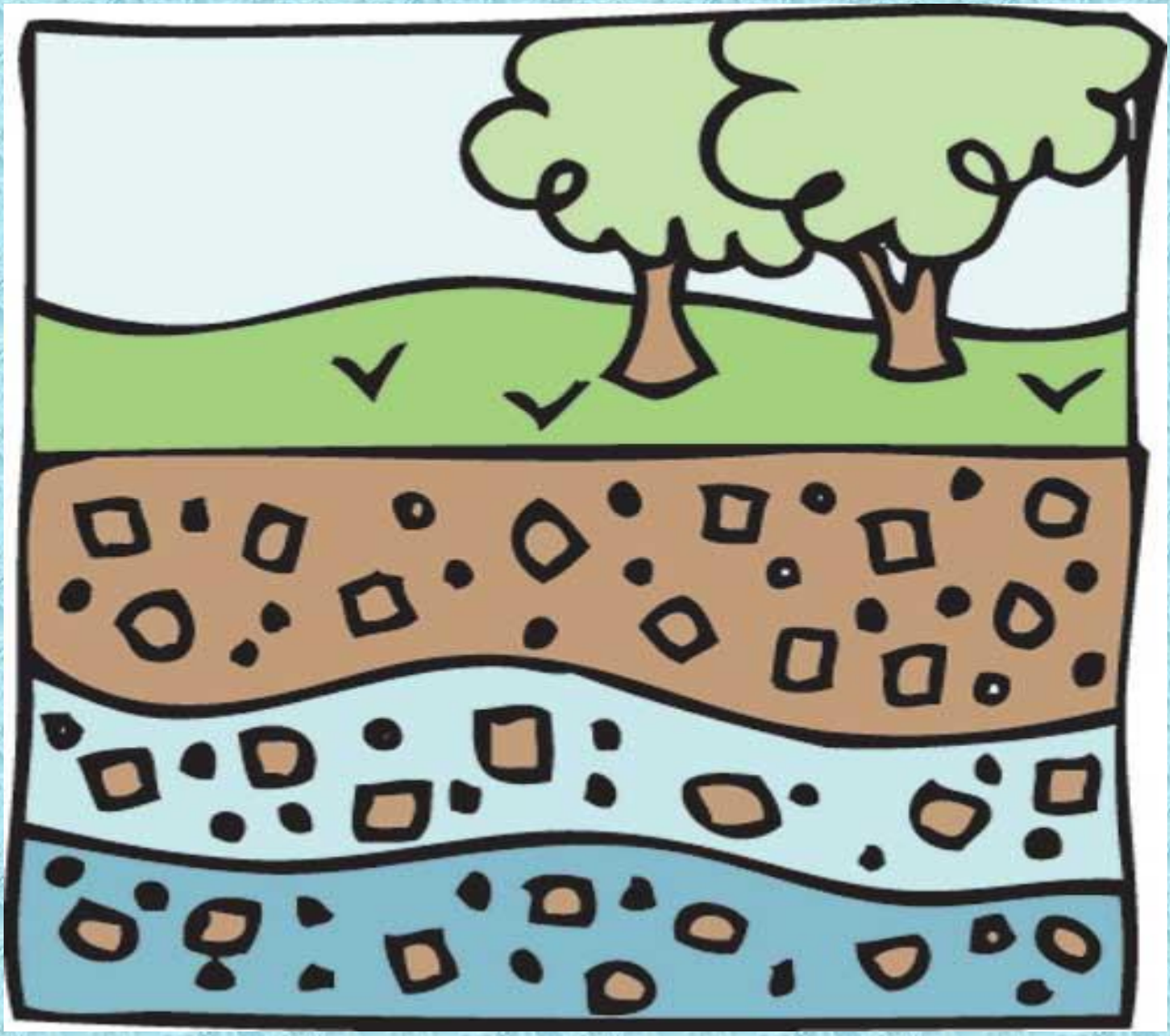
Ground Water Hydrology



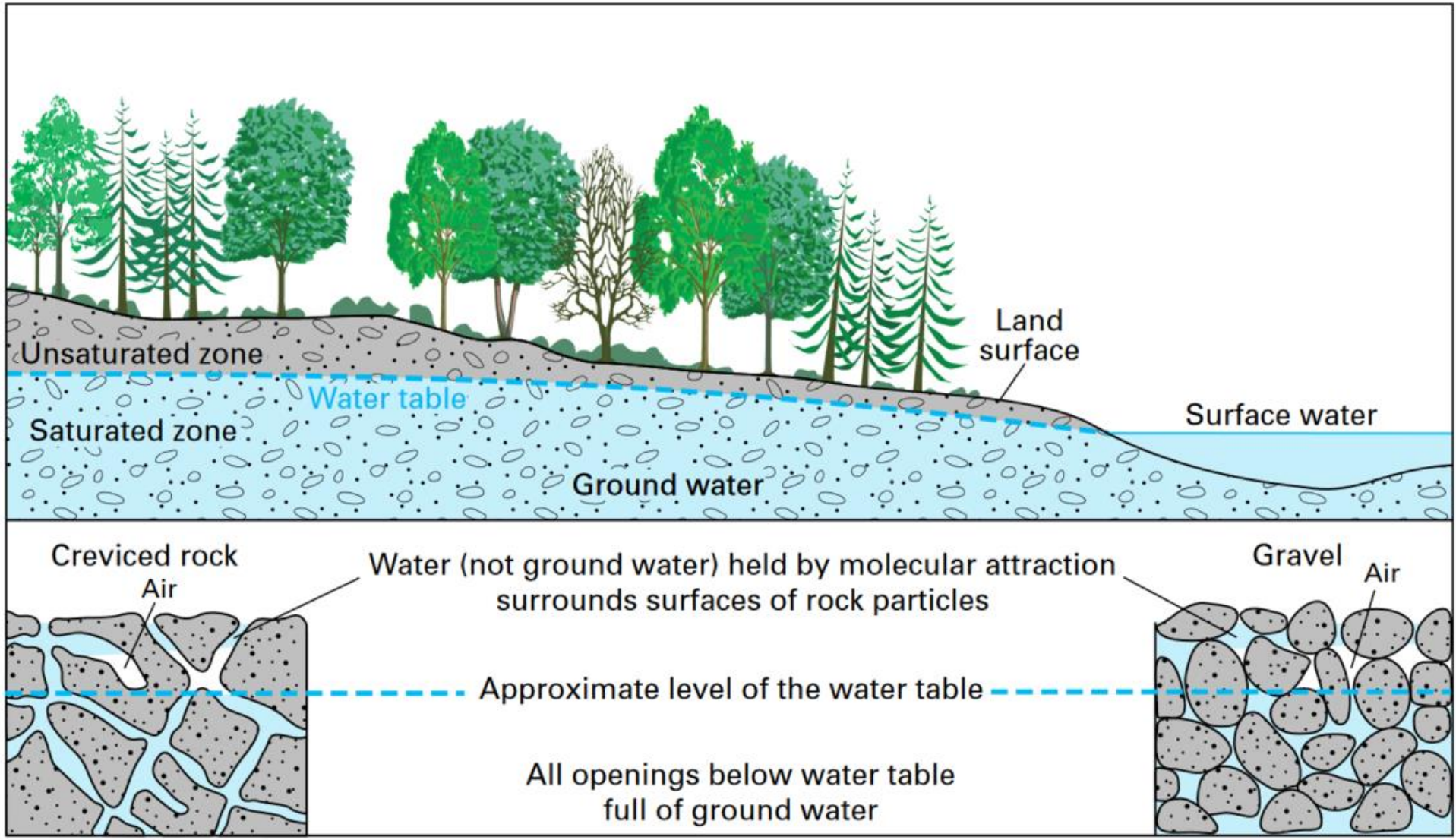
Runoff

- Water running along Earth's surface because it cannot enter the ground
- Reasons:
  - It is raining faster than water can infiltrate
  - Ground is saturated (cannot hold any more, its full)
  - Ground is impermeable (solid rock, concrete, asphalt)
  - Ground is frozen (frozen ground is impermeable)
  - Ground has little or no vegetation (plants)
  - Ground has steep slope or gradient (water can't remain in place long enough to soak in)

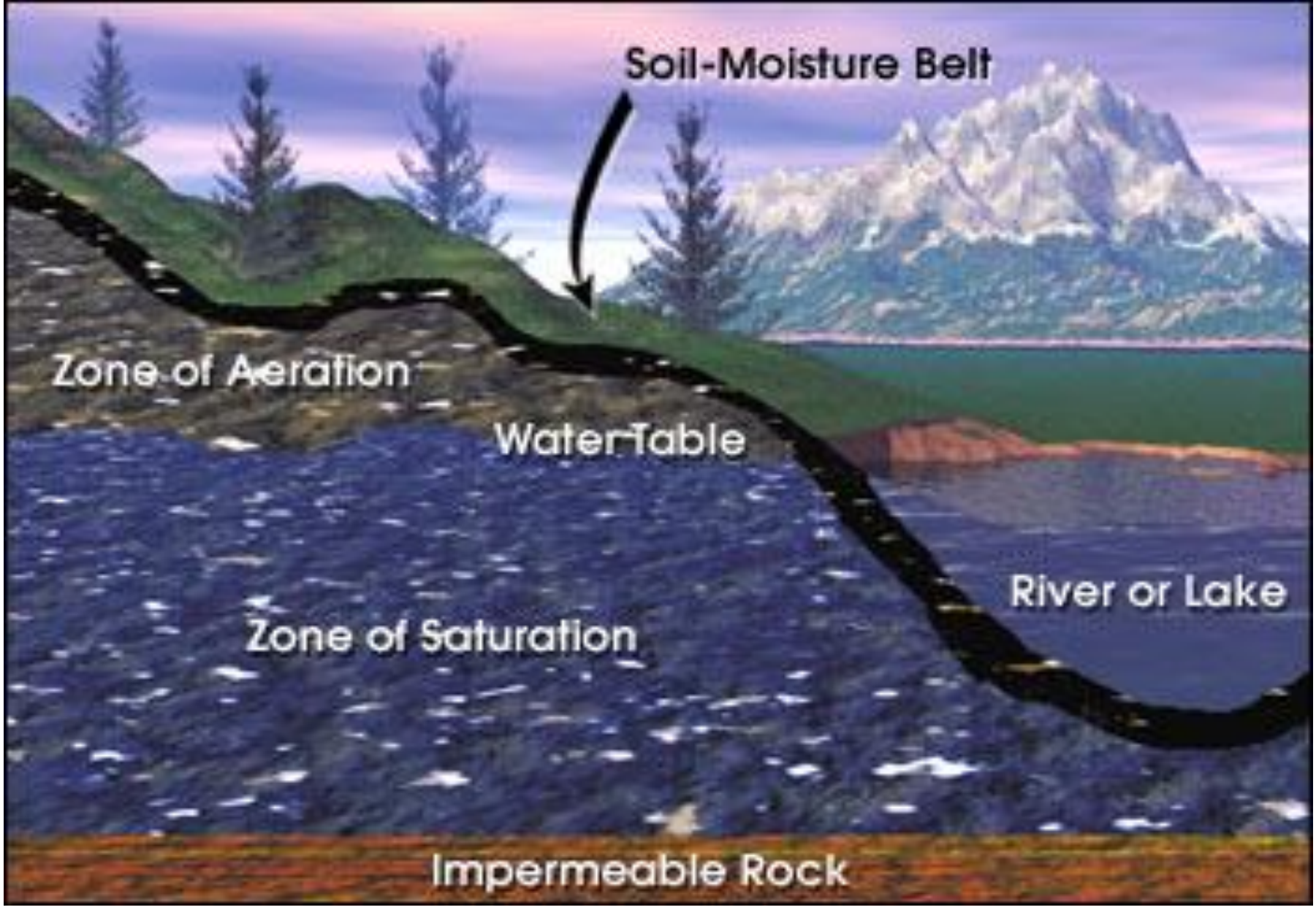
Infiltration (also known as Percolation)

- Water is absorbed by the ground
- Reasons:
  - Infiltration rate is faster than precipitation
  - Ground is unsaturated (room to hold water)
  - Ground is permeable
  - Ground is covered by vegetation (plants)
    (the plants and their roots slow down runoff allowing more water to soak into the ground)
  - Ground is flat or gentle slope
    (water will not flow down hill, so it will stay in place to either soak into the ground or evaporate)

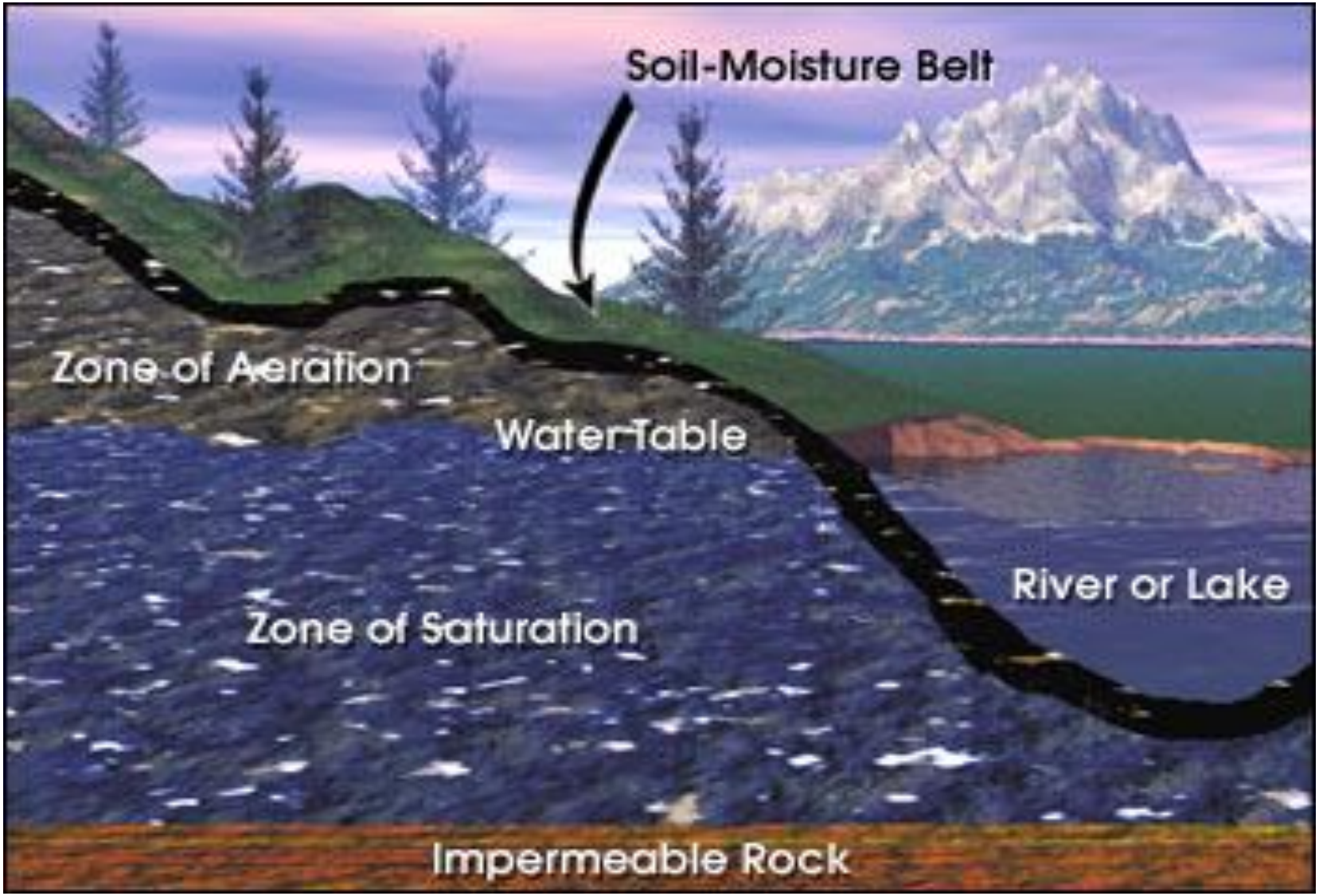
Earth's Groundwater System and Surface Water System



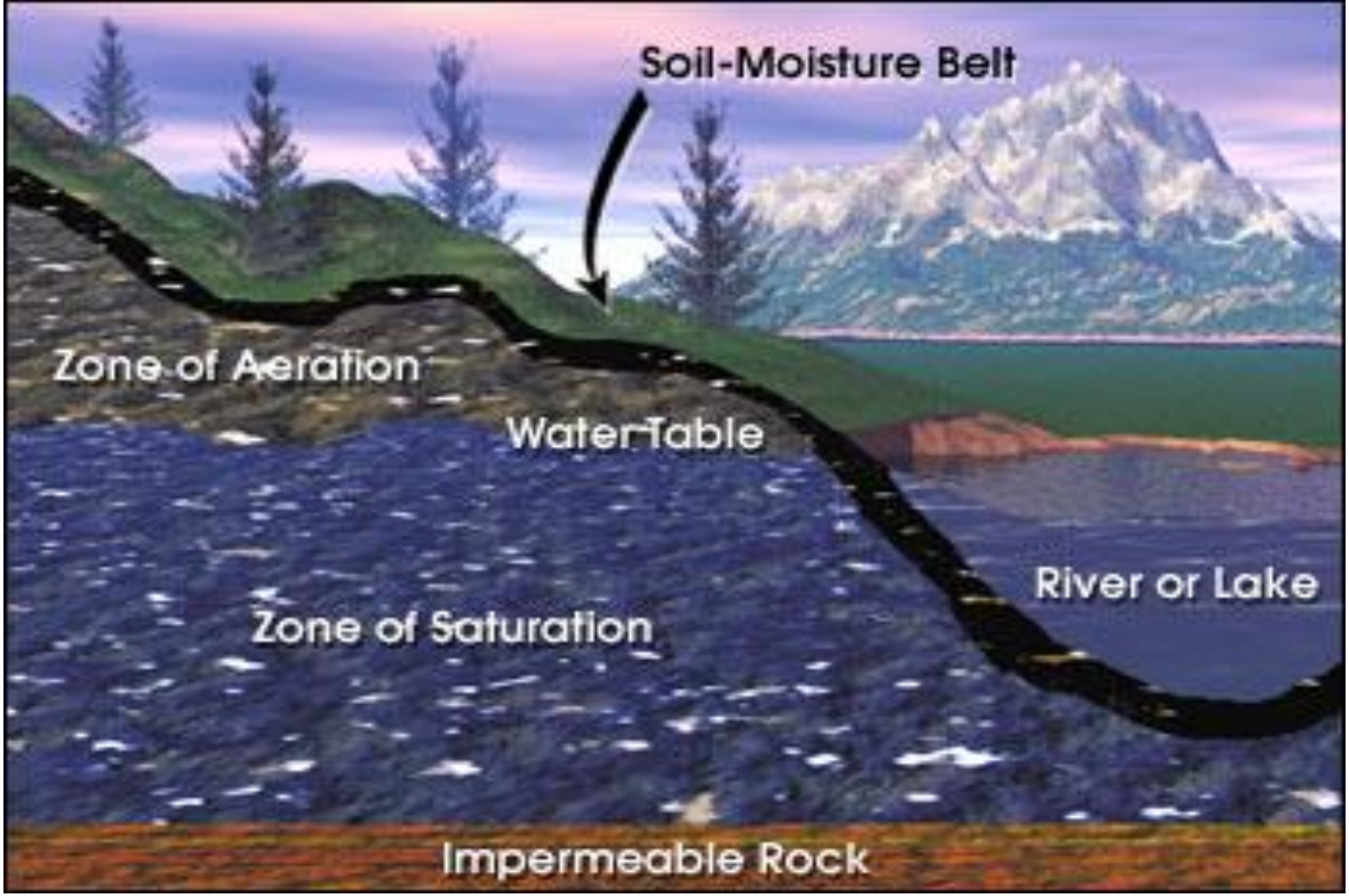
How ground water occurs in rocks.



Rainwater infiltrates downward until it reaches impermeable bedrock where water cannot pass through



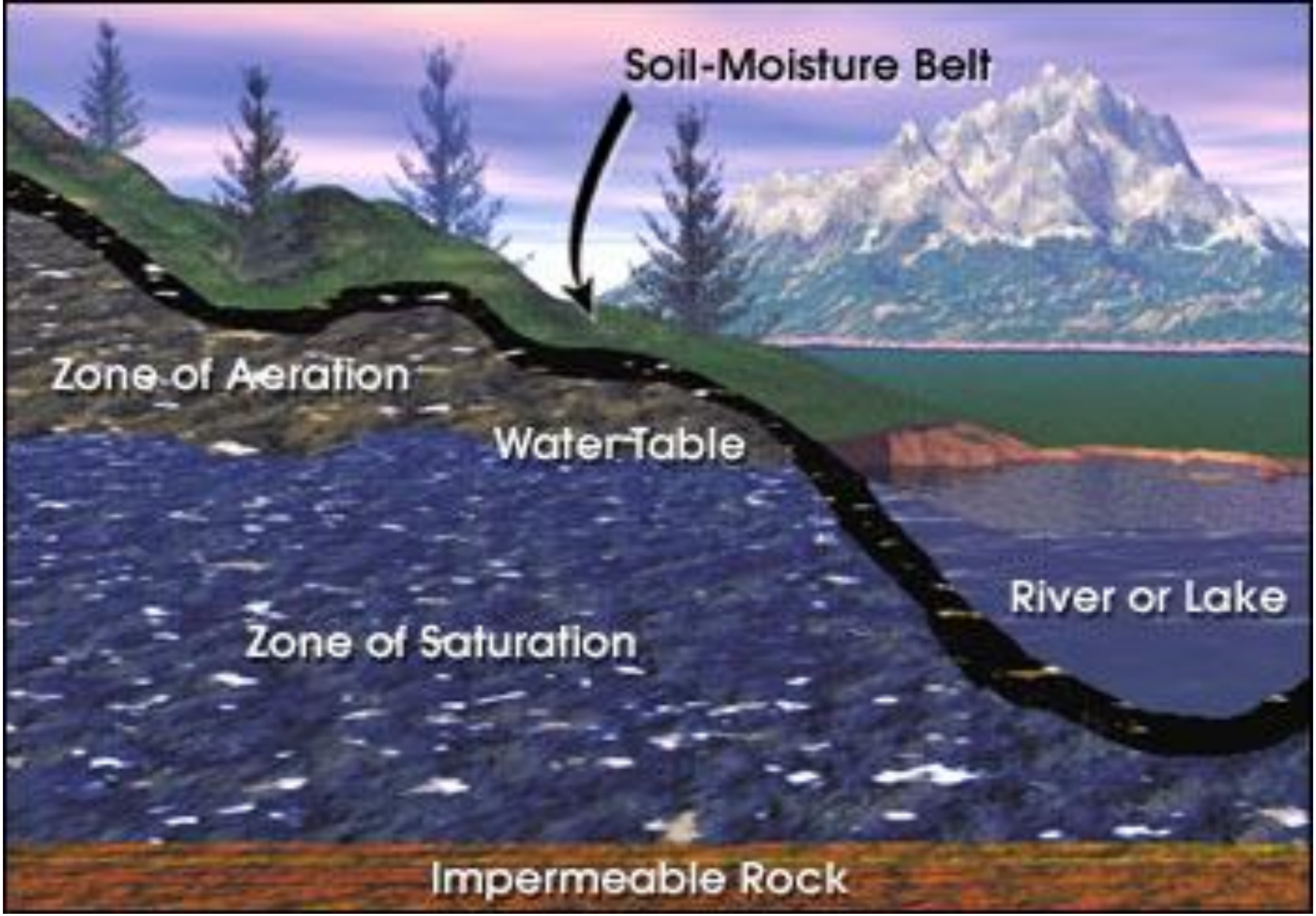
Zone of saturation: ground water collects and is stored in this zone because it cannot penetrate the impermeable bedrock below.



Water table: the upper surface of the zone of saturation.

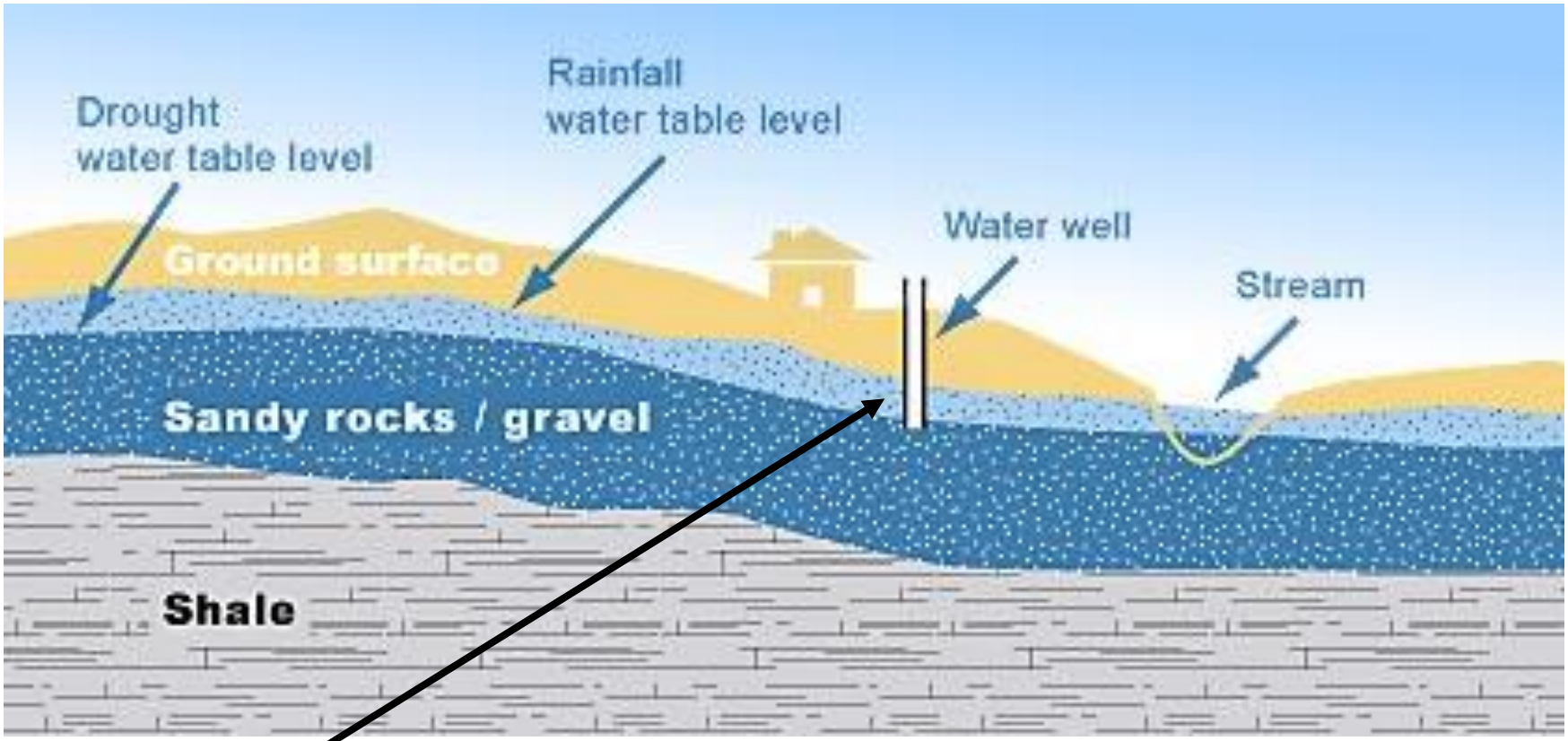
When it rains a lot, water table is high (closer to surface).

When there is a drought, or too much water is pumped out, it is low.



Zone of aeration: water is able to infiltrate this soil because the pore spaces are filled with air. (Unsaturated)

You can see here how the water table is higher in the rainy season, and lower in the dry season.

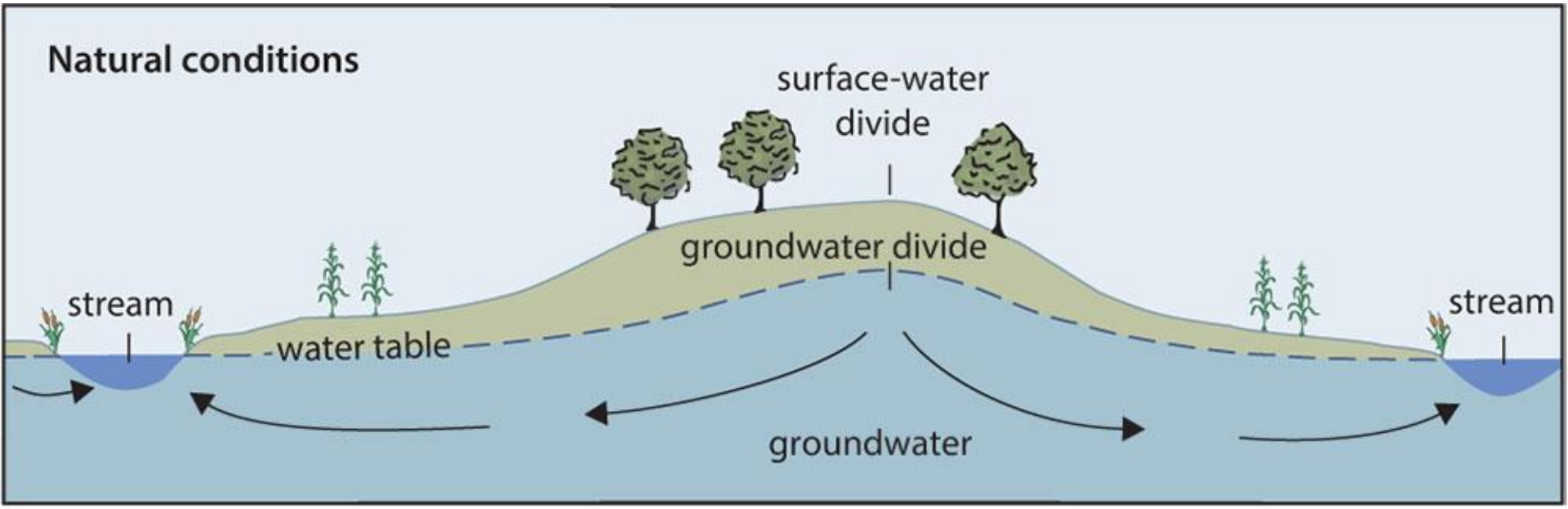


Water Well:

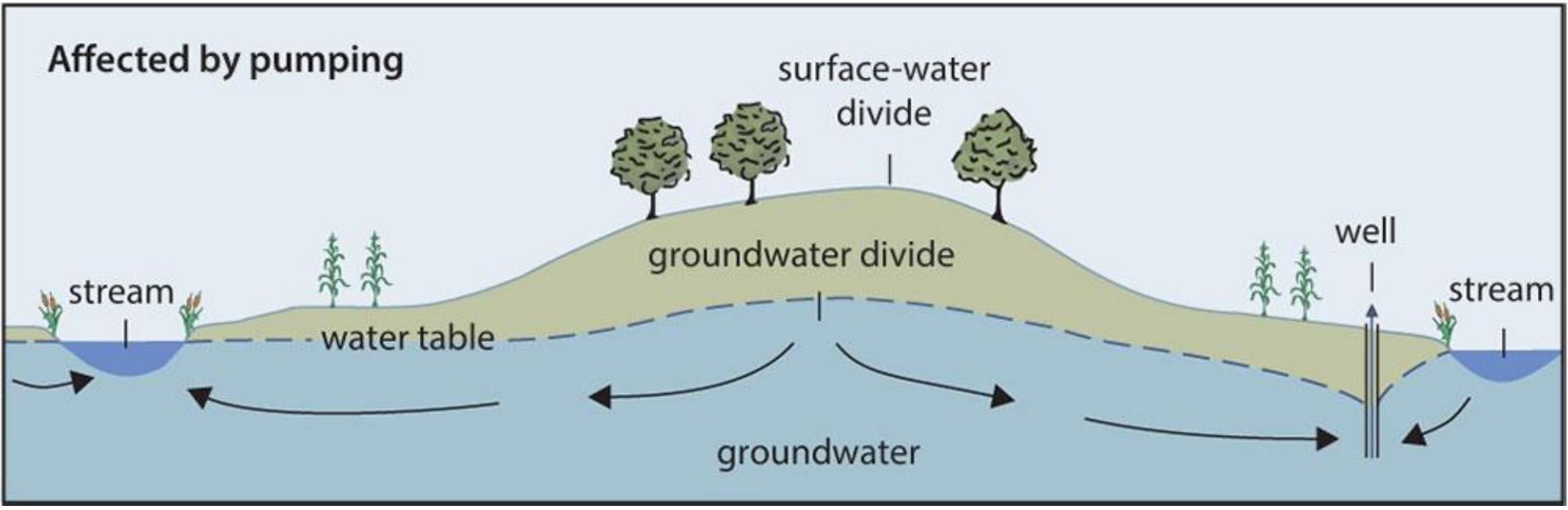
If you dig deep enough below the water table you can make a well.

The well will fill up with water due to the differences in pressure.

Runoff on Earth's surface runs downhill

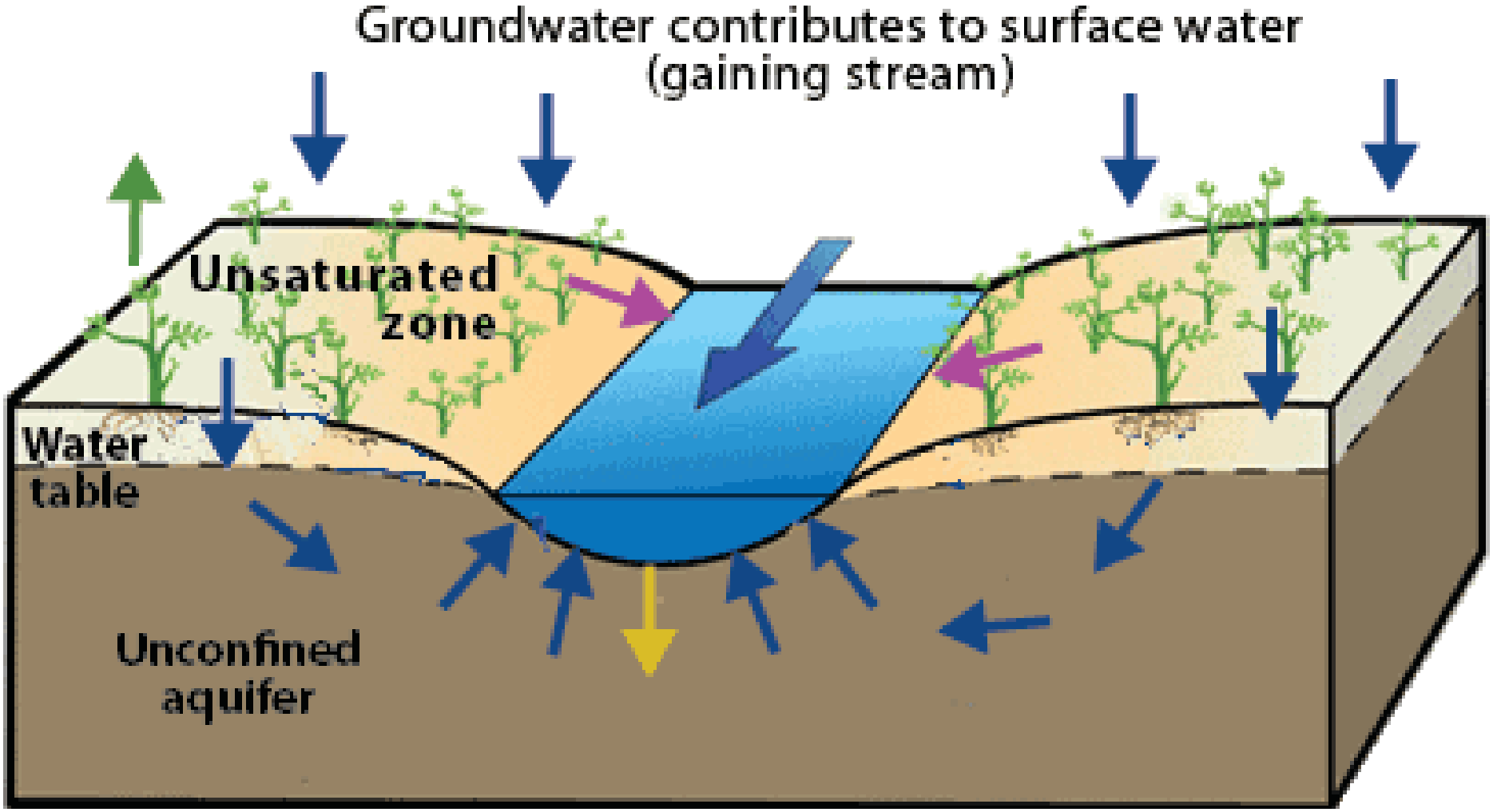


Ground Water also flows downhill



You can see how the well causes the water table to be lower where water is pumped out

Streams flow even when it isn't raining. This is because water is being added to the stream from the ground water. The water table is higher than the bottom of the stream bed. The same condition exists in natural lakes and man-made wells.

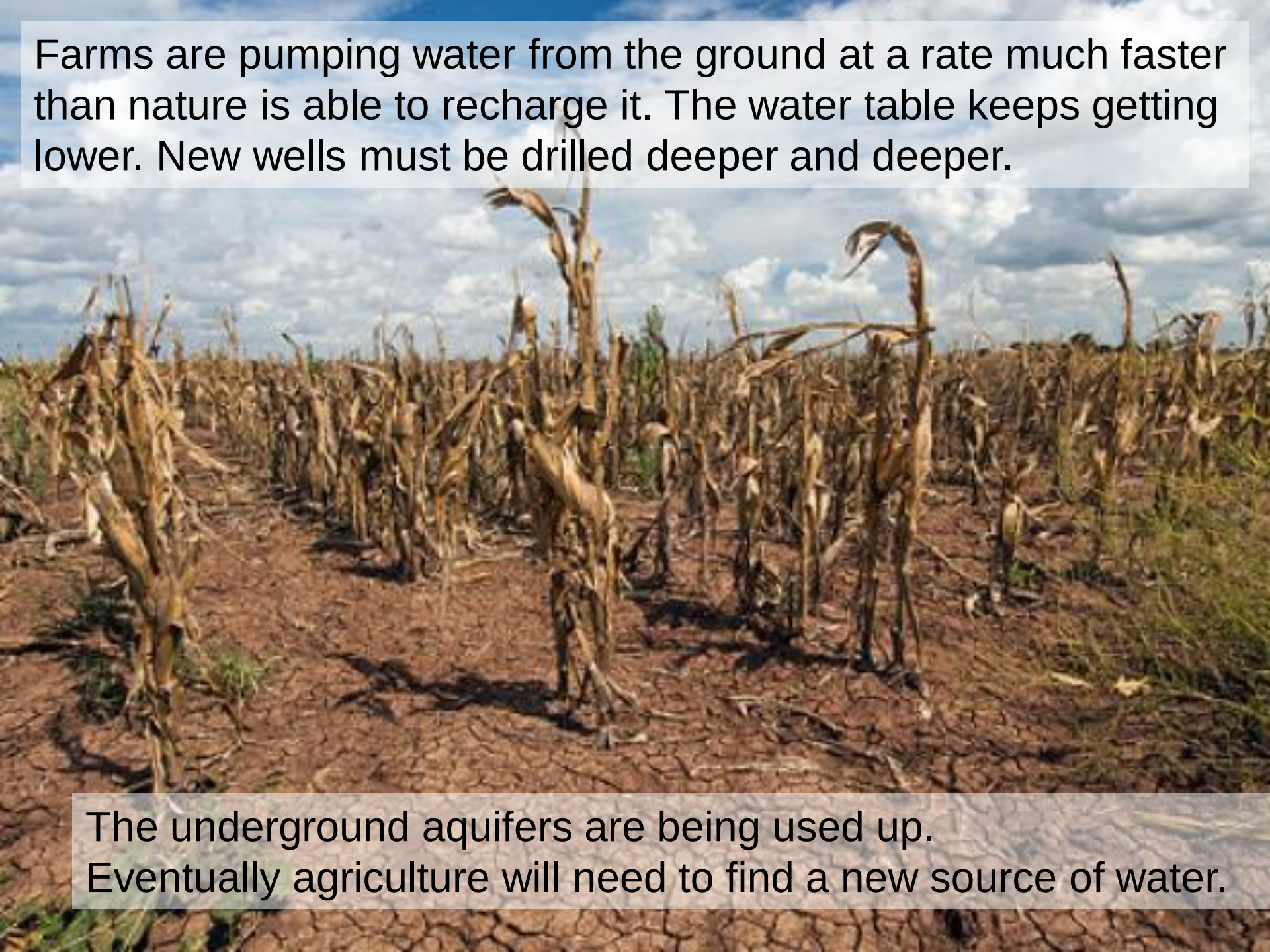


If the water table drops below the bottom of the stream bed then the river may dry up.

Over 70% of Earth's fresh water supply goes towards agriculture

Farms are pumping water from the ground for irrigation

Farms are pumping water from the ground at a rate much faster than nature is able to recharge it. The water table keeps getting lower. New wells must be drilled deeper and deeper.



The underground aquifers are being used up.
Eventually agriculture will need to find a new source of water.

But we don’t HAVE-TO run out of fresh potable water!

We can save our precious water through creative sustainable agricultural practices.

Now that you have viewed the notes slides, check out the fact sheet:

What is Ground Water?

and

More About The Hydrological Cycle