



Environmental Health Officer

Water sampling: Turbidity Test

Lesson objective

Students create a simple instrument called a 'Secchi disc' to test water samples for turbidity and record measurements from each test on a form.

Lesson overview

Students work collaboratively and follow the teacher's instructions to make their Secchi discs. The discs are used to test the turbidity or lack of clarity of three water samples. Students must test all three water samples and accurately enter the data from their tests onto the forms provided.

Classroom organisation

This task can be completed individually, in pairs or small groups. Consider the water sampling process when setting up this activity as it may be easier to have three different work stations so three groups of students can be measuring the turbidity of different samples at once.

Resources

Making the Secchi Disc

Other

- ☐ CD disc or similar per Secchi disc. (CD's will work best with this activity however you can also use plastic from ice cream lids, old paint tin lids, Milo lids etc. You will need to punch a hole in the centre of these
- ☐ Length of string – one metre per student/team
- ☐ Black felt pen – one per student team
- ☐ Paper clips – three per student/team
- ☐ Pliers – one or two pairs as these can be shared
- ☐ Small fishing sinker, washer or similar weight around 40g – one per Secchi disc

Print

- ☐ Making a Secchi Disc Instructions and Template (optional)

Conducting the Test: Water Sampling

Other

- ☐ Three buckets (20 litres is better)
- ☐ Water samples for testing. Tap water with soil or clay added in varying amounts in the three buckets is a good substitute for simulating varying water samples. If there is only sand at your school, it may



be necessary to use some red food colouring (which seems to attach itself to suspended particles, and make the water much darker or more turbid).

- ❑ Clipboard

Print

- ❑ Student worksheet –Water Sample Record Sheet (Worksheet 1)

Pre-activity preparation

Students need to understand the term ‘turbidity’ as it is used in the video. This refers to how unclear or transparent the water is due to stirred up sediments; it is not necessarily an indication of pollution.

Activity description

Making the Secchi Disc (15 minutes)

Use the **Secchi disc** design- (Secchi Disc Template and Making a Secchi Disc Instructions) which provides students with a Secchi disc template and visual instructions on the process for making the disc or alternatively you may wish to make the disc/s yourself and have them ready for use.

Activity – Testing the Secchi Disc (40 minutes)

1. Set up three buckets of water with different amounts of soil/clay/sand and food dye – clear, cloudy, very cloudy, extremely cloudy.
2. Introduce the Secchi disc and refer to its markings as helping to give a visual cue as to the turbidity of the water samples. (The ‘Horiba’ used in the video can also take turbidity readings; this is just another method.)
3. Hand out copies of the Water Sample Record Sheet and explain the task and process for completing this form.
4. Demonstrate the process for testing the water sample and recording the result onto the Water Sample Record Sheet. Explain the Turbidity Report section on the Water Sample Sheet and how to complete it.
5. Assign students to different water samples and remind them that they should lower the disc into the water until it just disappears.
6. Each student/pair/group measures the string from the Secchi disc to the top of the water, measuring between the water line (marked with paper clip or finger) and the disc when it becomes just visible.
7. The Student records the measurements for each bucket on the Water Sample Record Sheet, completing all sections including the Turbidity Report.
8. Students analyse their results using the guiding questions to focus their findings.

The Teacher needs to consider the following.



- Explain that the nearest centimetre will be accurate enough for our purposes
- Explain the legend on the Water Sample Record sheet and ask students to analyse the data to determine whether the readings 'low', 'moderate' or 'high' are required. Ask students to complete the Turbidity Report table on the Water Sample Record Sheet.

Guiding Questions – get students to answer the following questions about their own readings.

- Which sample appears to be the most 'turbid?' Why? Students should be encouraged to use their own reasoning and knowledge of the term turbidity.
- Did you have a reading that said 'High?' What could this indicate?
- Are the results from different groups consistent?
- Why would workers be asked to take regular measurements in a river?

Extension Activity

Students compare the results of all the groups, and discuss the following questions as a class.

Guiding Questions

- Which sample appears to be the most 'turbid?' Why? (Students should be encouraged to use their own reasoning and knowledge of the term turbidity).
- Did anyone have a reading that said 'High?' What could this indicate?
- Are the results from different groups consistent?
- Why would workers be asked to take regular measurements in a river?