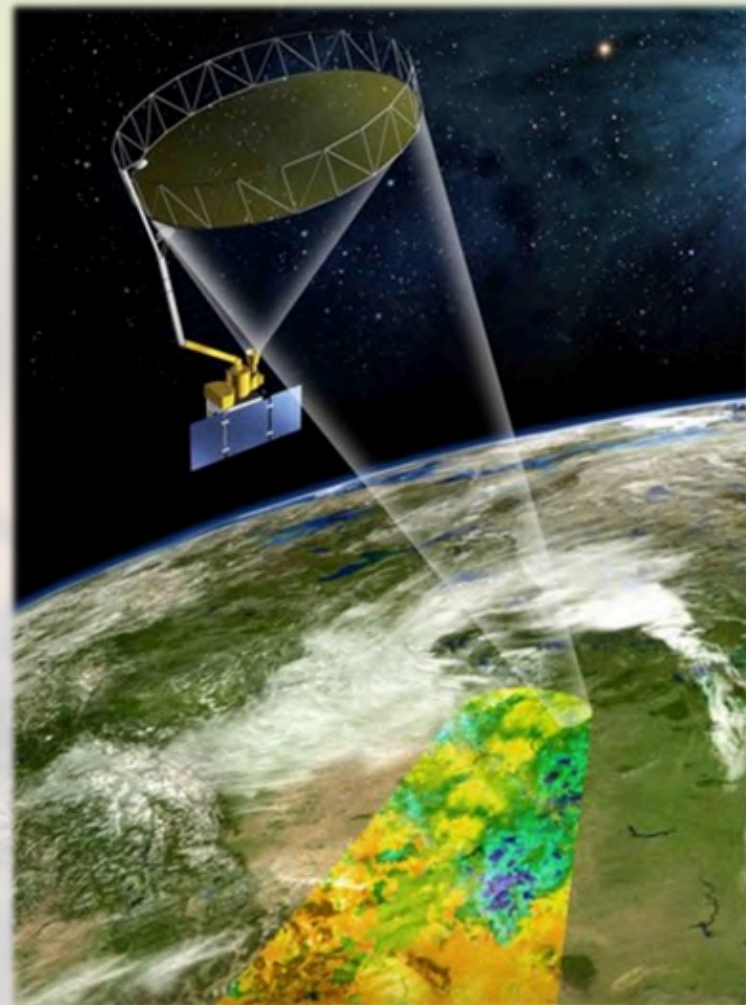
Enter data in the Soil Moisture Data Sheet under the Dry Column

Drying the Soil Sample





Soil Moisture Active Passive (SMAP) is a NASA environmental monitoring satellite that measures soil moisture across the planet. SMAP is designed to measure soil moisture, every 2-3 days.





With this measurement, students may investigate how soil moisture:

- Relates to precipitation
- Relates to surface, soil, and/or air temperatures
- How soil moisture varies diurnally and annually as well as over days or weeks
- How soil moisture relates to plant phenology



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GLOBE and Beyond





IVSS Reports

- Gozo College Middle School, 6th report submitted earned a four-star student research badge.

<https://www.globe.gov/do-globe/research-resources/student-research-reports/-/projectdetail/globe/hot-air-warm-soil-a-temperature-link>

Hot Air, Warm Soil – A Temperature Link



- Gozo College Rabat Primary School, 3rd report submitted earned a four-star student research badge.

<https://www.globe.gov/do-globe/research-resources/student-research-reports/-/projectdetail/globe/do-seasonal-differences-really-affect-our-soil-temperature-and-soil-moisture-content>

Do seasonal differences really affect our soil temperature and soil moisture contents?



- Gozo College Sannat Primary & Special Unit School, 2nd report submitted earned a four-star student research badge.

<https://www.globe.gov/do-globe/research-resources/student-research-reports/-/projectdetail/globe/investigating-climate-s-effect-on-soil-temperature-and-moisture>

Investigating climate's effect on soil temperature and moisture



- Laura Vicuna Primary School, Ghasri, 1st report submitted earned a three-star student research badge.

<https://www.globe.gov/do-globe/research-resources/student-research-reports/-/projectdetail/globe/can-changes-in-soil-temperature-indicate-variations-in-soil-weight>

Can Changes in Soil Temperature Indicate Variations in Soil Weight?





Taking it a step further.....

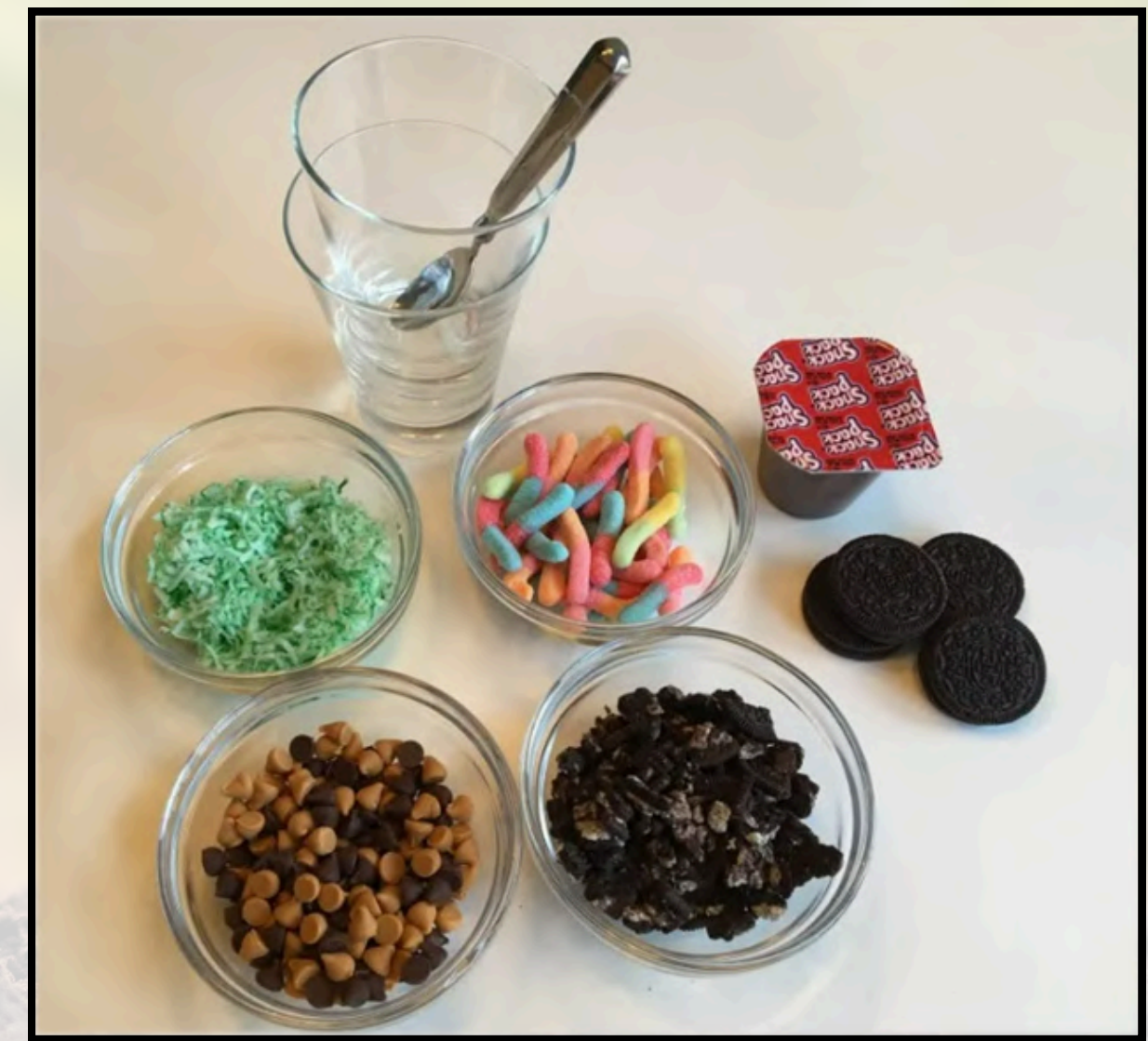
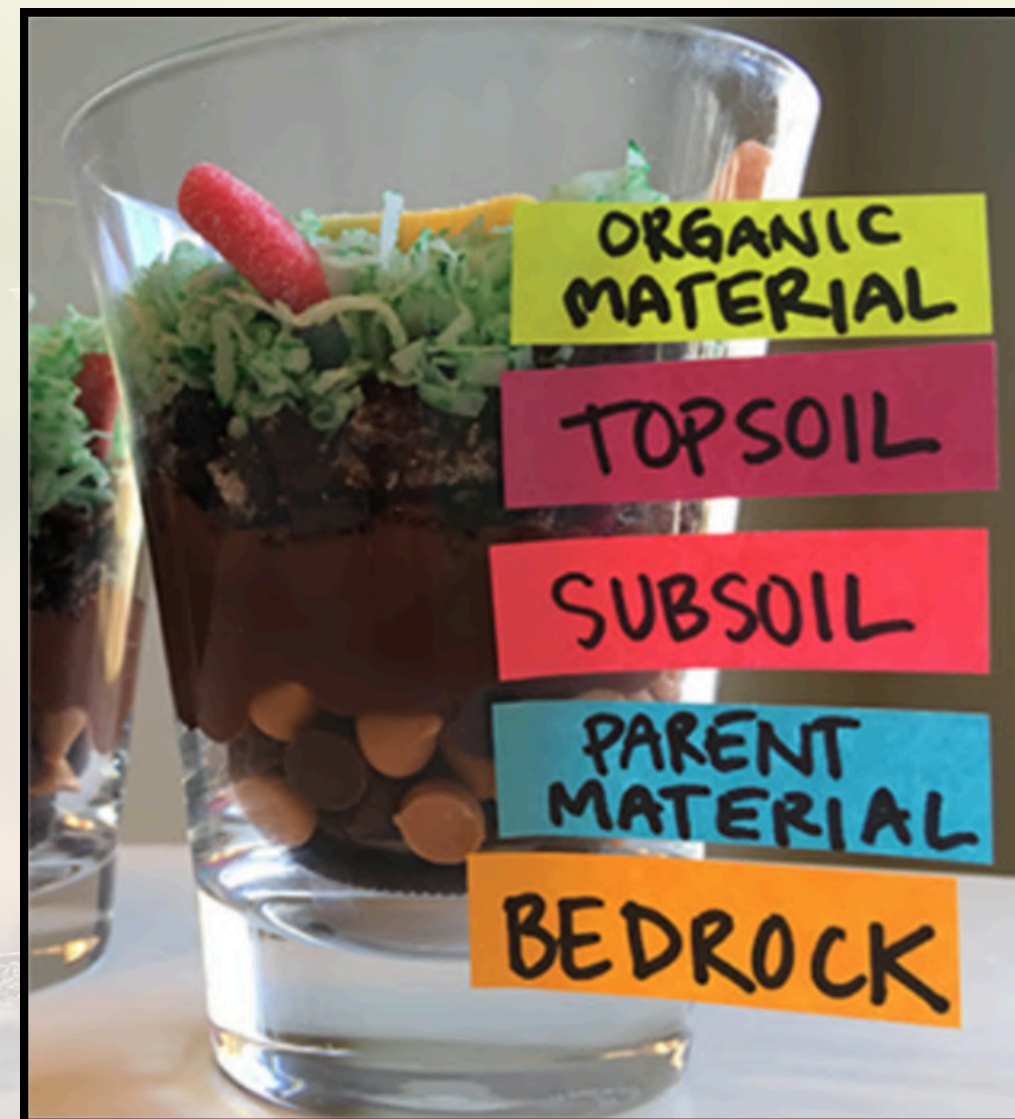
1. Grow a vegetable garden at school

- Sow seeds of local, seasonal crops,
- Observe the conditions of the environment that promote seeds to germinate,
- Measure and record plant growth.



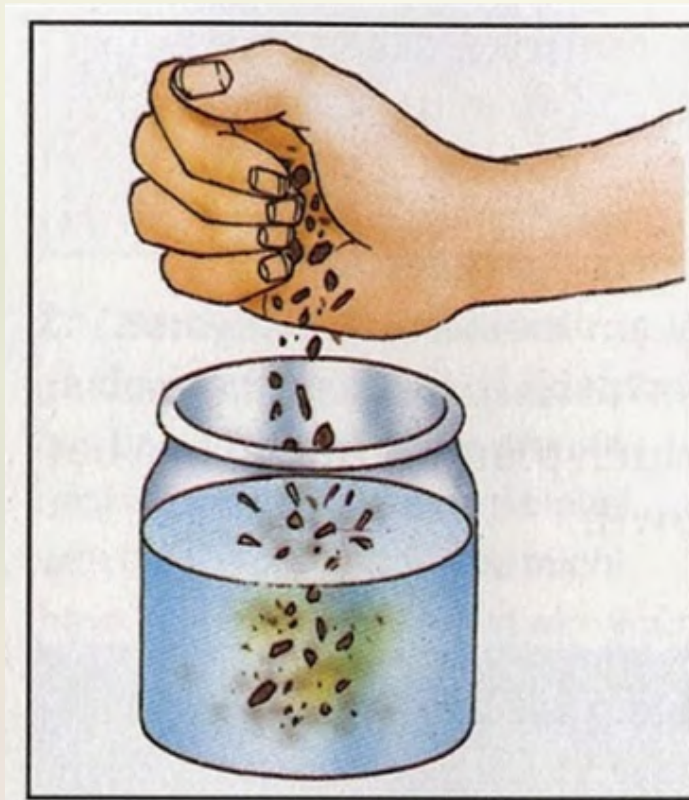
Taking it a step further.....

2. Edible Soil Layers

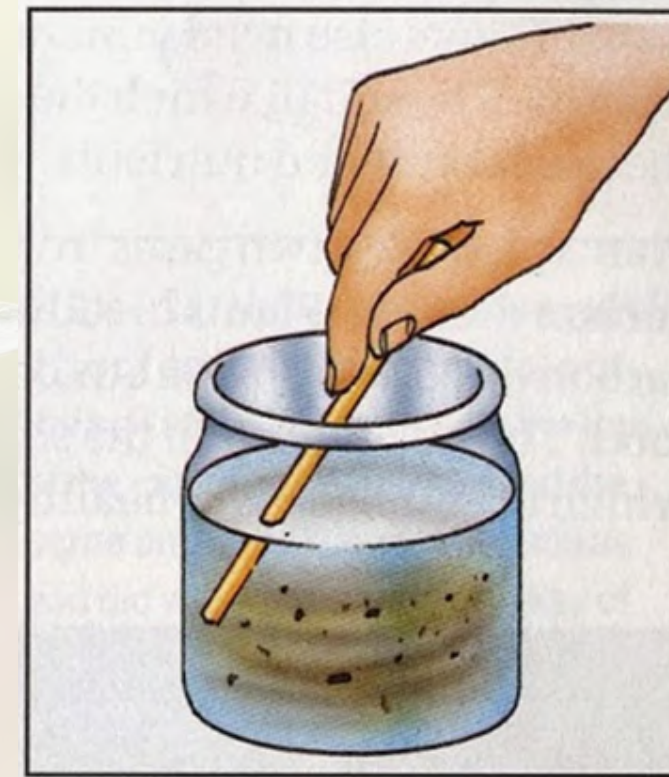


Taking it a step further.....

3. Soil Shake up Activity



1. Half fill a glass jar with water and then put in a handful of soil.



2. Use a stick to stir the soil into the water. Then leave it to settle.



3. Watch as the soil settles in different layers. What falls to the bottom of the jar? What settles above that? And what settles at the top layer?

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Taking it a step further.....

For more ideas visit www.globe.gov

**Primary Level
Soil Module**



**Secondary Level
Soil Module**



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Come Awake | #savesoil Anthem | feat. Machel Montano and Arjuna Harjai

Watch Later Share

A YouTube video player thumbnail for the song "Come Awake" by Machel Montano and Arjuna Harjai. The image shows a person in traditional Indigenous attire with large feathered wings, holding a feather. A red play button is centered over the image. The text "Come Awake" is written in a large, white, serif font, and "SAVE SOIL" is written in a smaller, white, sans-serif font below it. In the bottom right corner, it says "Watch on YouTube".

Come Awake

SAVE SOIL

Watch on YouTube

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“NEVER TOO LITTLE TO
CARE AND DO OUR
SHARE”



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Wish you Happy Exploring with GLOBE

*Thank
you!*

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