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The ecosystem of the estuary of the river and the eutrophication

WORKSHEET 1 (biological data)

Phase 1 – By the river

- *What are algae?*

- *Can you distinguish algae?*

- *What is their characteristics?*

- *How "green "are the water of the river?*

- *Is it possible to have the phenomenon of "eutrophication"?*

- *How many different species can you notice in the river?*

No	Morphological characteristics (without the use of microscope)	Possible genus (latin name)
1		
2		
3		
4		
5		
6		

- *Except these algae do you believe that there are also microscopic algae?*

- *If yes in the above answer what can we do in order to identify them"*

Then, collect water samples along the river on certain points.

Phase 2 – In the Laboratory

Use the microscopes and scientific books for algae identification. Focus on green algae (Chlorophyta) that are pollution indicators.

No	Morphological characteristics (with the use of microscope)	Species or Genus (latin names)
1		
2		
3		
4		
5		
6		

"May some of these species indicate organic pollution?"

"What are the possible causes of eutrophication according to biological and chemical data?"

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Possible causes of eutrophication	**1 : Totally possible** **2 : Most possible** **3 : less possible** **4 : Totally impossible** **Mark from 1 to 4**
- Discharge of Sewage (waste water)	
- Fertilizer runoff	
- Runoff water of Attiki Odos (great closed motorway)	
- Runoff water of Athens International Airport "Eleftherios Venizelos"	

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WORKSHEET 2 (chemical data)

Phase 1 - By the river

Take samples from certain parts of the river, especially on the pipes. Use:

- Chemistry Kit for chemical analysis (for field work)
- Microprocessor Conductivity/TDS Meter
- pH Meter

Fill the table for each sample site when we are in the field:

Sample site	Temperature of the water	ph	Dissolved Oxygen	Conductivity	Salinity	TDS (% or ppm)
1						
2						
3						
4						
5						
6						

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Phase 2 – In the Laboratory

In the laboratory of the school, measure:

Sample site	Quantity of *Escherichia coli*	-NO$_3$ (nitrates)	-NO$_2$ (nitrites)	-PO$_4$ (phosphates)	Polycyclic* Aromatic Hydrocarbons (PAHs)	Chlorine* Polyclhorinated Biphenyls (PCBs)	Copper (Cu)	Chromium (Cr)
1								
2								
3								
4								
5								
6								

*If the measures of PCBs and PAHs is not possible at the school, these can be made by an official scientific Laboratory.

"What are the possible causes of eutrophication according to biological and chemical data?"

Possible causes of eutrophication	1 : Totally possible 2 : most possible 3 : less possible 4 Totally impossible Mark from 1 to 4
- Discharge of Sewage (waste water)	
- Fertilizer runoff	
- Runoff water of Attiki Odos (great closed motorway)	
- Runoff water of Athens International Airport "Eleftherios Venizelos"	

"There might be a correlation between the disposal of various pollutants in the river and well-being (Human Health)?" Investigate especially the role of PCBs and PAHs on Human Health.

"Is there a correlation between death caused by cancer and the pollutants of the Athens International Airport "Eleftherios Venizelos" and the Port of Rafina"

Chemical compounds emitted	Origin of pollution	Environmental impact
PCBs		
PAHs		
Copper		
Chromium		
Nitrites		