Worksheet 2: We produce drinking water – Methods of purifying water

The pores of various filters

In the experiments you have used various filters. In Experiment 1 the contaminated water was poured into a funnel with the filter paper and the silica sand. Filter paper contains small openings (pores), through which the water can flow. Dirt particles that are larger than 10 µm (1 micrometer = 1/1.000.000 m), do not fit through these pores. They remain on the filter paper.

The pores are larger in the silica sand filter. On average they are 100 µm in size. However, many dirt particles adhere to the grains of sand. Therefore, a sand filter allows only particles that are smaller than 0.1 µm to pass through. Sand filters are thus very good, but take up much space and require elaborate cleaning.

The membrane filter cartridge has a pore size of approx. 0.2 µm. It is small and more water can flow through it due to the higher pressure. A membrane filter cartridge must always be cleaned. Therefore, when needed for medical or pharmaceutical purposes it is usually thrown away after a single use.

In our experiment, the membrane filter in the form of a hollow fiber tube* cleans equally as well as the membrane filter cartridge because of the similar pore size. In technical applications it is better suited to larger installations for the extraction of drinking water. Using a small pore size of 0.001 µm and a very high pressure (80 bar and higher) this filter system uses the process of reverse osmosis to desalinate seawater into drinking water.

* Membrane = thin film-like structure. Possesses tiny pores if used for filtering purposes.

Fiber = a single, relatively long and very thin strand of a flexible material, similar to human hair. In technical applications, usually made of plastic.

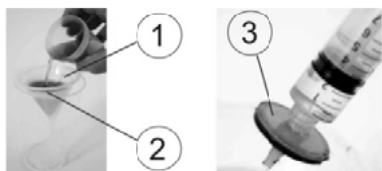Hollow fiber = the fiber is hollow on the inside, like a tiny tube.

Hollow fiber membrane = a hollow fiber whose porous walls act as a filter.

Task 1

Underline the names of the different filter types in the text.

Task 2

Label the photos with these names.

1 _____

2 _____

3 _____

4 _____

Task 3

Fill in the different filter types into the table and write the appropriate pore size of the filter next to it.

Name of the filter	Pore size