Tool-Kit Manual

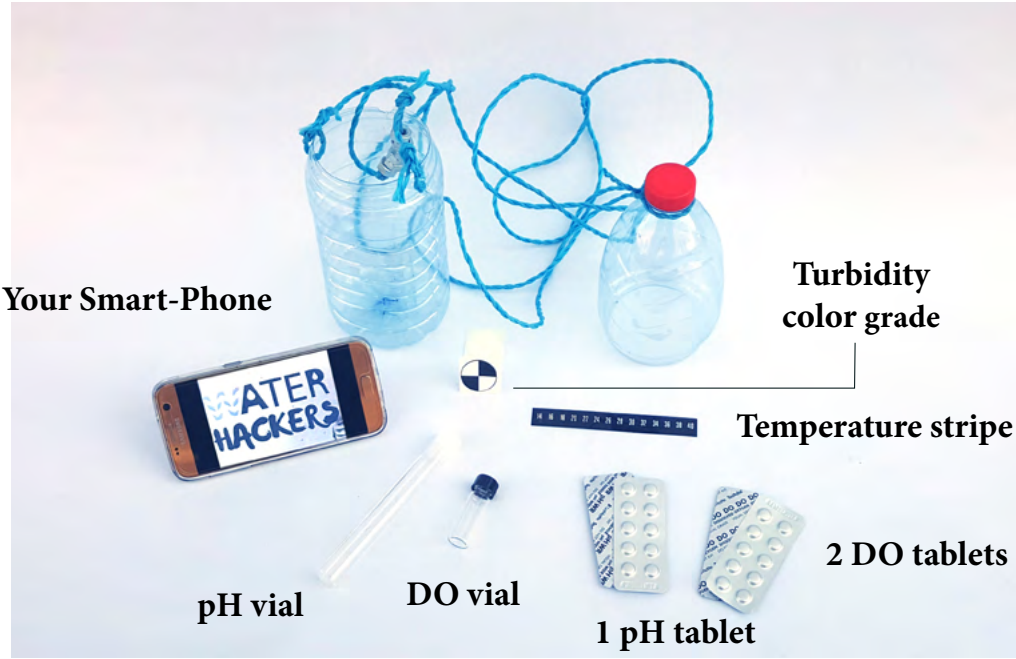
Analysis

GET PREPARED BEFORE START TO ANALYSE

Before starting the monitoring phase, you should already have assembled the bucket collector and check that all is fine to start.

Visit www.water-hackers.lu/tools (soon online) and follow the tutorials before starting the Analysis.

IS THE BUCKET COLLECTOR READY?



THE PROJECT

Water Hackers is a citizen science initiative that is empowering scientists, designers, students and public authorities to make knowledge on water quality more accessible. Even though 'water' is an important asset within our urban environment nowadays citizens are strongly detached from the hidden dynamics of nature.

How can we bring back the link between from these elements such as water tap, the river flowing under a bridge, the rainwater to the grey-water pouring in the canals? To this aim, the Water Hackers project allows citizens to monitor water quality during their everyday life.
Be part of this project and become a Water Hacker!

HOW TO PARTICIPATE

1. Learn about the hidden proprieties of water by using this manual

2. Download our tools and start analyse water quality in your area

3. Share your analysis in our online platform map

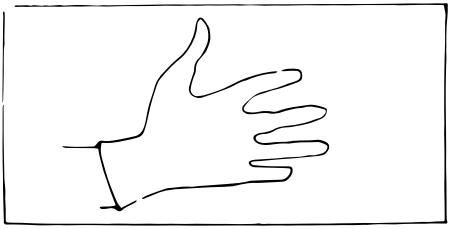
4. Join our events and share your knowledge with the community !

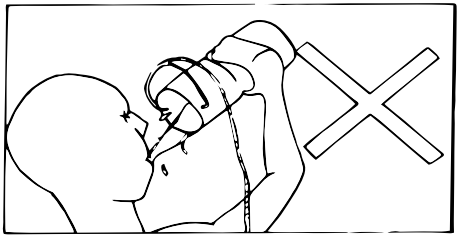
Armed with your monitoring results, you will use the resources available in the "Watergram" platoform (soon online) to take action and protect the vital water resources in your community.

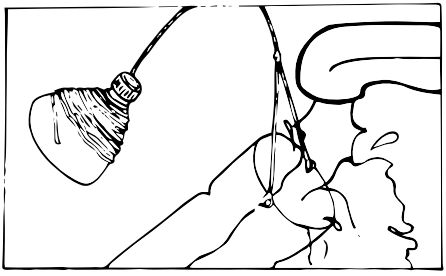
FOR YOUR SAFETY

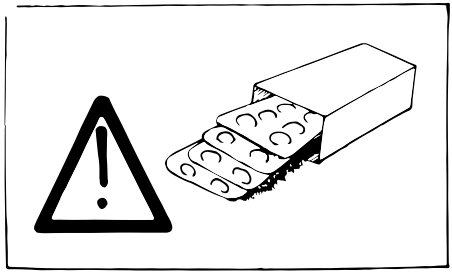
Before you get some water, read these safety suggestions!

- Never drink the water you are monitoring.
- Never monitor alone, always have an adult supervision near you.
- This set contains chemicals that may be harmful if misused, not misuse them.
- After testing remember to flush the container with fresh water and store them dry.
- Stay out of the waterbody (like rivers) as much as possible and protect your hands with gloves.
- Check the weather conditions. Do not go sampling in heavy rain or if a storm is predicted.
- Follow all posted notices and sign regulations and don't enter private property.
- If possible, have a cell phone and a first aid kit handy.
- If you take a boat out, follow safe boating practices. Wear a life jacket at all times!
- Store the Test Tablets in a cool, dry place and only open the foil when ready to use the tablet.
- Remember, your safety is more important than the data!

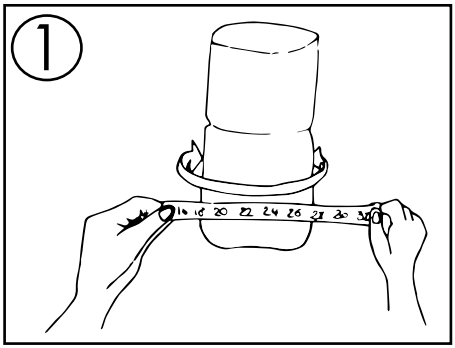




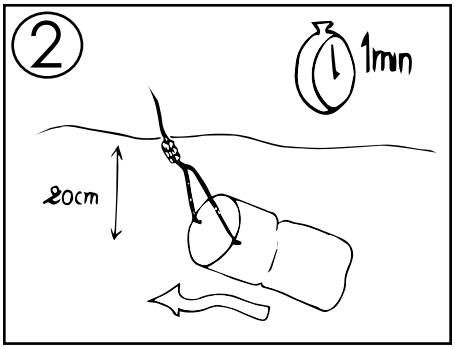




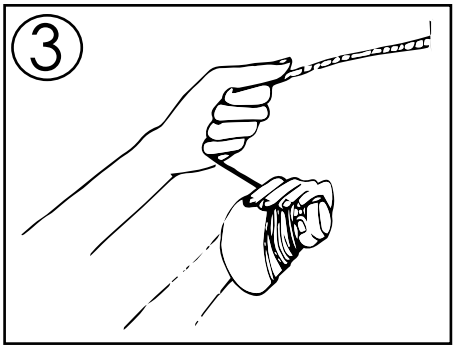
STEP 1: TEMPERATURE



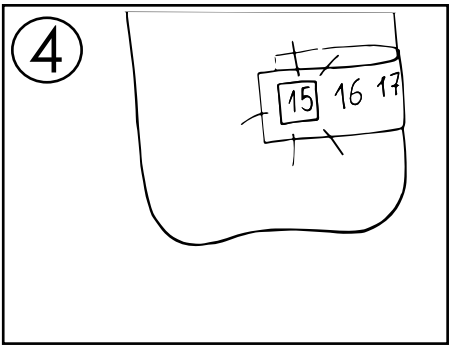
1. Adhere a thermometer strips on the outside bottom of your collector bucket.



2. Throw the collection bucket in the water without twist the wire. TIP: Hold the top part strongly so that the bucket doesn't slip away from your hands during the launch. Once it's in the water, allow the water to flow into the bucket for 30 seconds while it is still submerged (about 20 cm under the surface).

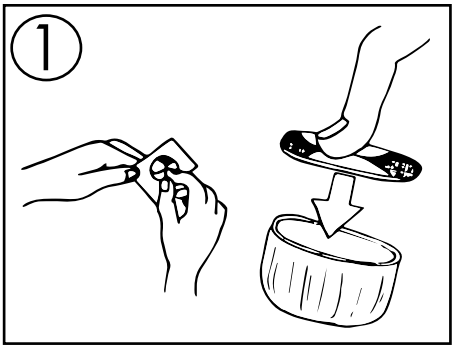


3. Rewind the wire back while using the top part of the bucket for keeping the wire together.

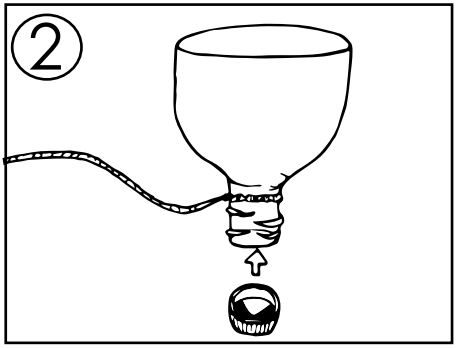


4. After the Collection look at the thermometer and read the temperature (the number with the green background on the highlight).

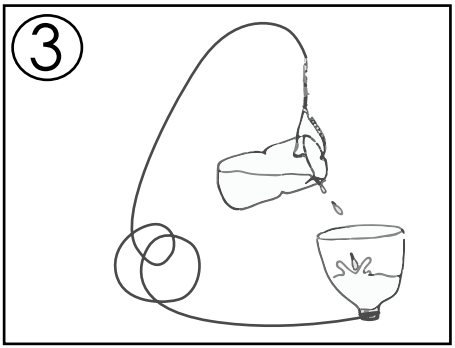
STEP 2: TURBIDITY



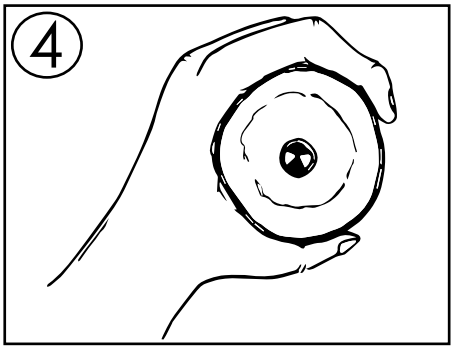
1. Remove the Turbidity disk sticker and adhere on the inner side of a cap



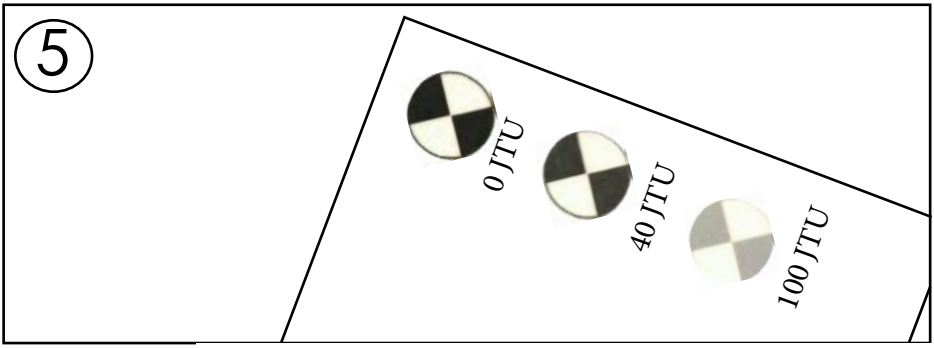
2. Screw the cap inside the second part of the collector bucket (top part of the bottle)



3. Pour out some water sample inside the top part of the bucket collector sample.

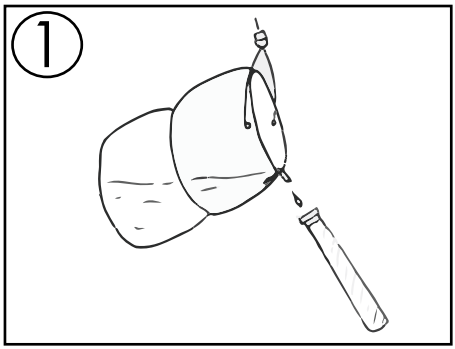


4. Check now the Turbidity by looing down to the adhesive at the bottom of the bottle.

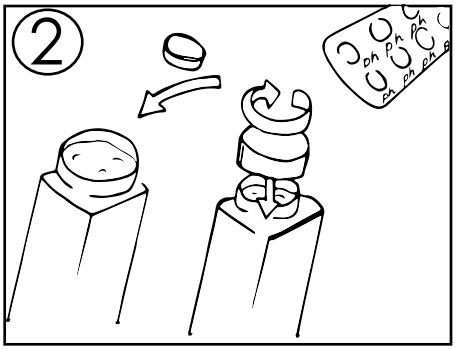


4. Hold the color comparison chart and compare the appearance of the Turbidity disk sticker to the chart.

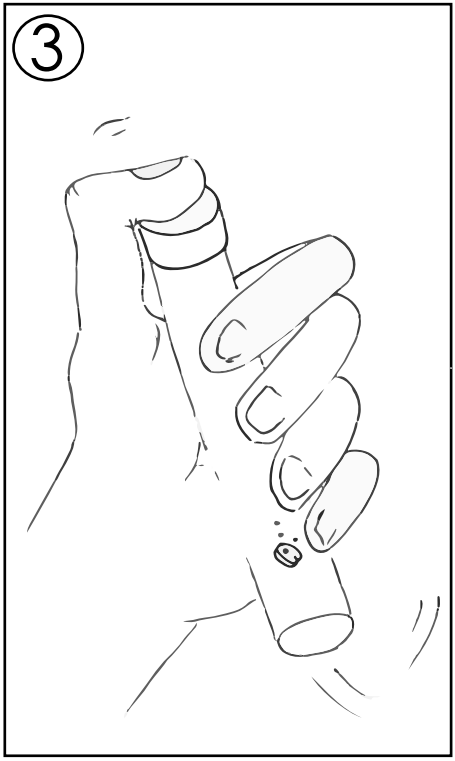
STEP 3: pH



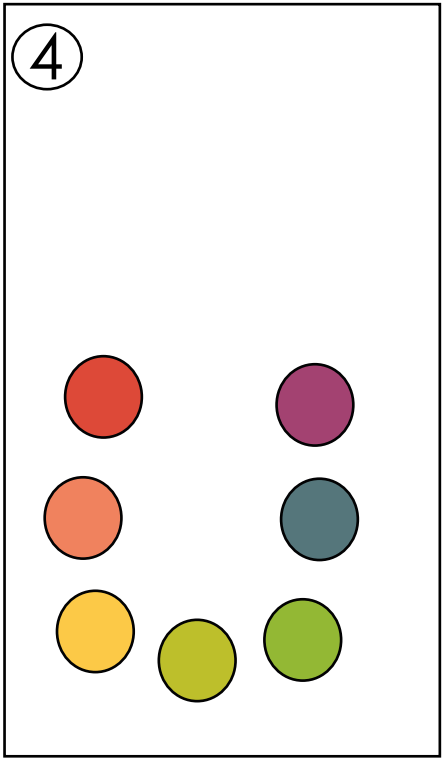
1. Fill the test tube until the 10 ml line with the water sample



2. Add 1 pH TesTab in the vial, screw the cap.

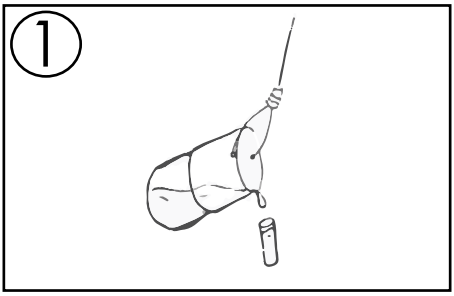


3. Cap and mix until the tablet has completely dissolved. Bits of material may remain in the sample.

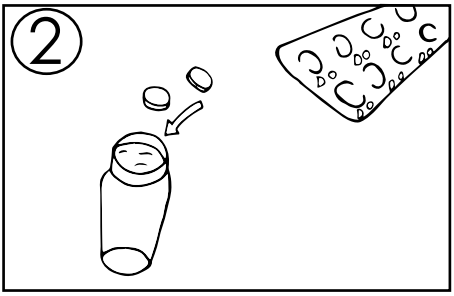


4. Compare the color of the sample to the color comparison chart. Record the result as pH.

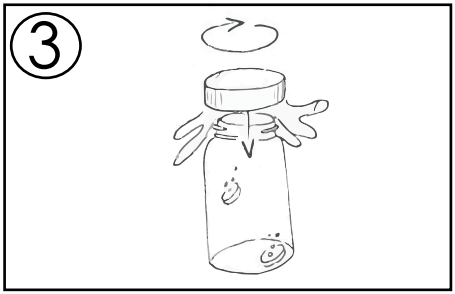
STEP 4: DISSOLVED OXYGEN



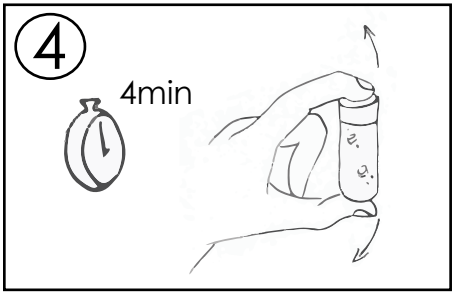
1. Submerge the small glass vial into the water collection bucket. Carefully remove the vial from the water sample, keeping the vial full to the top.



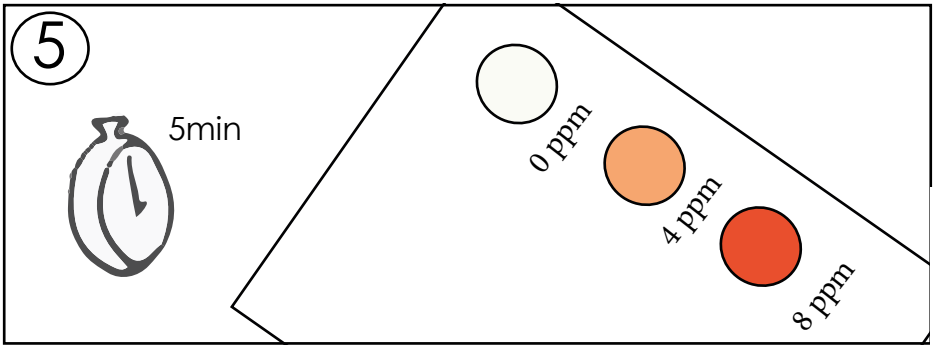
2. Drop two Dissolved Oxygen TesTabs into the vial. Water will overflow when the tablets are added.



3. Screw the cap on the vial. More water will overflow as the cap is tightened. Make sure no bubbles are present in the sample.



4. Mix by inverting the vial over and over until the tablets have dissolved. This will take about 4 minutes.



5. Wait 5 more minutes for the color to develop. Clock . Compare the color of the sample to the color comparison chart. Record the result as ppm dissolved oxygen.

STEP 5: DISSOLVED OXYGEN CALCULATION OF SATURATION %

To calculate the % saturation locate the temperature of the water sample on the % saturation chart.

Locate the dissolved oxygen result of the water sample at the top of the chart.
The % saturation of the water sample is where the temperature row and the dissolved oxygen column intersect.

For Example: If the water sample temperature is 16° C and the dissolved oxygen result is 4 ppm, then the % saturation is 41.

Dissolved Oxygen, ppm

Temperature, °C	0ppm	4ppm	8ppm
2	0	29	58
4	0	31	61
6	0	32	64
8	0	34	68
10	0	35	71
12	0	37	74
14	0	39	78
16	0	41	81
18	0	42	84
20	0	44	88
22	0	46	92
24	0	48	95
26	0	49	99
28	0	51	102
30	0	53	106

GENERAL DATA SHEET

Parameter	Example	Site 1
Date	27/03	
Location	Alzette	
Air Temperature	15°	
Water Temperature	12°	
Dissolved oxygen	1ppm	
pH	7pH	
Turbidity	0JTU	

TAKE A PICTURE WITH YOUR SMARTPHONE OF YOUR WATER SAMPLE AND DATA SHEET!

UNDERSTAND YOUR ANALYSIS

Did you find high temperatures?
Possible cause – thermal pollution from streambank collapse
Possible action – daylight the waterbody through restoration

Did you find high turbidity levels?
Possible cause – too much runoff is entering the waterbody
Possible action – develop a riparian buffer

Did you find a non-neutral (~7) pH?
Possible cause – nonpoint source pollution contaminating the waterway
Possible action – restore wetland surrounding the waterbody

Did you find low dissolved oxygen?
Possible cause – eutrophication from increased nutrients entering the waterbody
Possible action – install a log deflector to aid in creating turbulence.

JOIN

TAKE ACTION

You have run the tests, now it's time to interpret your results and develop a plan for action. Turbidity, pH, temperature, and dissolved oxygen are all indicators that help us understand what's happening in our waterways. But that's just the first step. Once you understand the health of your waterway then you can help others to protect and restore it. Make sure to enter your data through our Watergram platform. www.water-hackers.lu/map

CONGRATULATION, YOU ARE NOW A WATER HACKER!
Experience water quality around you and spread it with our community!

It would be really great if you could share some information about your hack on our platform.

Share it on our Facebook page:
Water Hacker

Credits:

Editing: Socialmatter Design Studio
Drawings: Chelsea Dasthy and Tessy Krier
Design and Layout: Irina Moons
Scientific advices: Dr. Christian Penny (LIST)
Source: EarthEcho Water Challenge

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Fonds National de la Recherche Luxembourg

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start up