



Exploring Water Turbidity

Equipment required (per group)

- Print out or share the 'Water Turbidity' worksheet (2 pages) digitally
- Large clear container (e.g., jar or large glass)
- 3 teaspoons of soil
- Teaspoon
- Torch
- 2 pieces of black paper (enough to surround the container)
- Pencil
- Scissors
- Tape (e.g., Sellotape)
- Plain white paper
- App: "Light Meter LM-3000" or similar (optional)
- Timer (stopwatch, timer app or clock)
- Internet enabled device and internet access (to watch the instructional videos)

To complete the activity

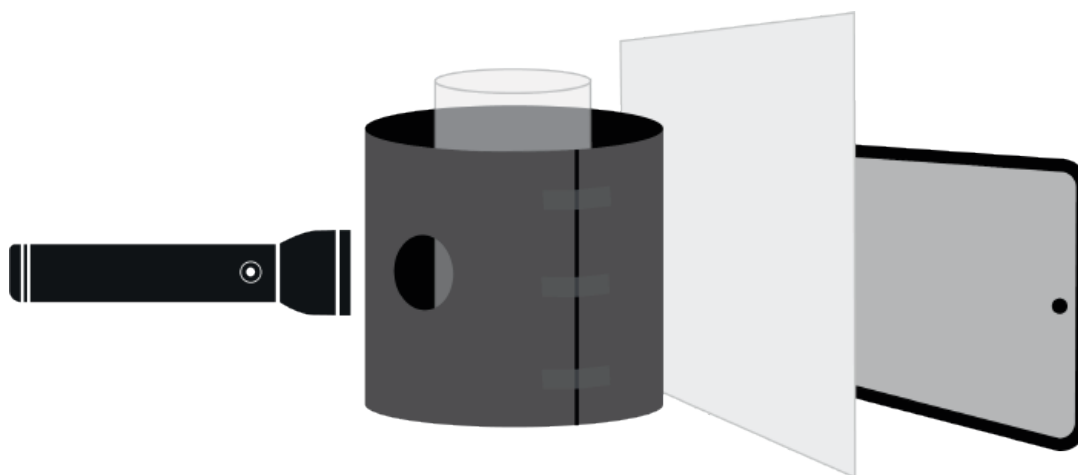
1. Begin with a brief discussion about water turbidity and its impact on ecosystems.
2. Divide learners into small groups (2-4 per group). Ensure each group has the necessary equipment, including jars, soil, black paper, torches, and optional light meters or apps.
3. Guide learners through preparation. You may wish to demonstrate how to cutout the circles from the black paper and attach the paper to the jar.
4. Encourage learners to test the visibility through the jar with clear water before adding soil.
5. Support groups to follow the instructions provided in the 'Water Turbidity' Worksheet, recording their results on their worksheet.
6. After the experiment, invite groups to share their completed worksheets and observations with the class.
7. Guide learners to answer key questions from the worksheet, such as: "What is the relationship between trapped light and turbidity?"

Water Turbidity



Many factors are monitored when looking at water quality e.g. pH level, temperature, salinity, oxygen level, nitrates and phosphates.

We measure turbidity we measure the amount of light that is scattered when light is shined through a water sample. The cloudier the water, the less light is passed through the sample. Water with a high measurement of turbidity can have a significant impact on how aquatic plants and organisms survive due to the lack of light. It can also choke fish gills.



Instructions

- 1. Prepare the light aperture**
 - A. Take one piece of black paper and draw a circle in the centre using a torch as a template.
 - B. Cut out the circle and trim the paper to fit neatly around one side of the jar.
 - C. Use this piece as a template to create a second identical black paper.
- 2. Attach the paper to the jar**
 - A. Tape the two pieces of black paper around the jar so that the cut-out circles face each other on opposite sides.
 - B. Ensure you can see through one circle and out the other. Adjust the paper if necessary, by trimming or repositioning.
- 3. Build a diffuser (optional)**
 - A. A diffuser evenly scatters incoming light for precise readings. If you're using a light meter app. Share the video 'How to Build a Diffuser' – www.tiramor.cymru/waterquality (Resource 2)
 - B. To understand how the light metre app works, watch the video 'Getting Started with the Light Meter LM-3000' – www.tiramor.cymru/waterquality (Resource 3)
- 4. Begin observations**
 - A. Fill the jar with clear tap water and lightly seal the lid.
 - B. Draw a picture on white paper and observe it through both circles, to see how water clarity affects visibility.
 - C. Record your observations of the water's clarity in the table provided.
- 5. Measure and record**
 - A. Hold your device close to one circle so the camera or sensor is aligned.
 - B. Shine the torch through the opposite circle to measure the amount of trapped light using the app, or visually assess the turbidity if the app isn't available.
 - C. Record your results in the table.

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6.

Add soil and repeat

- Add 1 teaspoon of soil to the jar, mix well, and wait for 1 minute to allow sediment to settle.
- Observe the water through the circles, measure trapped light, and assess the turbidity level.
- Record your findings.
- Repeat the process by adding an additional teaspoon of soil each time, for a total of 3 teaspoons and 4 observations.

7.

Complete the table

For each sample (clear water, water with 1, 2, and 3 teaspoons of soil), record:

- Look: Describe the colour, clarity, and presence of sediment.
- Trapped Light: Measure the lux (if using a light meter).
- Turbidity: Categorise as High, Medium, or Low.

Samples	Look e.g., colour, clear/cloudy, sediment/no sediment	Trapped light (lux)	Turbidity (High/Medium/Low)
Water			
Water + 1 spoonful of soil			
Water + 2 spoonful of soil			
Water + 3 spoonful of soil			

8.

Draw a Conclusion

Analyse your results and answer the following question:

What is the relationship between trapped light and the turbidity of the water?

Additional Exploration

Optional

Experiment with other liquids, such as seawater, soapy water, or water mixed with oil. Compare your findings to those from the soil experiment.



High turbidity in rivers can block up to 80% of sunlight, starving aquatic plants of oxygen production and endangering entire ecosystems.