



INVESTIGATING THE HYDROSPHERE

ACTION PROJECT: WATER QUALITY

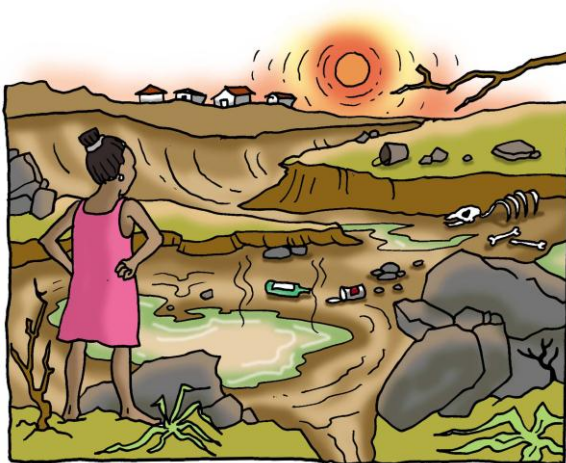
Grade 10 Physical Science

Student Name: _____

School: _____

Class: _____

Date: _____





A. Identifying aquatic river life

Finding or not finding certain aquatic animals in a water source can help us determine what the quality of the water is like.

In groups of 3, 4 or 5 do the following...

- Each member of the group take a net.
- One member of the group take a bucket, with a magnifying glass and a Petri dish.
- Half fill your bucket with river water and let the fun begin.
- Use your nets to catch insects and other aquatic water life from the river.
- If you catch something put it into your bucket.
- Take the Petri dish, put some of your "catch" in it with a little water and use the magnifying glass and books provided to identify what you have caught.
- Tick in the table below whether you have found the animals listed.
- Work out the average sensitivity score.

Groups of Animals	Tick the groups found	Group Score
Flat Worms		3
Worms		2
Leeches		2
Crabs or Shrimps		6
Stonefly nymphs		17
Minnow mayfly nymphs		5
Other mayfly nymphs		11
Damselfly nymphs		4
Dragonfly nymphs		6
Bugs or Beetles		5
Caddisfly larvae (cased & uncased)		9
True Fly larvae		2
Snails		4
TOTAL SCORE		
NUMBER OF ANIMAL GROUPS FOUND		
AVERAGE miniSASS SCORE (Total score divide by number of groups)		

What does my average score mean?

Circle the section in the table below that your average score fits into:

Ecological condition of the river	Sandy river type scores	Rocky river type scores
River largely untouched and in a very good natural condition	> 6.9	> 7.9
River mostly natural, few changes and in good condition	5.8 - 6.9	6.8 - 7.9
River has quite a few changes but is still in fair condition	4.9 - 5.8	6.1 - 6.8
River is largely changed and in a poor condition	4.3 - 4.9	5.1 - 6.1
River is badly changed and in a very poor condition	< 4.3	< 5.1

B. Water Quality Analysis

Use the equipment provided to test for the following... (Water to be tested at 2 different sites).

pH

Why pH?	Method	pH
pH measures how acidic or basic the water is. pH of most unpolluted water sources lies between 6.5 and 8.5. Polluted rivers are more acid or basic due to causes such as acid rain, chemical or sewage pollution. Many aquatic animals may die if the pH of the water in which they live changes.	Dip the pH strip into the water so that all 3 pads are covered. Keep the strip immersed for 5 seconds. Remove from the water and compare the colours on the strip to those on the pH chart.	<u>Site 1:</u> <u>Site 2:</u>

Is the pH of the water neutral, acidic or basic? _____

Temperature

Why Temperature?	Method	Temperature in degrees celcius
Temperature changes in water can influence the type, nature & amount of animals in the water. It also affects the amount of dissolved oxygen in the water. High temperatures could be a result of thermal pollution which is a result of the discharge of heated water from industries.	Hold the thermometer 10cm below the waters' surface for 2 minutes. Record the temperature.	<u>Site 1:</u> <u>Site 2:</u>

Dissolved Oxygen

Why Dissolved Oxygen (DO)?	Method	Dissolved Oxygen in ppm
DO is important in the maintenance of healthy water systems. Oxygen is important to the survival of many organisms. DO in water comes from the atmosphere and from rooted aquatic plants. DO % saturation is a measurement of water quality. Cold water usually holds more DO than warm water. High levels of bacteria from sewage pollution or rotting plants can cause DO % saturation to decrease.	Place a small tube 10cm below the waters' surface at the same place where you measured the temperature. Remove the tube from the water and add 2 DO tablets into the tube. Push the plastic cork into the tube and invert the tube for aprox. 4 minutes. Compare the colour of the water in the tube to the DO chart.	<p><u>Site 1:</u></p> <p><u>Site 2:</u></p>

The DO % saturation will be established where the temperature row and DO column intersect, circle your DO % saturation in the table below.

Dissolved Oxygen % Saturation

Dissolved Oxygen				
		0ppm	4ppm	8ppm
	2	0	29	58
	4	0	31	61
T	6	0	32	64
M	10	0	35	71
P	12	0	37	74
E	14	0	39	78
R	16	0	41	81
A	18	0	42	84
T	20	0	44	88
U	22	0	46	92
R	24	0	48	95
E	26	0	49	99
	28	0	51	102
	30	0	53	106

<p><u>Site 1:</u></p> <p><u>Site 2:</u></p>
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Turbidity

Why Turbidity?	Method	Turbidity in Nephelometric Turbidity Units (NTU) Circle the correct one
Testing turbidity indicates how clear or muddy the water is and it is caused by suspended solid matter in the water. High turbidity could be a direct result of soil erosion and urban run-off. High levels of turbidity can block out sunlight causing loss of aquatic life. Turbidity may be an indication of pollution in water bodies.	Place the turbidity disc 20 cm below the surface of the river water. Which numbers are visible?	<ul style="list-style-type: none"> • 5,4,3,2 (<10 NTU) • 4,3,2 (10-20 NTU) • 3,2 (20-30 NTU) • 2/none (>30 NTU)

Site 1:

Site 2:

What does it all mean...

Refer back to all your data that you collected during completing your research and briefly describe what you think the water quality is like at the two different sites.

Site 1:

Site 2:

Can you explain the differences at the two sites?

What effect could temperature; dissolved oxygen and pH have on the animals and plants living in the hydrosphere?

Do you think that there is a water pollution problem in the area?

Who do you think is responsible for this pollution and where could it have come from?

What do you think you can do about water pollution?

If we pollute water we are not respecting water and the environment, also by polluting water we make it more difficult to clean which implies that we may have to pay more for water services such as water purification. By not using glasses or closing taps when we do everyday tasks, we waste a lot of water. Therefore it is up to every one of us to take an environmental action with regards to water pollution and water wastage, whether it be simply throwing away waste in dustbins, recycling, closing taps, using glasses or helping those doing wrong understand the impacts of their actions. We all need to conserve (look after) water to conserve our environment.

