

Operation Water Biology Introduction



Along with the materials provided in the Operation Water Biology (OWB) kits, and the information and instructions provided in the handouts, there are a number of additional things the teacher will be asked to do or provide in order for the class to fully participate in the lessons. The following is a list of each of the extra considerations that teachers will need to make when using the OWB kits.

-The lesson plans in OWB assume that the students have already had lessons on lab safety and are aware of proper behaviour in a laboratory setting. No materials in the OWB kits are particularly dangerous but it is still up to the teacher to make sure that they are used in a safe manner.

-When you receive your OWB kit there is one set of materials that needs a little extra consideration. In the kit you will find a bundle of seven glass vials marked as “bio-oxidized iron samples”. These samples must be handled carefully and their contents must not be shaken. You may want to remove them from the rest of the materials and put them somewhere safe, they will not be used until Lesson Six.

-The OWB kit is designed for use by six groups of students. You will have to break your class into, at most, six approximately equally sized groups. In classrooms with few students using fewer groups will be fine. In this case some of the provided materials will just go unused.

-The experiments in OWB are best carried out in a classroom with multiple sinks. This serves two major purposes, it allows for easy water sample disposal and provides a source of water for rinsing out beakers and cups during the experiments. If sinks are not available there are ways to work around this, any sort of buckets or pails will work for temporary water sample disposal (none of the materials used in this kit would be harmful if mixed) and you can just pour the liquid down a sink later. You would also need to make several litres of water that can be used for rinsing available to the students.

-Along with the handouts for each lesson found on the SDWF website you will find “Test Procedure” and “Glossary” documents. These should each be printed off and distributed with the Lesson One handout. They are applicable to each of the lessons so students should keep this copy handy for use throughout the OWB program.

-Some of the materials such as the plastic cups and 5mL vials will be reused throughout this project. Make sure students do not throw these things away. You may want to provide a storage space for these things between lessons.

-In Lesson One, each group will require an empty, well rinsed, 2 litre plastic bottle.

-As part of Lesson One, you can do a quick presentation on some basic facts about your local water treatment facility. A little bit of research may be required to find out the location of the facility, source of raw water, how much water is treated per day, per year, whether it runs 24 hours per day, etc. Add in anything else your students may find interesting but there is no need to get technical.

-In Lesson Two, each group will require a regular black (orange pekoe) tea bag.

-In Lessons Two and Four, about 1mL of chlorine bleach will be required. Look for 4% sodium hypochlorite on the label.

-There is a very short procedure to prepare a chlorine solution that you will need to do immediately before each of the class sessions in which Lesson Two and Lesson Four will be taught. This procedure will only take a minute or two for you to complete. This will require a 100mL, or larger, beaker and, in Lesson Four, a coffee filter.

-Each group will need a coffee filter in Lesson Four and two coffee filters in Lesson Six.

-In Lessons Three, Four and Six each group will need two beakers. They will need to be at least 250mL. If this number of beakers is not available then almost any container can be substituted as long as it is of an appropriate size and is transparent. One easy suggestion is to cut the tops off of plastic bottles. If you are going to use other containers such as plastic bottles then they should be calibrated with 100mL, 200mL and 250mL marks using a graduated cylinder. You can do this by filling a graduated cylinder with 100mL of water and then pouring this water into your other container and marking the water level with a marker. Pour this water out and then fill the graduated cylinder with 200mL of water. Pour this into your other container and mark the 200mL level. Repeat this once more with 250mL.

-Lesson Five will have the students testing up to six different water samples for ammonia. You will need to arrange for these samples to be collected. One can be from your school and one maybe from elsewhere in the community but you should try to get the others from outside the community, from different sources and treatment facilities. Some of your students or fellow teachers may be from an outside community or planning to visit an outside community, ask them to bring in a water sample. Samples as small as 20mL will be okay and almost any clean, well-rinsed container will do, just make sure it is labeled with the location where it was collected.

-Lesson Seven of OWB is a research project and Lesson Eight is a field trip to a water treatment facility. These lessons are recommended but optional. You may want to check out one of the Safe Drinking Water Foundation's other programs, Operation Community Water Footprint (OCWF). This program is a much more detailed look at the local water supply and includes student research and field experiences which can replace lessons seven and eight of OWB.

-At the conclusion of OWB you may want to have a wrap up discussion with the students about what they have learned.

List of extra materials

- A teabag for each group
- Three coffee filters for each group and one extra for the teacher
- A 2L plastic bottle for each group
- Small amount of chlorine bleach
- Water samples from different sources