Title: To study the water quality of different samples taken from the environment

Ref. Code: P5_05

School: HKCCCU Logos Academy

Students' Name:

Hui Wing Kwan, Vivian (P5)

Kwan Yau, Diva (P5)

Po Tsz Yan, Jane (P5)

Sun Hei Mang, Sue (P5)

Wong Sea Son, Jana (P5)

Teachers' Name:

Mr. Cheung Wing Fung

Ms. Chan Man Kin

Background

- The safety of water we use at home is probably one of the most major concerns we are curious about. It is obvious to see cloudy or muddy water with harmful substance with our eyes. However, usually some polluted water can look just the same as pure water.

- The Hong Kong Environmental Protection Department (EPD) monitors the water quality in places like harbor areas and rivers. Over years, the water quality at some urban areas was bad, with very low levels of dissolved oxygen and high levels of pollutants. Also, sediment from there usually has high levels of organic matter and heavy metals.

- In this project, we are going to collect water samples from the ocean, toilet, tap, fish tank, supermarket and drainage and test their water qualities.

Hypothesis

Question: **What kind of water sample has the lowest quality?**

Prediction: We guess the **drainage water** has the lowest quality.

Introduction & Motive

Motive

- To study the water quality of different samples taken from our environment.
- To tell our friends, family, and teachers which kind of water is dirtier, and warn them not to drink or use those polluted water after the experiment.

Introduction

- Water quality is the suitability of water for a given use.
- Depending on the characteristics of the watershed around the water body, as well as changes in weather, water quality at a given point in a stream or river also reflects the effects of upstream activities.
- We can measure the water quality to assess the health of a natural water body.
- Water in a natural ecosystem has to have the right balance of dissolved oxygen, nutrients, temperature, pH, salt content, and light.
- Drinking water must have acceptably low levels of contaminants to be deemed safe.
- In the project, we want to discover if the water is clean or not. So we do this experiment to learn about water quality in different samples.

Materials and Tools

- Water quality sensors (pH, conductivity, temperature, dissolved oxygen) with data logger  
- Large test tube
- Small bucket and rope for collecting water 
- Beaker 
- Microscope 
- Container 
- Slides and cover clip 
- Notebook 
- Safety goggles 
- Bottle 
- Gloves 
- Labels and pens  
- Towel 
- Wash bottle 

Step-By-Step Procedure

- First, label one of the containers.
- Second, collect one sample of water from harbor shelter by using a small bucket and a rope.
- Third, test the sample's dissolved oxygen, temperature, pH and conductivity with a data logger and sensors.
- Forth, record the data on a notebook.
- Fifth, fill the sealable container with 40 mL of water sample.
- Sixth, bring the sample back to school for further study.
- Seventh, collect a sample of water from ocean, fish tank, drainage, tap(boiled or not boiled), supermarket(distilled water), toilet .
- Eighth, repeat step 3 to 6 for these water samples.
- At last, observe the water samples under a microscope (100X) and record the findings.

Step 1 & 2 (Sample from Shau Kei Wan Typhoon Shelter)

Step 2:

Step 3:

Step 4 & 5:

Water samples from open sea – Ocean 2 & 3

Step 6:

Water samples from drainage & fish tank

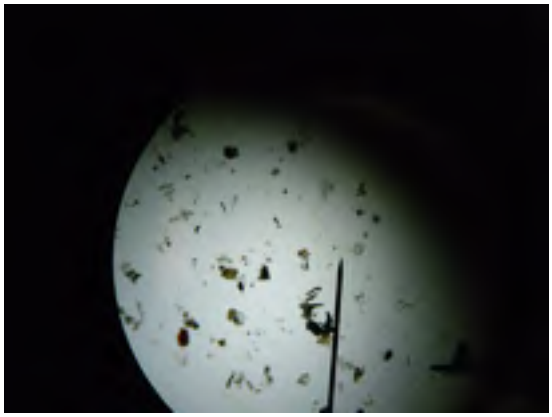
Water samples from the tap and toilet

Further study of samples at school

Group discussion & preparation

Observe water samples under the microscope

Impurities in drainage water and toilet water



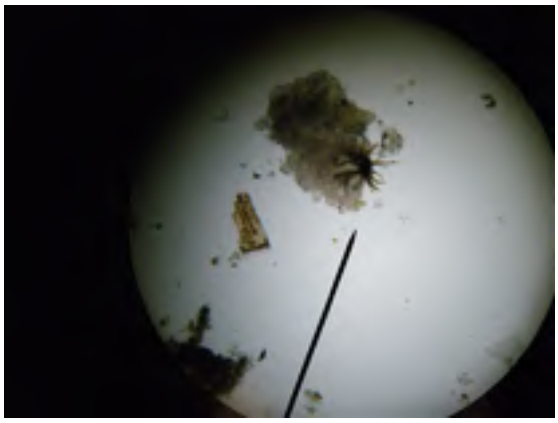


Table of Our results

Kind of water	Ocean water 1	Ocean water 2	Ocean water 3	Fish tank water 1	Fish tank water 2	Drainage water	Tap water	Boiled Tap water	Distilled water	Toilet water
Temperature	26.99`c	25.58`c	15.91`c	23.48`c	24.37`c	26.33`c	24.06`c	67.5`c	24.39`c	24.20`c
pH	7.46	7.42	7.52	6.38	6.72	8.56	7.51	7.53	7.08	7.46
Dissolved oxygen (%)	20.5%	23%	26.4%	41.4%	38.5%	36.5%	100%	50.7%	59.9%	45.5%
Conductivity (µS/cm)	100 µS/cm	100 µS/cm	100 µS/cm	73 µS/ cm	25 µS/ cm	10 µS/cm	28 µS/ cm	28.5 µS/ cm	18 µS/cm	100 µS/cm

Discussion & Analysis

Something that we found:

When the tap water hasn't been boiled, we can see that the dissolved oxygen is very high, which means the water is very clean. But after the water has been boiled, the dissolved oxygen became 50% lower, which means the water is dirtier than before.

The dissolved oxygen in ocean water 1-3 is relatively low compared with other water samples. We guess that there are many pollutants, like plastic bags, bottles on the water surface. The oil from the boat may stop the oxygen from dissolving into the water. Dissolved oxygen levels below 20% indicate low water quality for many aquatic animals and plants. So it is not good for the fish living there.

The dissolved oxygen in the fish tanks is about 40%. So, there is enough oxygen for the fish to live.

In the drainage water and toilet water, their dissolved oxygen is quite low. Also, we observed some impurities under the microscope. So we think they are not drinkable.

And lastly, we found that tap water (boiled or not boiled) and distilled water is cleaner than others because we can't see any impurities under the microscope.

Toilet water and ocean water 1-3 have the highest conductivity among all. It shows that they have a lot of salts.

Conclusion

In all of our samples, the drainage water sample has the lowest quality because it has the most impurities and relatively lower dissolved oxygen content.

Feelings

Vivian: This experiment is fun and I learn a lot! I learn about different water with different quality, looking things under a microscope and other things. I enjoy a lot!

Diva: I am the one who take photos of the group. Although we have many arguments in the project, I think that is a meaningful thing to do.

Jane: I am the one who will do the most in experiment. Although we need to spend most of our recess time to do the project, I still think that it worth it. We can know more information and have more changes to try to do the experiment.

Sue: I am the one who type report and the leader of the group. I am surprised when we discovered the drainage water has the most impurity! Maybe lots of people threw rubbish in there. That was bad then!

Jana: I am the one who write down and manage the information. Although we have to spend our recess and spare time to do this project, I still feel that team working is a very pleasant thing to do.

Reference:

1. Spark Data Logger Manual (Quality measuring machine)
2. Wikipedia: http://en.wikipedia.org/wiki/Water_quality
3. HKEPD: http://www.epd.gov.hk/epd/english/environmentinhk/water/water_maincontent.ht

☺The End☺