



Save The River Usk

Water Sampling Guidance

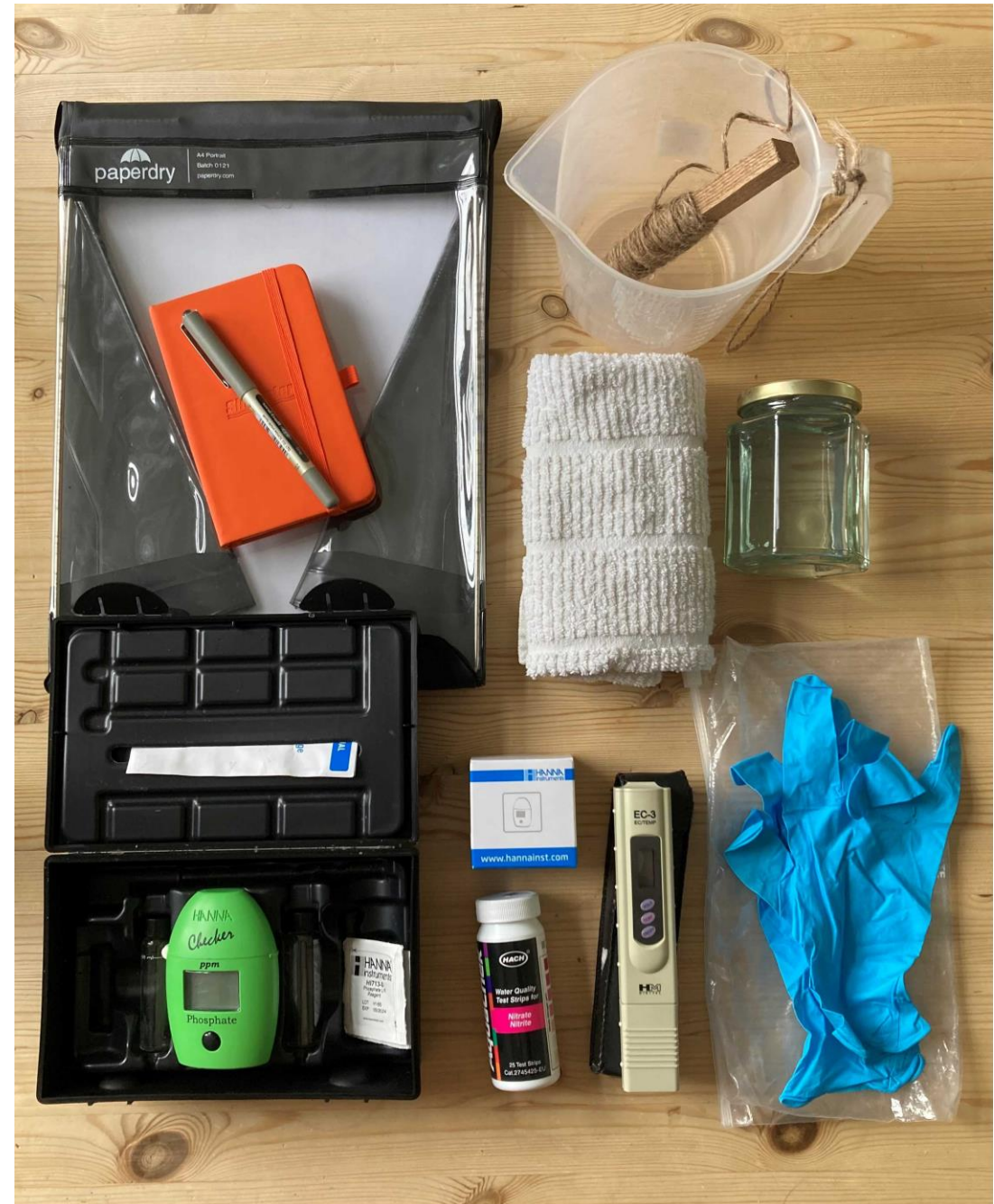


SAVE

OUR USK

Things to take to the field

- Sampling container (with cord attached, if required)
- Hand sanitizer and/ or waterproof gloves
- Waste bag, waste container
- Phone for recording data on Epicollect/ emergency contact
- Paper form/ notepad and pen (in case your phone fails)
- EC and temperature meter
- Nitrate test strips
- Hanna phosphate checker and reagents
- Syringe and filters (for transferring sample into glass vial if required)
- Dry and clean cloth to clean glass of glass vial
- Rainwriter/ waterproof clipboard or plastic bag to protect notes from rain



Choosing a sampling container



- Make your own, reuse a container you already have, or buy one for a few pounds
- The type of sampling container you choose will depend on where and how you plan to collect a sample (bridge, riverbank, or in-stream)
- Ideally sampling containers should:
 - be made from reusable plastic
 - be wide-necked or open topped
 - hold at least 1L of water
 - be easy to handle and transport

Low-cost sampling container ideas

- **Small bucket** – with cord attached are very versatile
- **Nalgene wide neck bottle** – with cord attached around the neck, if required
- **Clean milk carton** – cut into a sampling container, and attached to cord or a stick, if required
- **Large measuring jug**

Cord can be very useful for collecting hard-to-reach samples



Collecting a water sample – general approach

1. **Identify a safe place to collect your sample**, where water is free flowing - this could be from *a riverbank* or *a bridge*, or from *within the river channel**
2. **Perform a ‘triple rinse’ of your sampling container**, by filling your container and then emptying it down-stream, three times
3. Lower your sampling container into the water and aim to **collect your sample** for testing from just below the surface of the water
4. **Transport your sample to a suitable site nearby** to carry out water quality tests

* *only if approved by your volunteer coordinator*



Water sampling – general hints and tips



Good practice

- Collect your sample upstream of where you are standing
- Discard water downstream of where you are collecting it from
- Triple rinse your sampling container before collecting a sample for analysis
- Rinse your other monitoring equipment (syringes, test tubes etc.) in river water before carrying out tests



Warnings

- Take care not to disturb riverbed or bank side sediment – with either your body or your sampling container - as you collect your sample
- Avoid taking your sample from stagnant or very slow-moving areas within the river

What are we measuring

Water parameters and order of testing:

1. Water Temperature



2. Electrical Conductivity

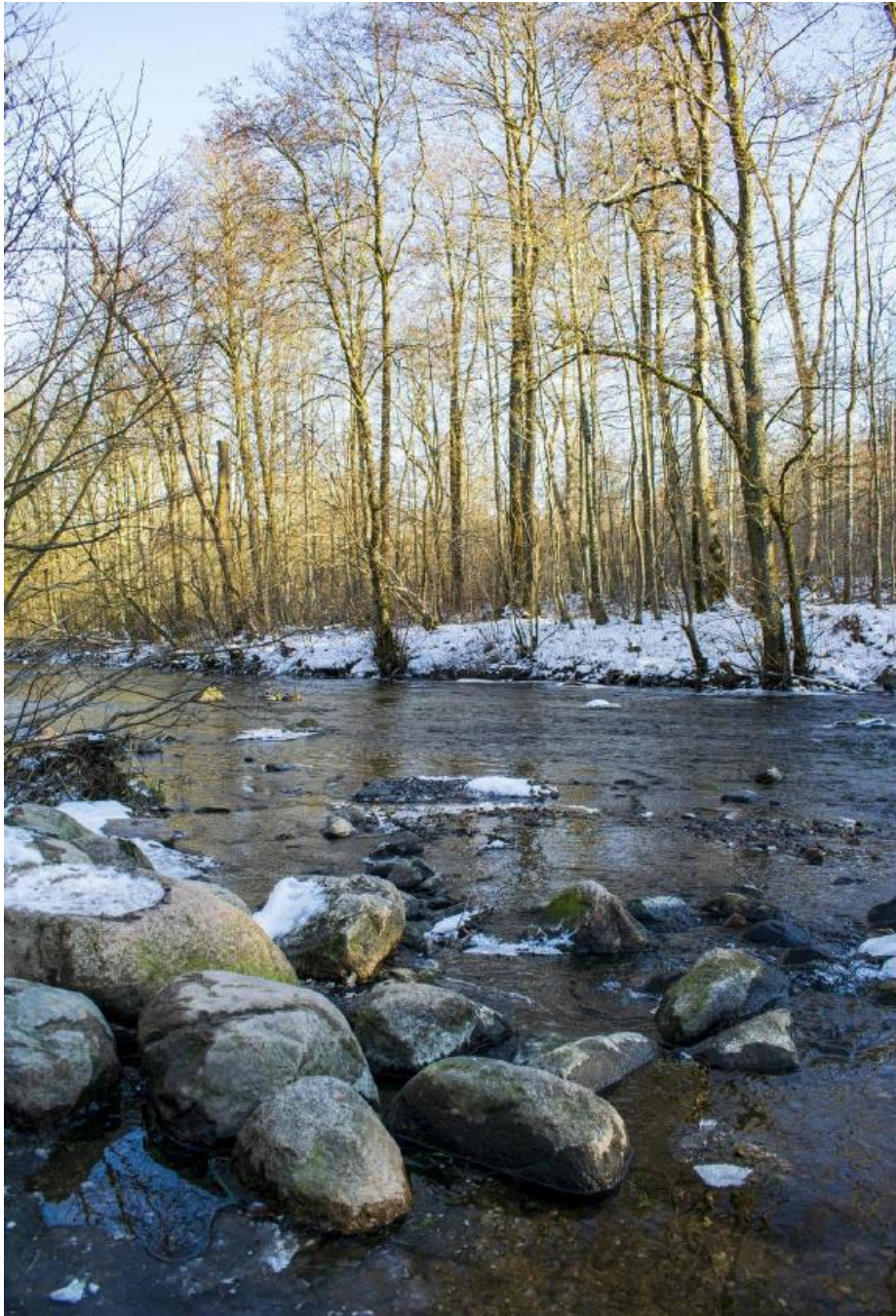


3. Nitrate



4. Phosphate



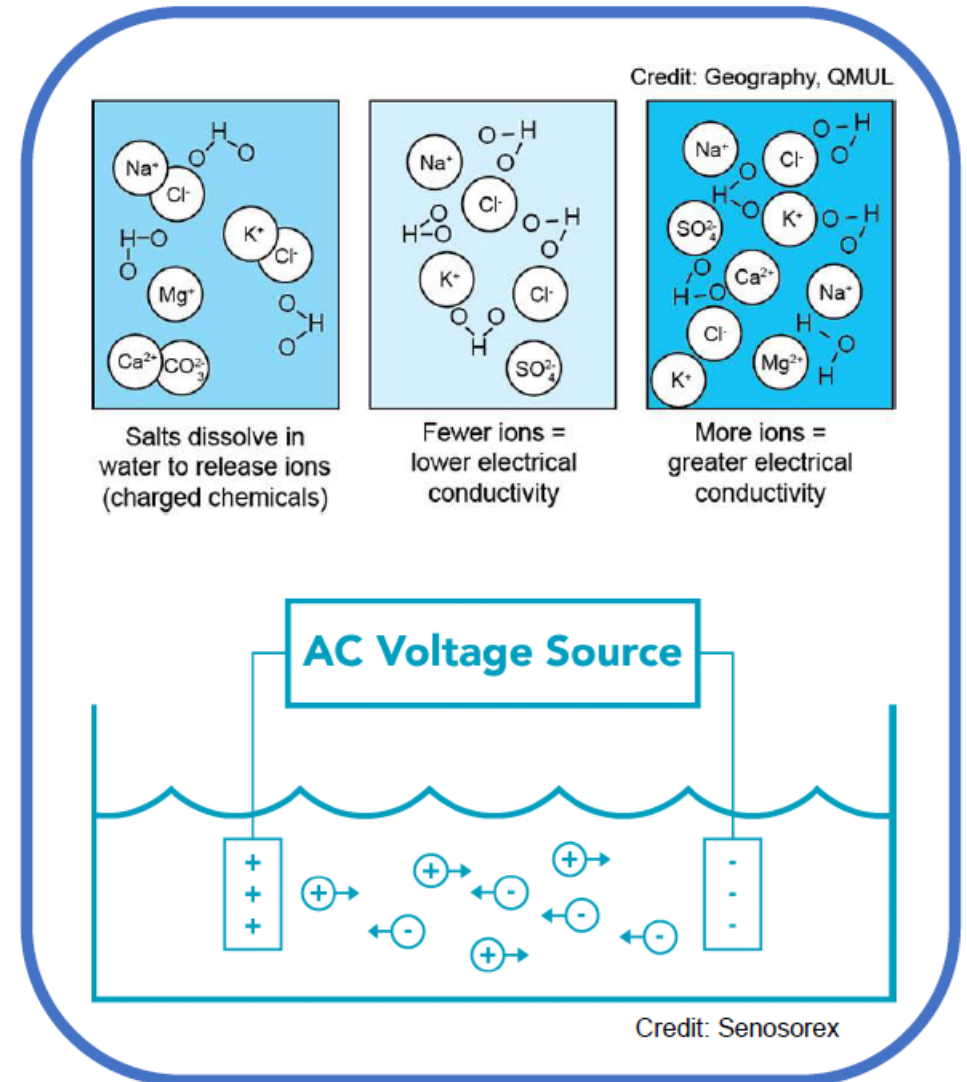


Why measure temperature?

- Water temperature controls the rate of many chemical, physical and biological processes in a river
- Water temperature determines whether a river habitat is suitable for different aquatic species to survive
- Warm water can hold less dissolved oxygen than cold water
- Water temperature is measured in degrees centigrade ($^{\circ}\text{C}$)

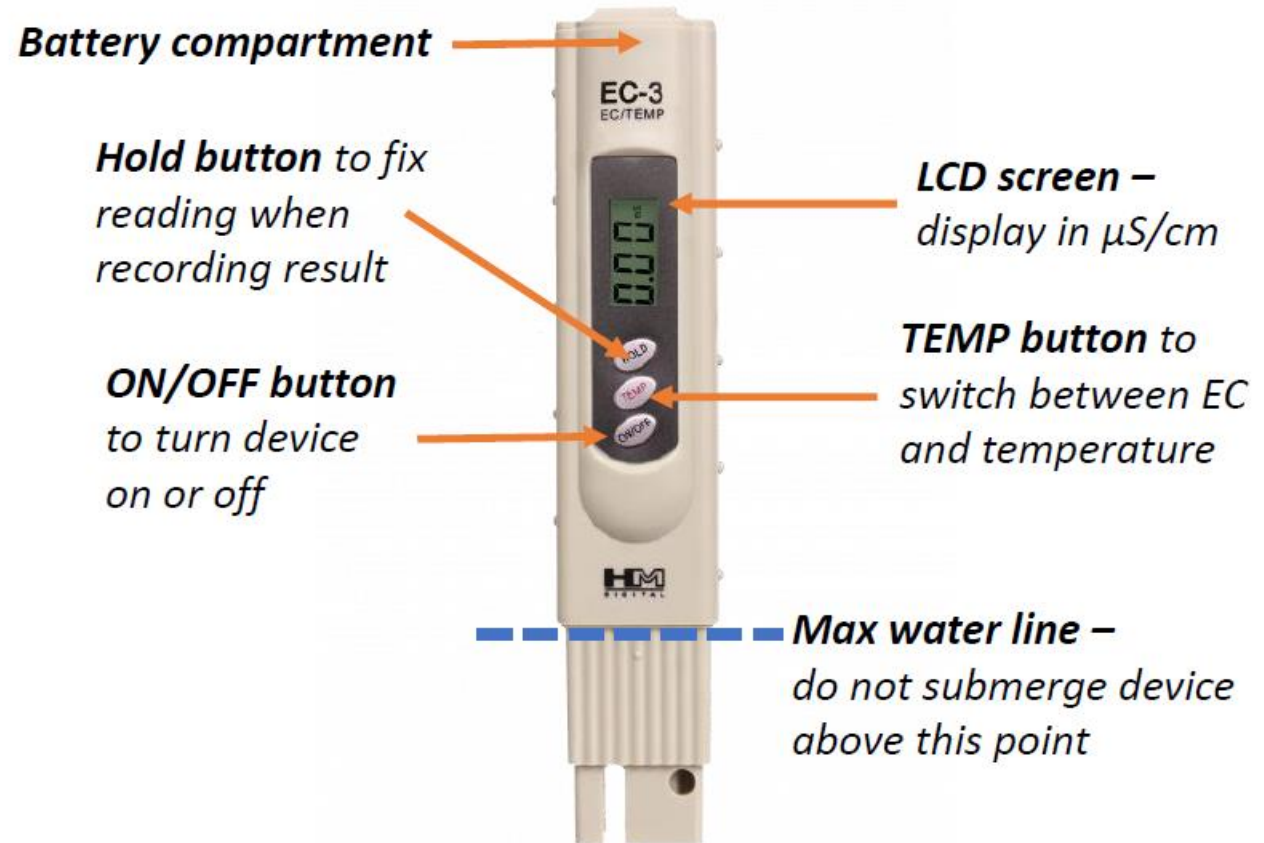
Why measure electrical conductivity?

- **Electrical conductivity (EC), measured in $\mu\text{S}/\text{cm}$, gives us an indication the total amount of dissolved solids (TDS) in the water**
- Water containing dissolved salts (ions) conducts electricity
- EC naturally varies between different freshwater bodies (due to differences in geology) and can range from $<100 \mu\text{S}/\text{cm}$ to $>1000 \mu\text{S}/\text{cm}$ in rivers
- EC also varies as a result of changes in water temperature and stream discharge
- Understanding the natural range (baseline conditions) in EC can help us to understand when readings are unusually high, which may indicate a contamination event has occurred



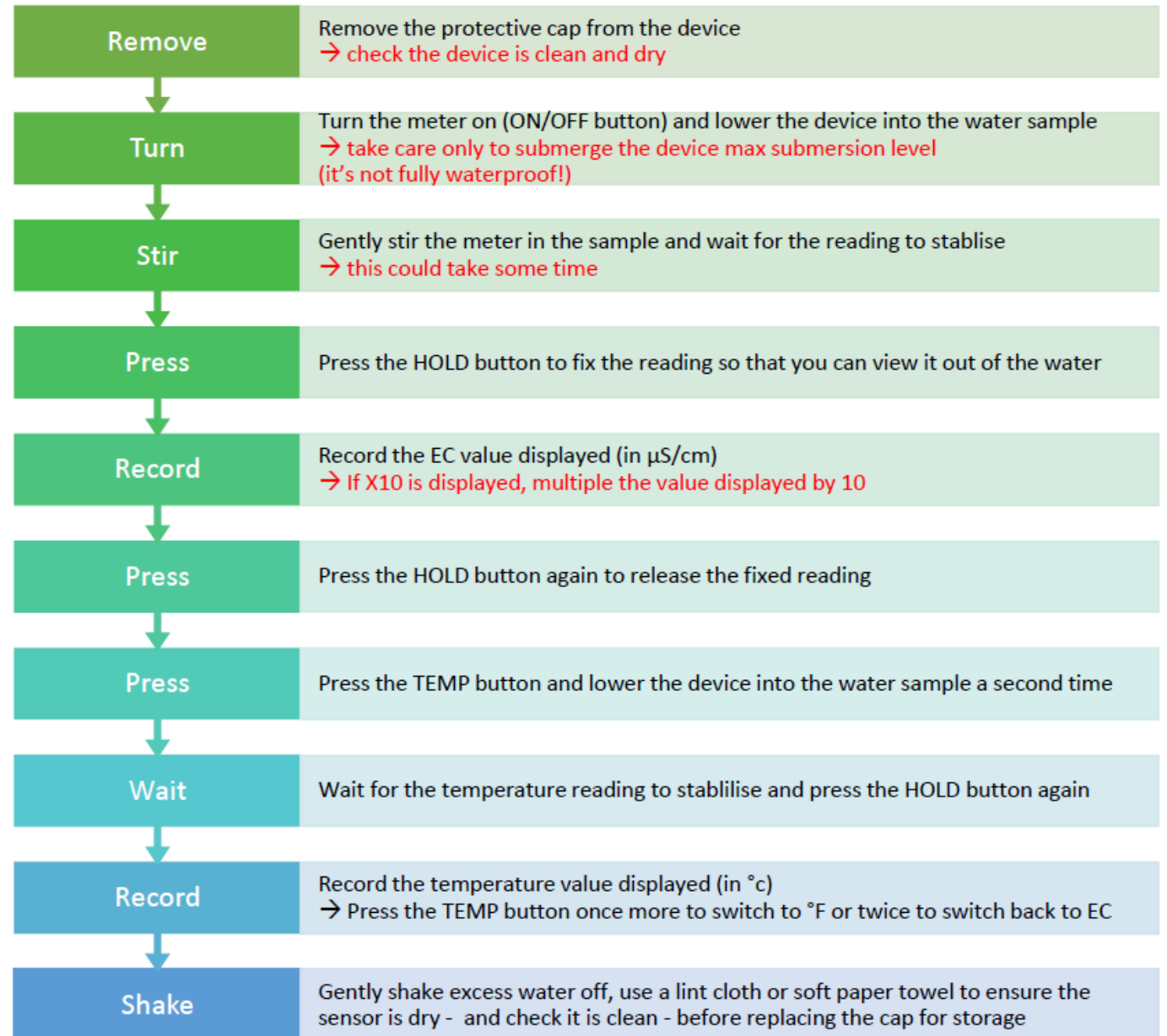
What do you need to measure EC and temp?

- A combined EC and temperature handheld meter – for example, the HM Digital EC-3
- Your water sample either in a sample container or flowing river water at your sampling site (within arms reach)
- Take care not to submerge the meter too deep!



HM Digital EC-3 Meter

How to use the HM EC and temperature probe



Repeat to take 3 readings of water temperature and 3 readings of EC

Looking after the HM Digital EC-3

The HM Digital EC-3 is robust (and comes with a 3-year warranty) but needs to be looked after to continue to perform well...

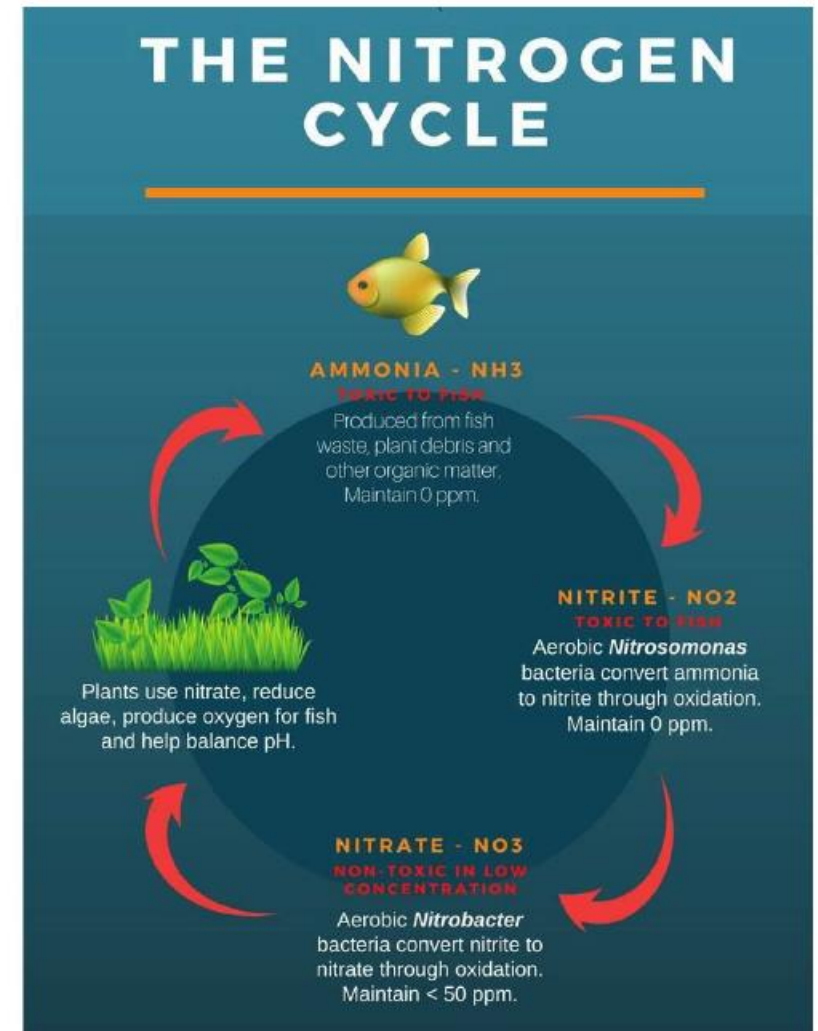
- Make sure the device is clean and dry every time you put it away after testing
- Store somewhere cool and dry place between trips to the field
- You may need to change the batteries (model 375A) in your device at some point –follow the instructions provided by the manufacturer
- The device is factory calibrated, but after a while may benefit from recalibration –your group coordinators will advise if this is necessary
- More information about the HM Digital EC-3 meter can be found online (<http://hmdigital.com/product/ec-3/>) and in the manufacturer's instructions provided with the meter

Nitrate



Why measure nitrate?

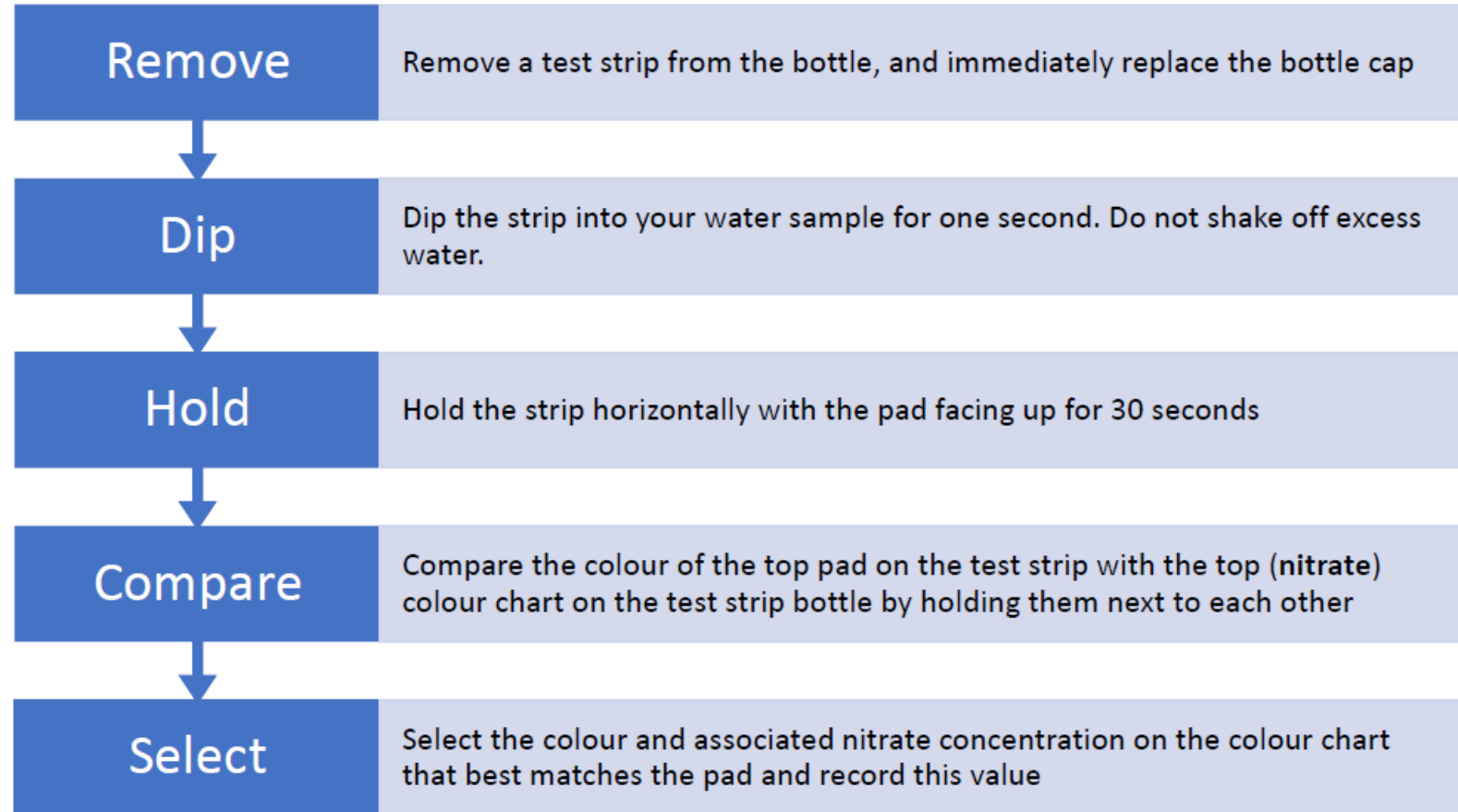
- Nitrate (NO_3^-) is the oxidized form of nitrogen found dissolved in water
- Nitrate in water comes from a variety of sources, including agricultural run-off and wastewater discharges
- Nitrate is an essential nutrient, but high concentrations in rivers can cause serious damage to aquatic ecosystems
- Its concentration is commonly measured in ppm (mg/l) or ppb ($\mu\text{g/l}$)



Simplified nitrogen cycle in water

Credit: Aqueon

How to use Hach water quality test strips for Nitrate



Phosphate



HANNA

Checker

ppm

Phosphate



HANNA[®]
instruments

HI713-0
Phosphate LR
Reagent

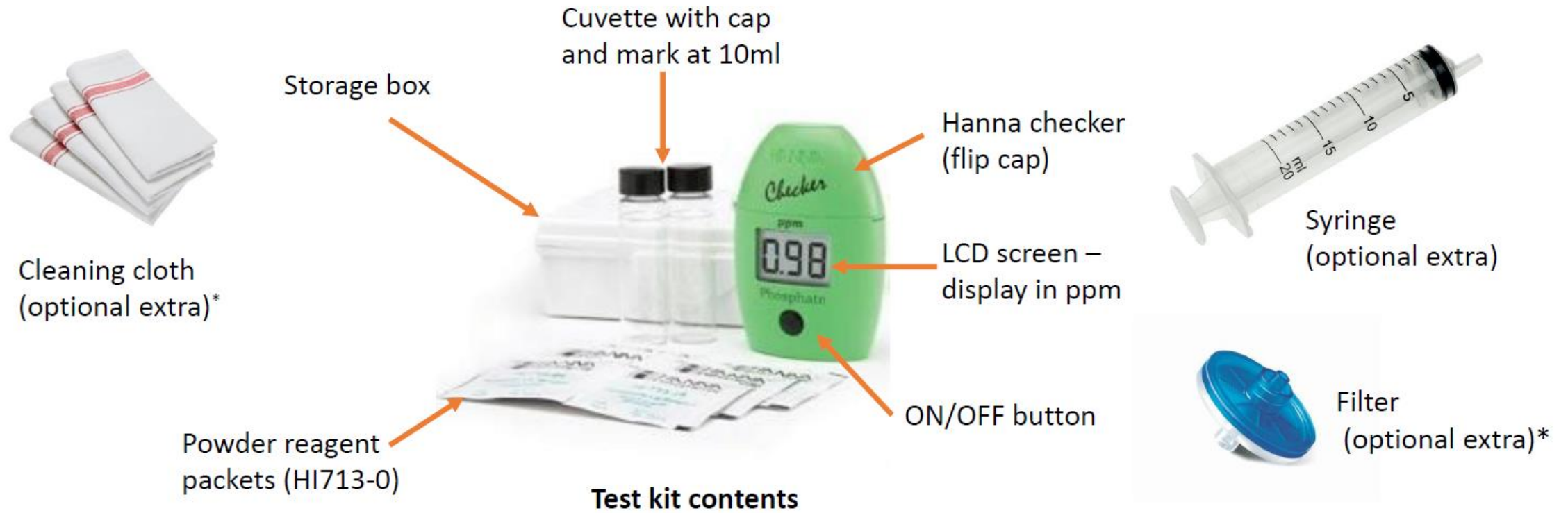
LOT H174
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www.hannainst.com

Why measure phosphate?

- Phosphate (PO_4^{3-}), also referred to as orthophosphate, is the bioavailable form of phosphorus, found dissolved in water
- Phosphate found in rivers comes from a variety of sources, including agricultural run-off and wastewater discharges
- Phosphate is an essential nutrient, but high concentrations in rivers can cause serious damage to aquatic ecosystems
- Its concentration is commonly measured in ppm (mg/l) or ppb ($\mu\text{g/l}$)

Contents of the Hanna Phosphate Low Range Handheld Colorimeter (HI-713)

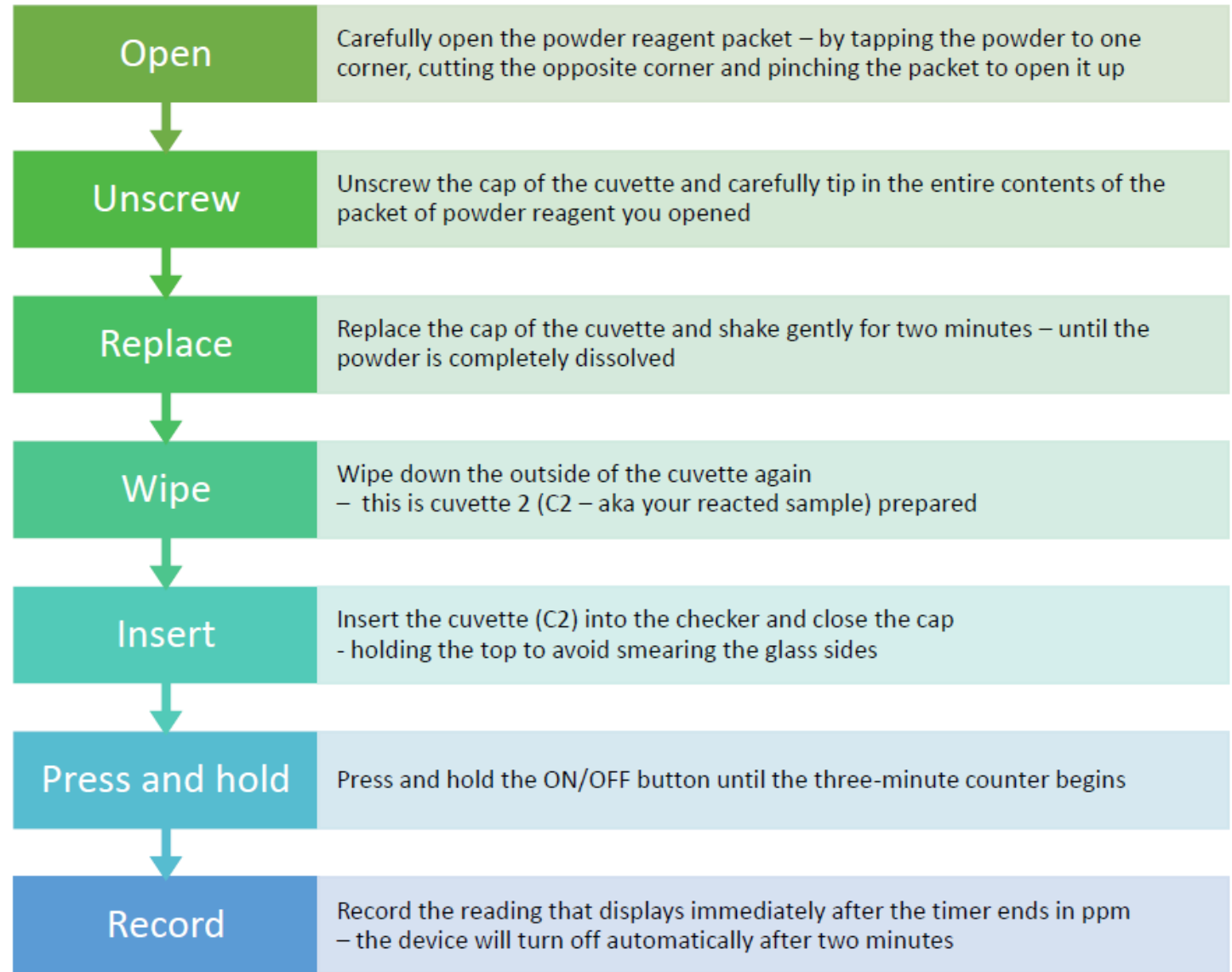


* Not included in kit provided by Hanna

How to use the Hanna Phosphate Low Range Colorimeter (HI-713) – Part 1



How to use the Hanna Phosphate Low Range Colorimeter (HI-713) – Part 2



Top tips for using the Hanna Phosphate Checker



If the sample contains lots of debris, or is very turbid, filter it before analysis



If you notice bubbles in the cuvette, gently swirl or tap it to remove them



Always make sure the cuvette is clean and dry before placing into the checker: wipe off fingerprints with a cloth



If any error codes appear, such as low battery("bAt"), check the instruction booklet provided for guidance on what to do



In cold weather, the powder reagent may take slightly longer to dissolve, so use a separate cuvette for the blank and reacted samples (C1 and C2) to avoid time-out

Safely disposing of samples and reagents

- Do not dispose of reagents or water samples mixed with reagents directly into the river or down a surface water drain –this could contaminate the river
- Higher concentration and toxicity reagents as found in the Hanna test kit should be disposed of down a wastewater sink or toilet when you return home, these will be treated at the sewage treatment works
- Water samples that have not been mixed with any reagents can be returned directly to the river or to a green space
- Take all other waste material, such as packaging, home with you and dispose of in your household waste



Recording your data



Download the
app



Access your
groups project



Add an entry



Upload your
entry



How to use epicollect

1. Downloading the Epicollect app



→ Search for and download the FREE **Epicollect5 Data Collection** app from the Google Play or Apple store

- Epicollect is available on Apple and Android phones
- You will need a google account to create an account on Epicollect and use the app



Epicollect5 Data Collection

Oxford University, CGPS Productivity

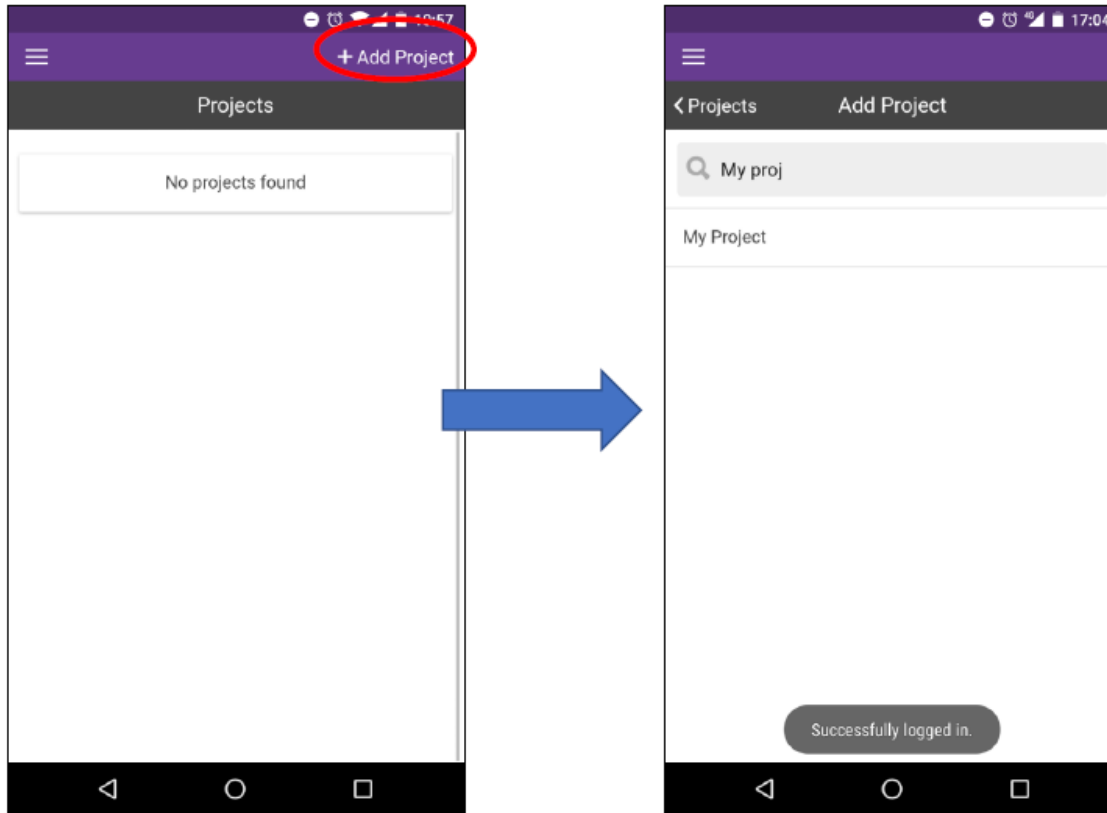
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E Everyone

i This app is available for all of your devices

Installed

2. Accessing your group's Epicollect project



- Open the Epicollect app on your mobile device and sign into your account
- Click on the “+ **Add Project**” button in the top right-hand corner
- Start typing the project name in the search bar to find your group's project and click on it once it appears to add it to your projects list

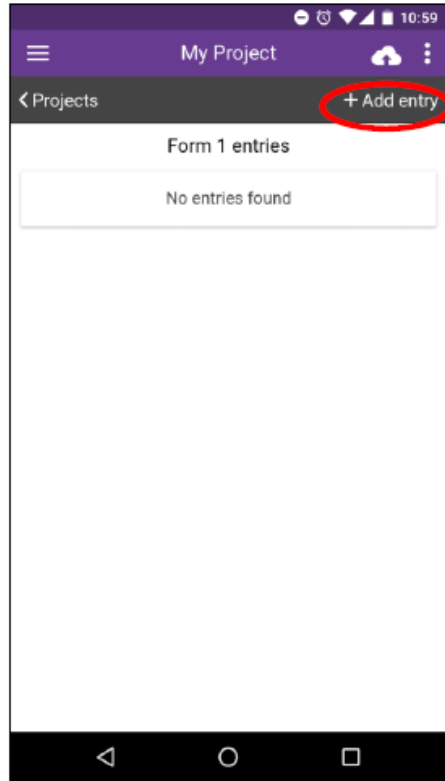
Our project name:



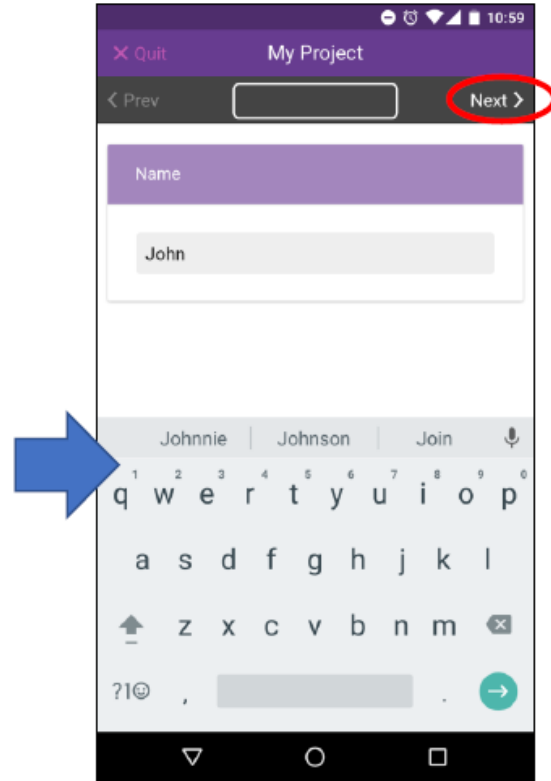
SAVE THE RIVER USK MONITORING

Citizen science data collection on the water quality of the River Usk

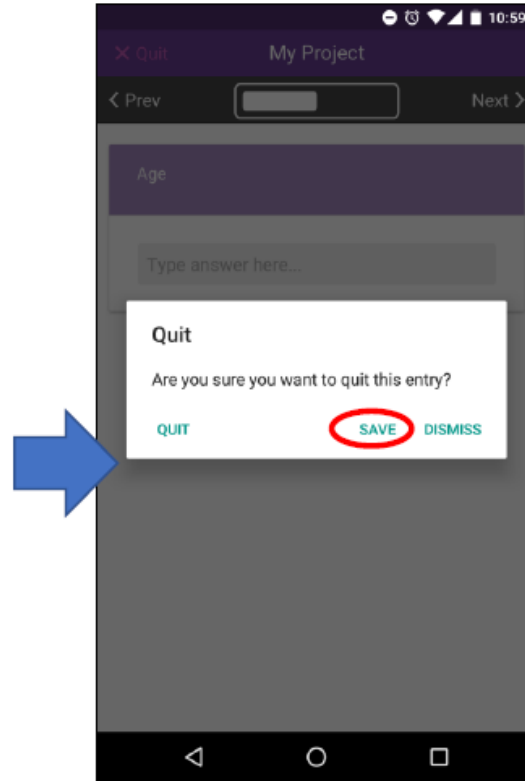
3. Entering data into the Epicollect app



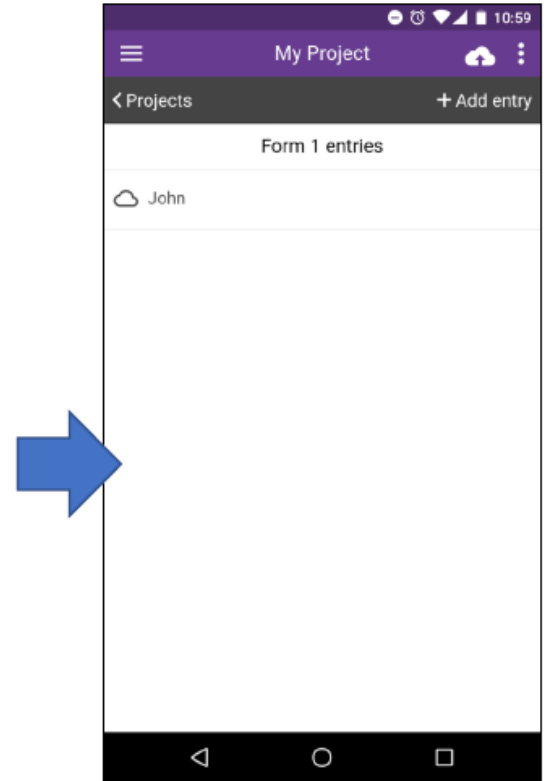
→ Select your group's project from the list and click **+Add entry**



→ Work through the questions on the form, clicking "**Next**" to move on, or "**Prev**" if you need to make any changes



→ If you need to quit before finishing, you'll be asked to "**SAVE**" the form for later, or "**DISMISS**" it, deleting the entry

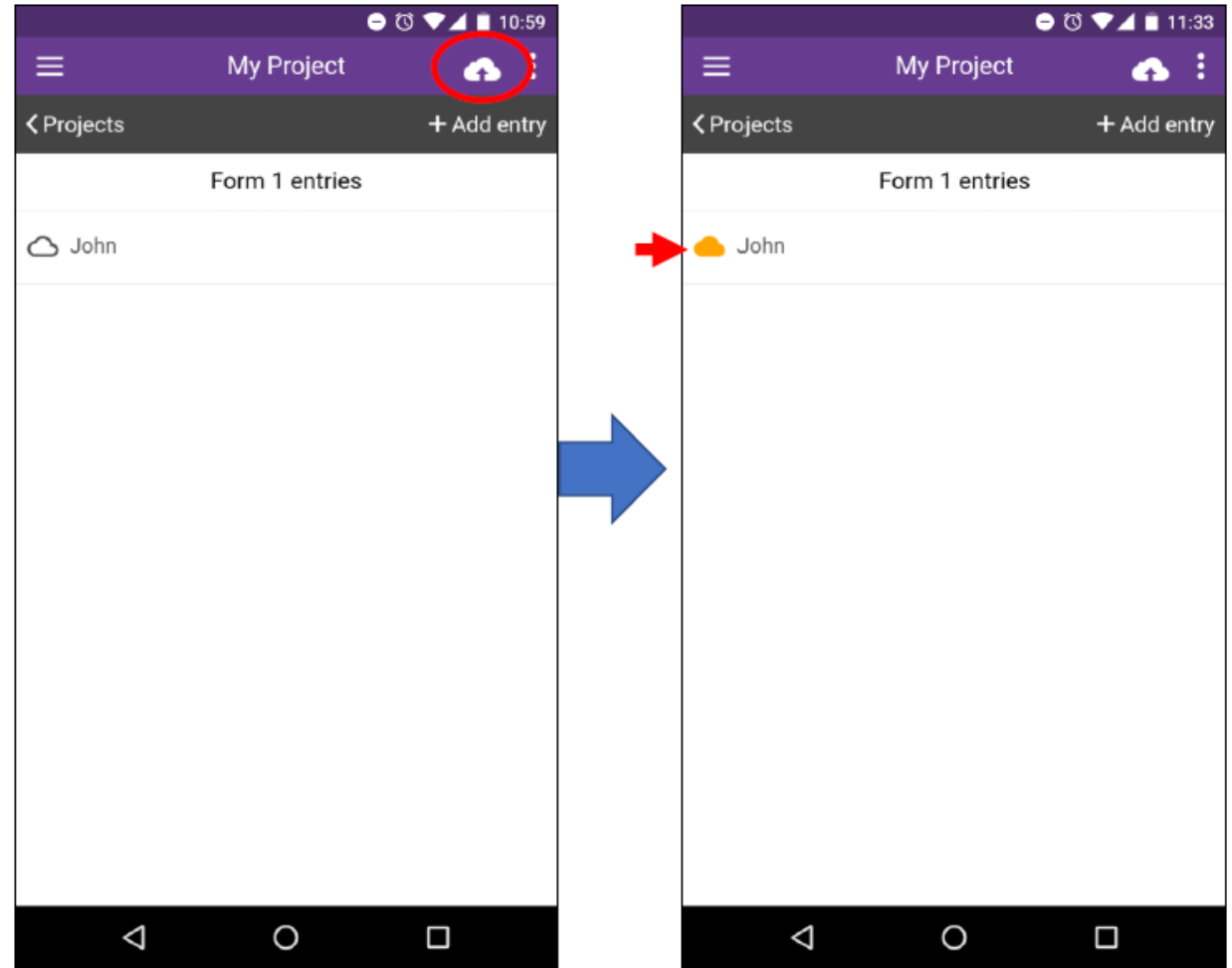


→ When you save your form entry, it will appear in a list of your entries for that project

4. Uploading data from the epicollect app

→ Once you have saved and completed your survey and are satisfied with it, click the **upload** button

- You can edit an entry on your phone but only before it's been uploaded
- The web application is the online project database where all data entries are stored and can be viewed
- The cloud icon next to the form entry will change from white to colored once that entry has been successfully uploaded to the web application
- You can add entries when you're offline (in the field) and upload them later when you're online (at home)



Storing and maintaining monitoring equipment

After every sampling trip, check that your monitoring equipment is clean and dry before putting it away

You may need to rinse some of your equipment when you get home, for example your sampling devices, containers or sensors, particularly if the water you were sampling appeared to be contaminated

Store all your monitoring equipment in a cool, dry location, ready for your next field survey

Ensure that any electronic monitoring equipment is well maintained and regularly calibrated where required

Thank you for
contributing
to protecting
our river!

