

Environmental Studies FACT SHEET



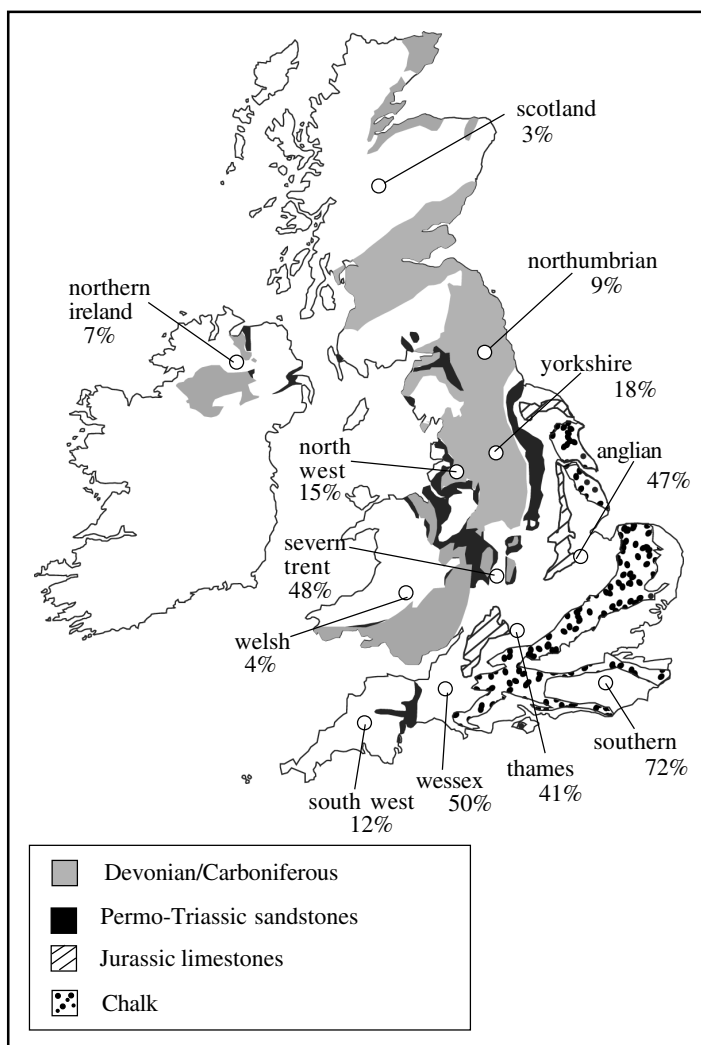
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Exam Questions on Aquifers

Aquifers are rocks which have millions of microscopic pores that are filled with water. This is known as **groundwater** – it is in the ground – and it supplies us with about one third of our water supply. (Fig 1)

Fig 1 Percentage of total supply from groundwater

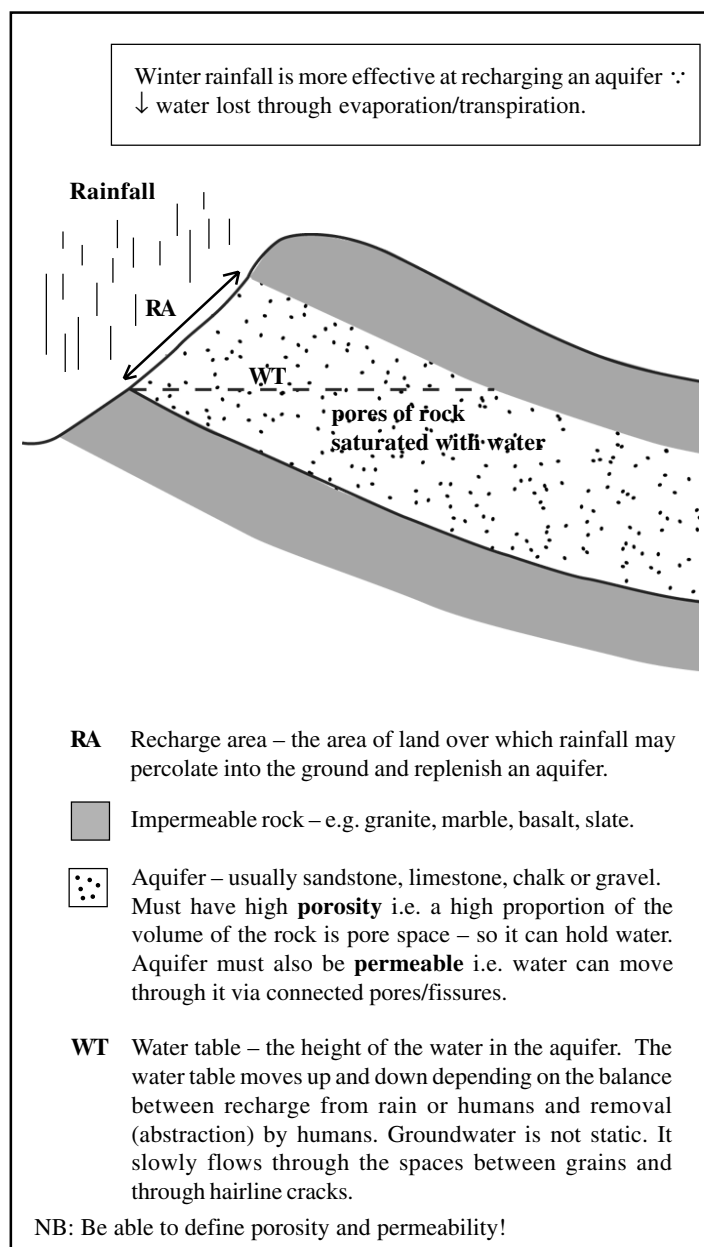


The other two thirds of our water supply comes from rivers and reservoirs – what we call **surface water supplies**. The advantages of using groundwater instead of reservoirs are summarised below.

Groundwater or reservoirs?

- Groundwater extraction is cheaper than building a reservoir.
- No need to build reservoir/less environmental impact.
- No evaporation losses from groundwater.
- Groundwater does not just provide us with domestic and industrial water – it serves as part of the source of some rivers and without groundwater input many rivers would dry up in summer. This could be used as an argument for reservoirs.
- Because rainwater may take decades or even centuries to reach the water table it is usually clean, so it requires less treatment.

Fig 2. Main features of an aquifer



If extraction of water is faster than it can be recharged the water table will fall. This may reduce the volume of water we can get from a bore hole or it may result in wells drying up. It may also lead to:

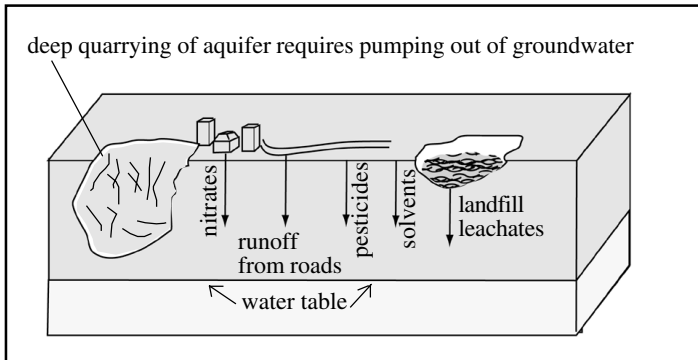
- Subsidence - as the weight of rocks above is not now supported by water filled pores. This has happened in London, Tokyo and Mexico City.
- Saltwater intrusion - if in coastal areas, seawater is sucked into the emptying pores of the aquifer.
- Streams/rivers drying up

Sometimes then, it is necessary to **artificially recharge** an aquifer. We can do this by pumping water underground or by diverting a river over a recharge area.

Rain falling on the land surface today may take decades or even centuries to reach the water table. As it moves slowly downwards through the soil it is effectively filtered – groundwater supplies are very pure and require little treatment before we can use them. However, the slow rate of movement of water also applies to toxic chemicals that we have applied to the land. It is highly likely that pesticides which were applied in the 1950's, for example, are still making their downward journey to our future water supplies.

Threats to groundwater are summarised in Fig 3.

Fig 3. Threats to groundwater



Typical Exam Questions

There are five questions which may be commonly asked:

1. Label the main features of an aquifer. You should be able to name rocks that commonly form aquifers and those that never do (Fig 1 & 2).
2. Outline the main advantages/disadvantages of groundwater compared to reservoirs (Box on page 1).
3. State the main threats to groundwater and the consequences of using too much of it. (Fig 3 and 5).
4. Outline how an artesian well works (Fig 4).
5. Describe unconfined and confined aquifers (Fig 5).
6. Explain where and why springs form (Fig 5).

Fig 4. An artesian well

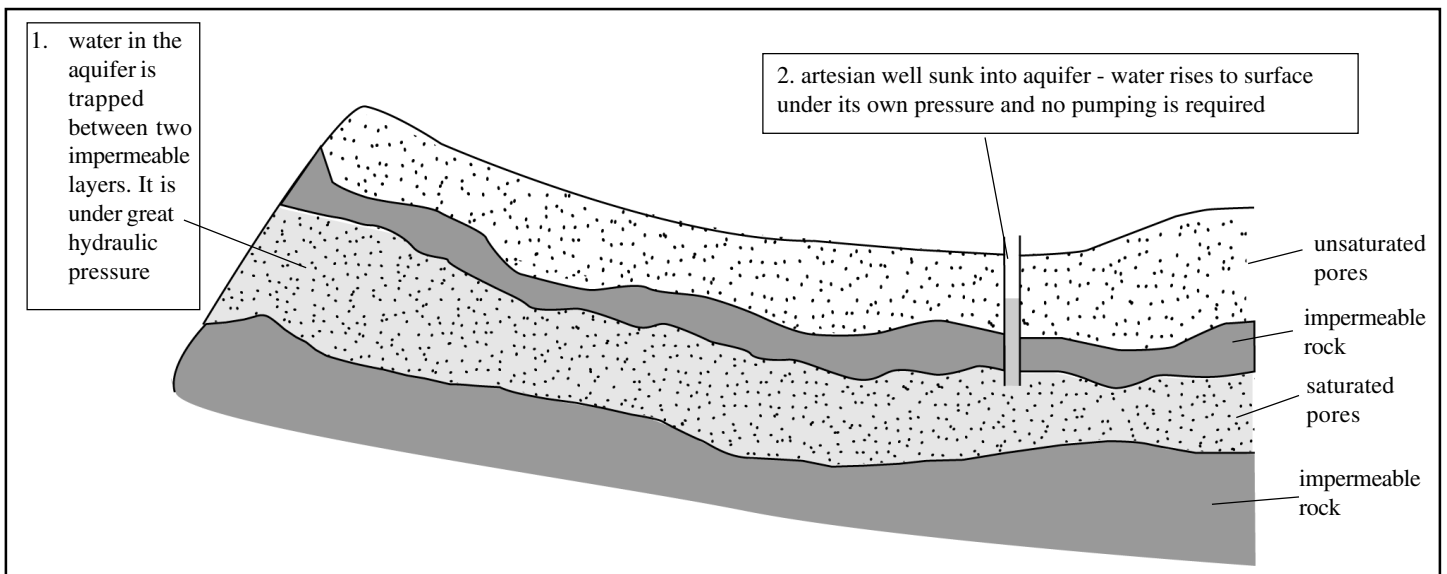


Fig 5. Natural springs

