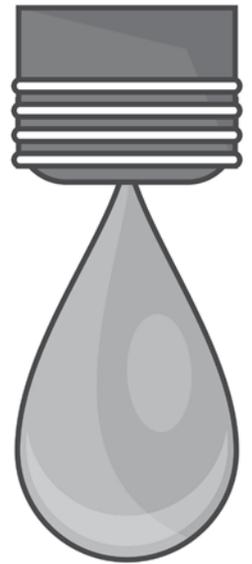


# What are **AQUIFERS**...

*and why do we need them?*



An aquifer is a large underground storage space for clean water that occurs naturally from collected rain or snow. Aquifers are hidden under the ground, so you might be surprised to learn that you depend on them every day. In many countries like Africa, they are the key to survival!



## **QUESTION:**

*Look closely at this young girl, reaching in to fill her bottle with the water just below her. Why would an aquifer be helpful to these thirsty children in Africa?*

---

---

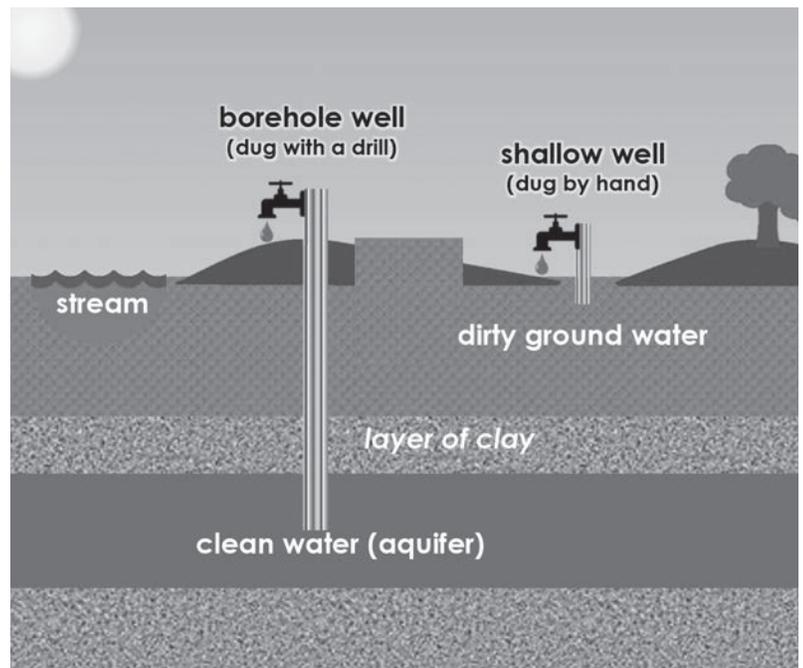
---

---

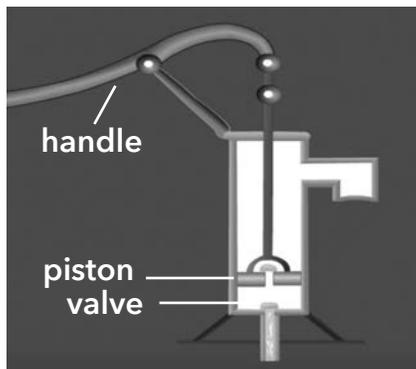
## **Why do we need aquifers?**

The main purpose of an aquifer is to supply clean drinking water. This is done by drilling into the aquifer and installing a well. A well is a hole in the ground from which water can be drawn.

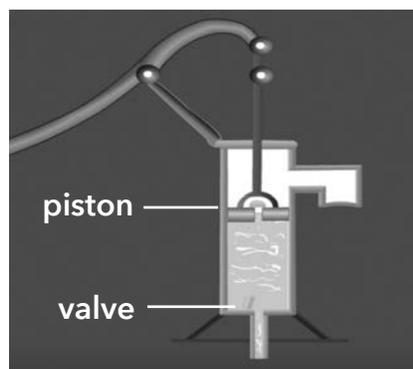
Think of a well as a straw that sucks groundwater up to the surface.



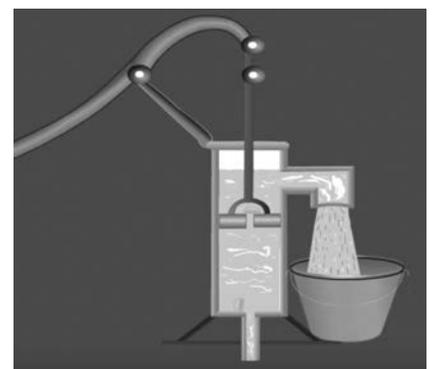
Many wells include a hand pump to get water up to the surface. Here's how it works:



The handle of the pump is moved up and down to take out the air.



When the piston of the pump is moved up, the pressure inside reduces. At the same time the valve at the bottom opens to allow the water to push upwards.



By repeating the process of moving the pump handle up and down, clean water comes out

## What else do aquifers do?

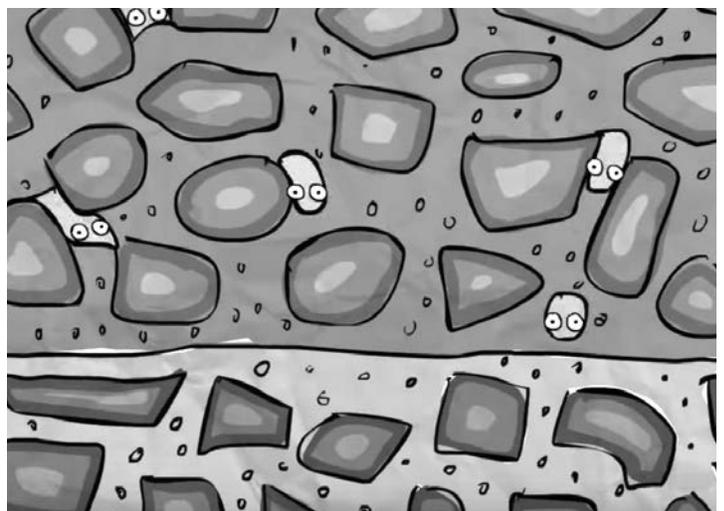
Aquifers not only supply water, but they also act as a filter to clean water.



Have you ever watched someone make coffee? The coffee grounds aren't dropped into the water; instead, they are placed inside a filter. When water runs through the filter, drinkable coffee comes out, while the grounds stay trapped in the filter.

An aquifer works the same way. Dirty water

that contains particles, like debris and bacteria, enters the open spaces of the aquifer. These small spaces allow the water to pass through but trap the other things.



Watch the YouTube video entitled: "What is Groundwater", by KQED Quest.

## QUESTION:

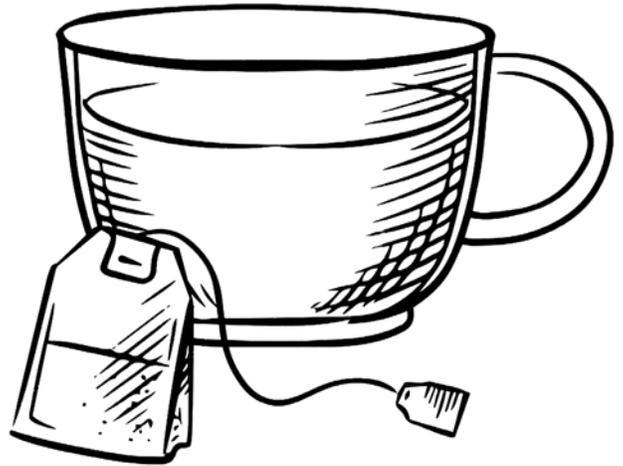
*How is a tea bag like an aquifer?*

---

---

---

---



## What do aquifers look like?

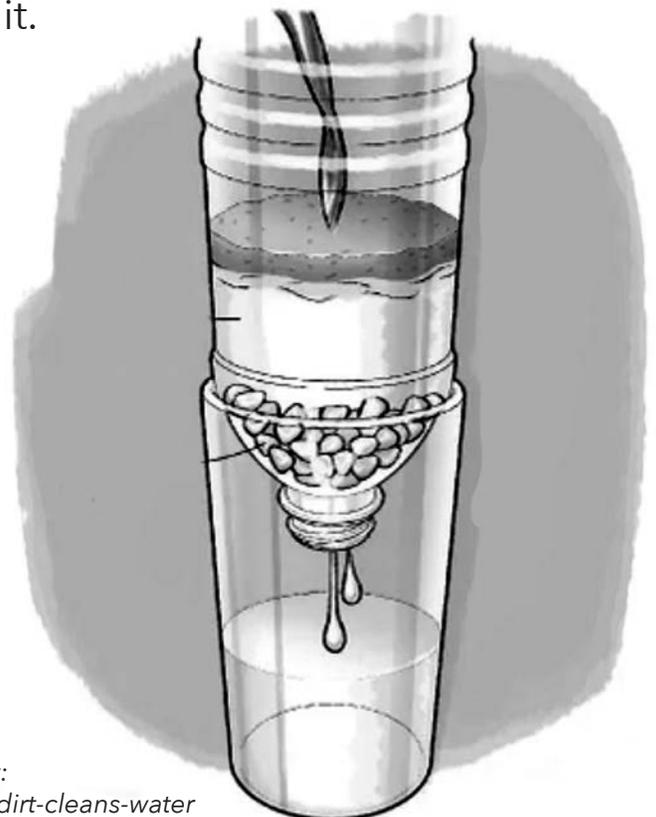


Since an aquifer is underground water, you might picture it looking like an underground river or a water balloon, but an aquifer is more like a sponge than a river or balloon.

Underground water fills small holes and cracks within the rocks, sand, and stones that make up the aquifer. These small openings provide spaces for the water to slowly move through, much like a sponge allows water to pass through it.

For an aquifer to form, the rocks and materials in the ground must be permeable, which means water is able to move through them.

Aquifers are often made up of permeable rocks, like sandstone, or loose materials, like sand and gravel. An aquifer can be made up of more dense or thick rocks as long as those rocks have cracks or channels through them where water can pass.



Learn more about permeable materials at:  
[www.scientificamerican.com/article/how-dirt-cleans-water](http://www.scientificamerican.com/article/how-dirt-cleans-water)



## How do you find an aquifer?

It's important to find a good aquifer before drilling a hole for a well. New technology allows drillers to generate sound waves that are recorded through the audio jack of a cell phone. These sound waves help locate the deepest aquifers that lie below the ground.

## Aquifers help save lives.

3.4 million people die every year from scarce and contaminated water, and sadly, most of these deaths represent children. Using the technology of The Village Drill and water location software, WHOlives, a non-profit organization helps families in Africa and other countries construct clean water wells.



## QUESTION:

*How might the people in these photos use the water might they pump to the surface from an aquifer?*

---

---

---

---