

## INFORMATION SHEET

***Vibrio cholerae*** is a small bacterium (1,4–2,6  $\mu\text{m}$  in length) with a flagellum. The natural habitat of the bacterium is in brackish or saltwater. Rivers, streams and lakes are also home to the bacterium, particularly if there is human activity nearby. When ingested, the bacterium can cause diarrhoea and vomiting within several hours to 2–3 days after ingestion. When visiting areas known to have an outbreak of cholera, it is advised to: drink and use bottled water; frequently wash hands with soap and safe water; use chemical toilets or bury faeces if no restroom is available; or treat water.

The bacterium has been extensively studied using **electron microscopy**. A **transmission electron microscope** is used to look at 2D specimens in ultrathin sections less than 100 nm thick. An image is formed from the electron beam being transmitted through the specimen. A **scanning electron microscope** focuses a beam of electrons onto the surface of the sample and results in a 3D image of the surface of the sample.

[Adapted: <<https://www.mrc-lmb.cam.ac.uk>> and <<https://www.fei.com/>>]

**Potable water**, also known as drinking water, is water that is considered safe to drink or to use in preparing food. In developed countries, tap water meets drinking water quality standards. In less developed countries, water may not meet the water quality standards, and so should be treated before use.



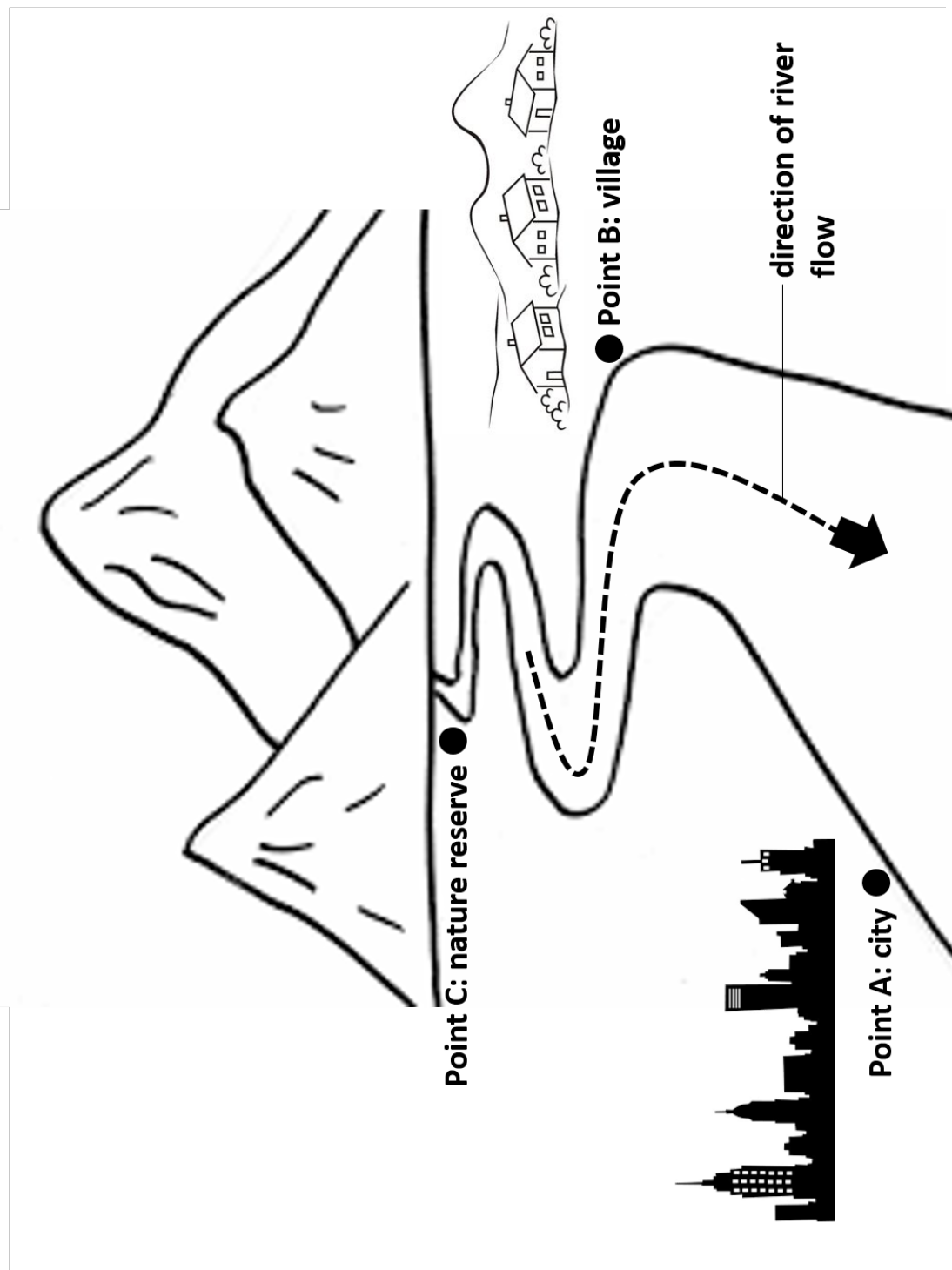
**POTABLE  
WATER**

**Treatment of water:** this can be done by boiling water, adding disinfectants such as bleach, or by filtering. Boiling water is the surest method to kill disease-causing organisms, including viruses, bacteria, and waterborne parasites. The addition of bleach to water at a concentration of 1 ml/litre will be sufficient to sterilise water. Filtration of water that is cloudy or has particulate matter in it is advised.

[Adapted: <<https://www.thespruce.com/tap-water-safety-1907904>>]

**Cholera testing** can be done in a number of ways for water samples. This investigation makes use of a colour test using Activated **Solution A**, which is a dark blue-purple colour. In the presence of large amounts of *V. cholerae*, the Activated Solution A will become clear. If no *V. cholerae* is present, the Activated Solution A will remain a blue-purple colour. Very small amounts of *V. cholerae* in water samples result in Activated Solution A changing to a blue-grey colour.

**Map of River – to be referred to in Question 1.20**



[Adapted: <<http://clipartmag.com/river-clipart-black-and-white>>]