# Activity: Getting agitated (Years 7 and 8)

Micro-organisms at work—at the sewage treatment plant

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| Victorian Curriculum F–10[[1]](#footnote-1) links:  **Levels 7 and 8**  **Science**  **Science Understanding**  **Science as a Human Endeavour**  Science and technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations  **Biological sciences**  There are differences within and between groups of organisms; classification helps organise this diversity  Interactions between organisms can be described in terms of food chains and food webs and can be affected by human activity |

## Introduction

Students measure the effect of aerating water on dissolved oxygen (DO) levels and relate the increased DO to the aeration stage of sewage treatment and types of bacteria at either the Eastern Treatment Plant or the Western Treatment Plant.

### Equipment

A sample of tap water

Thermometer or temperature probe

DO meter or datalogger with a DO probe

### Preparation

Ensure that all safety requirements are followed.

### Activity steps

Teacher tip

Schools that do not have access to a DO meter could contact their local council to enquire about the availability of Melbourne Water Waterwatch kits provided for local groups/schools to borrow.

1. Show a sample of tap water, measure its temperature and use a DO meter or data-logging equipment with a DO probe to measure the level of DO. Explain that it is useful to measure temperature as the temperature affects the DO levels.
2. Depending on the available resources, demonstrate or enable students to investigate the effect of aerating a sample of water. Two methods of aerating water are:

* a pump and aquarium aerator stone
* mechanically agitating the water, for example with a whisk or hand beater.

1. Relate the two types of aeration used at Melbourne’s two main treatment plants. The aerated sludge plants at the Eastern Treatment Plant and the 25W pond at Western Treatment Plant use aerators like the aerator stone; 55E at the Western Treatment Plant uses aerators similar to the hand beater.
2. Highlight the stage of aeration in the overall process in the [treatment of sewage at the Western Treatment Plant](https://www.melbournewater.com.au/node/168).
3. Measure the DO levels and temperature before and after aeration and record data in a table.
4. Discuss the following:

* What happens to the DO levels in the water as a result of the two methods of aeration?
* What type of bacteria benefits from the aeration of sewage?
* Why is aeration a step in sewage treatment?

1. Students write a brief report about their investigation including their results and responses to questions, including images of the relevant section of the treatment plant to indicate where the process takes place.

### Extended investigation

Students design an investigation that measures the effect of adding dead plant material such as grass clippings or the leaves of an aquatic plant to a sample of water. Ideally the investigation can be carried over at least 1–2 weeks.

Students set up a control for comparison. Students take measurements of temperature and DO levels.

### Teacher background

DO is the amount of oxygen gas that is dissolved in the water. DO is measured in milligrams per litre (mg/L). Aquatic organisms such as fish require at least 6 mg/L of DO in the water to survive.

Organic wastes are the remains of any living or once-living organism. Organic waste is decomposed by bacteria; these bacteria remove DO from the water when they breathe. If more food (organic waste) is available for the bacteria, more bacteria will grow and use oxygen and the DO concentration will drop.

1. Creative Commons Licence Victorian Curriculum and Assessment Authority (VCAA) <<http://victoriancurriculum.vcaa.vic.edu.au/>> Accessed 14 August 2016. [↑](#footnote-ref-1)