

# **Exploring Geology**

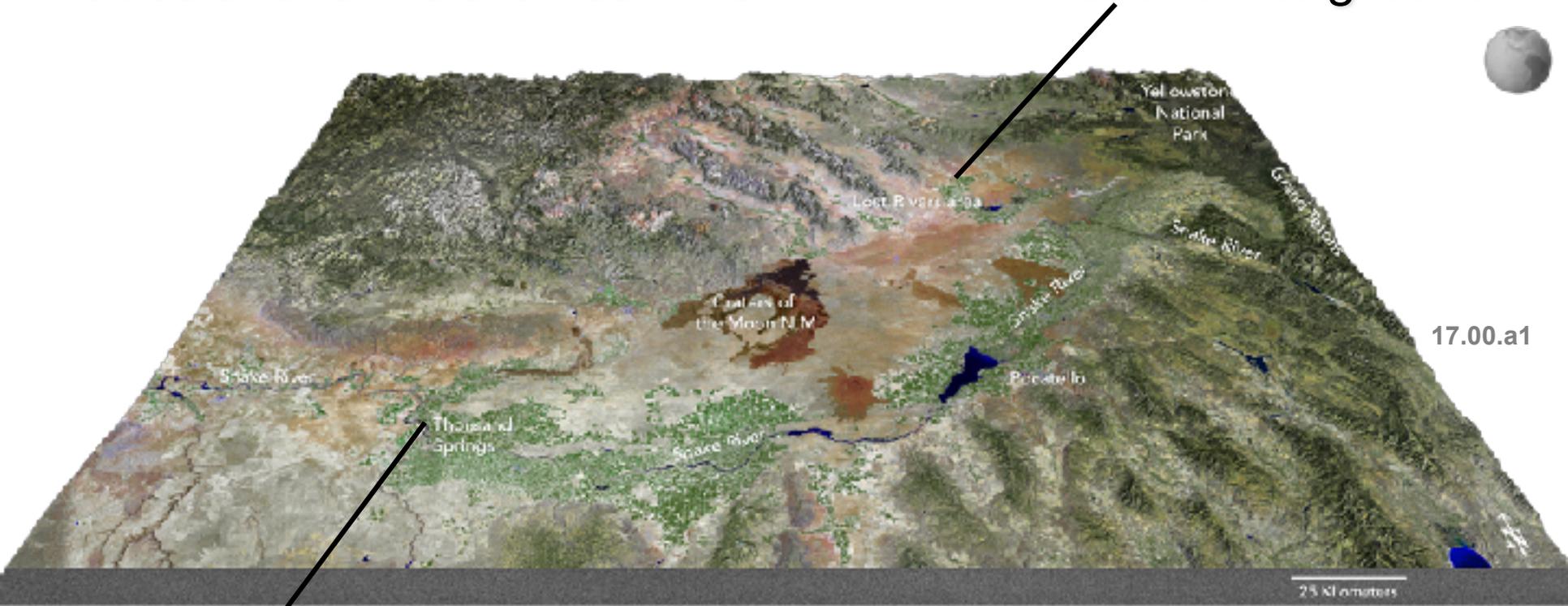
## **Chapter 17**

### **Water Resources**

# Snake River Plain, Southern Idaho

Snake River flows southwest; most cities and farms are near river

Water from rivers soaks into ground



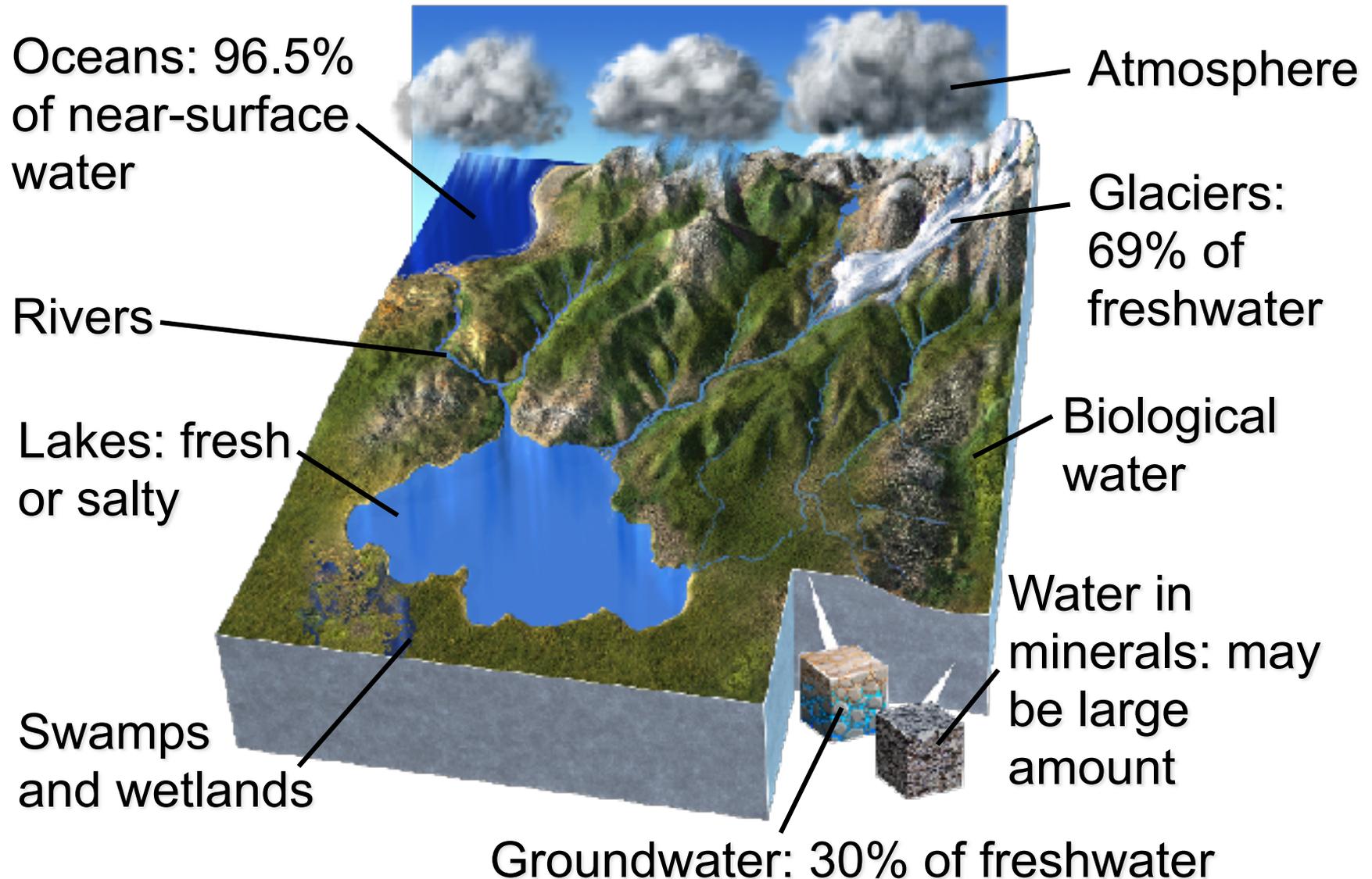
Water re-emerges in Thousand Springs area

*How does water move between the surface and subsurface?*

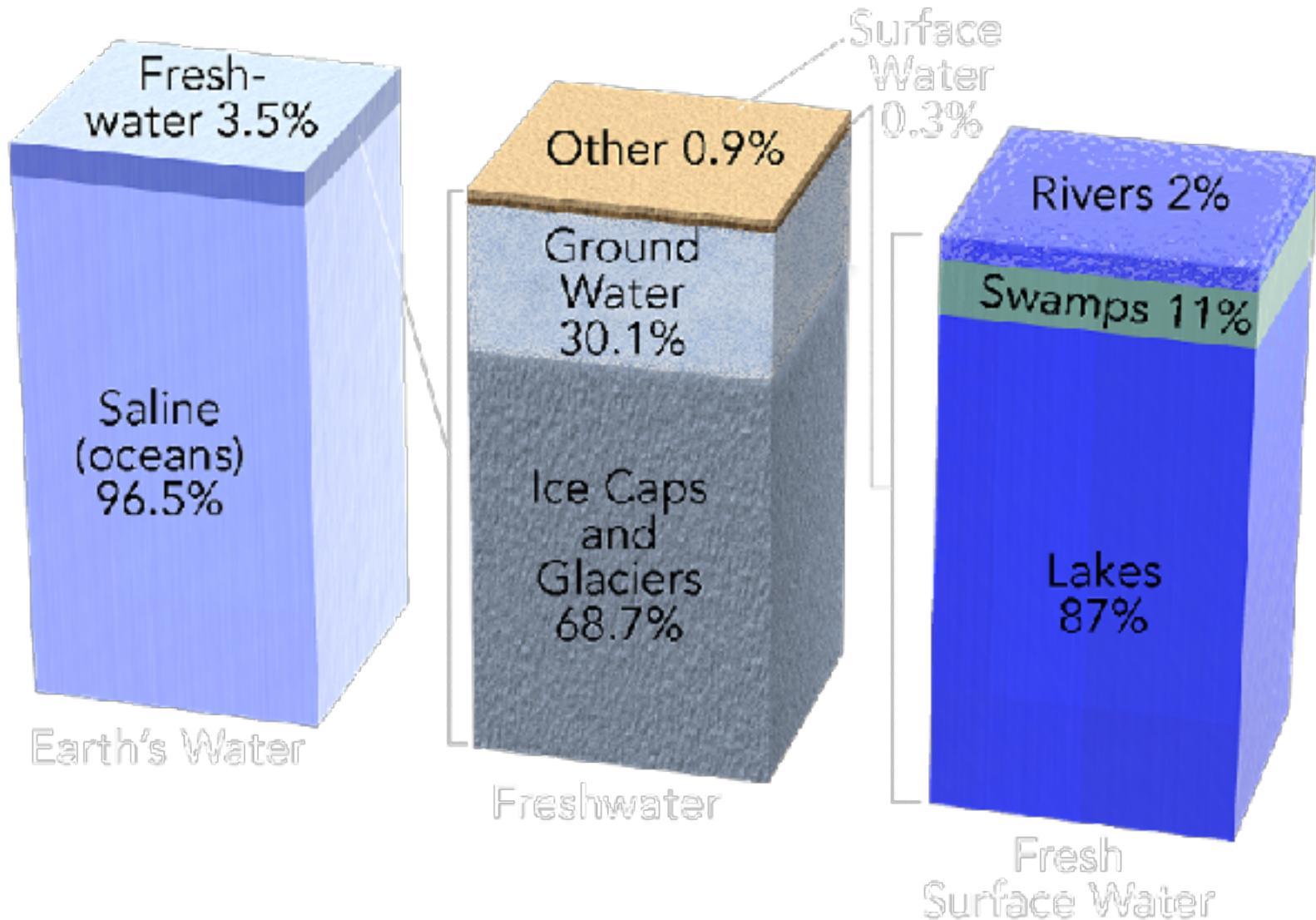


# Settings of Earth's Water

*Observe all the places where water is present*

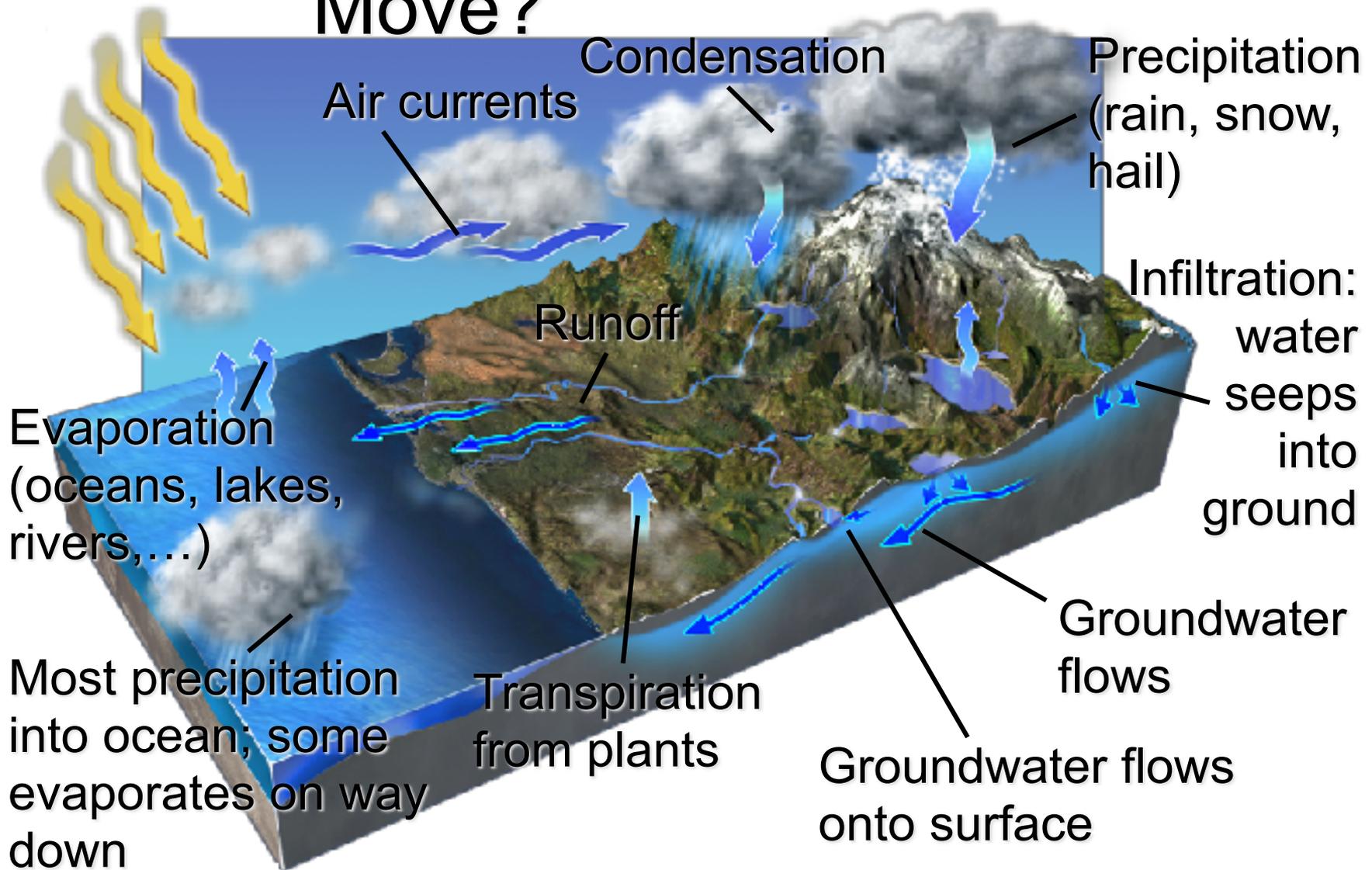


# Distribution of Water



# How Does Water Move?

*Observe how water moves between settings*

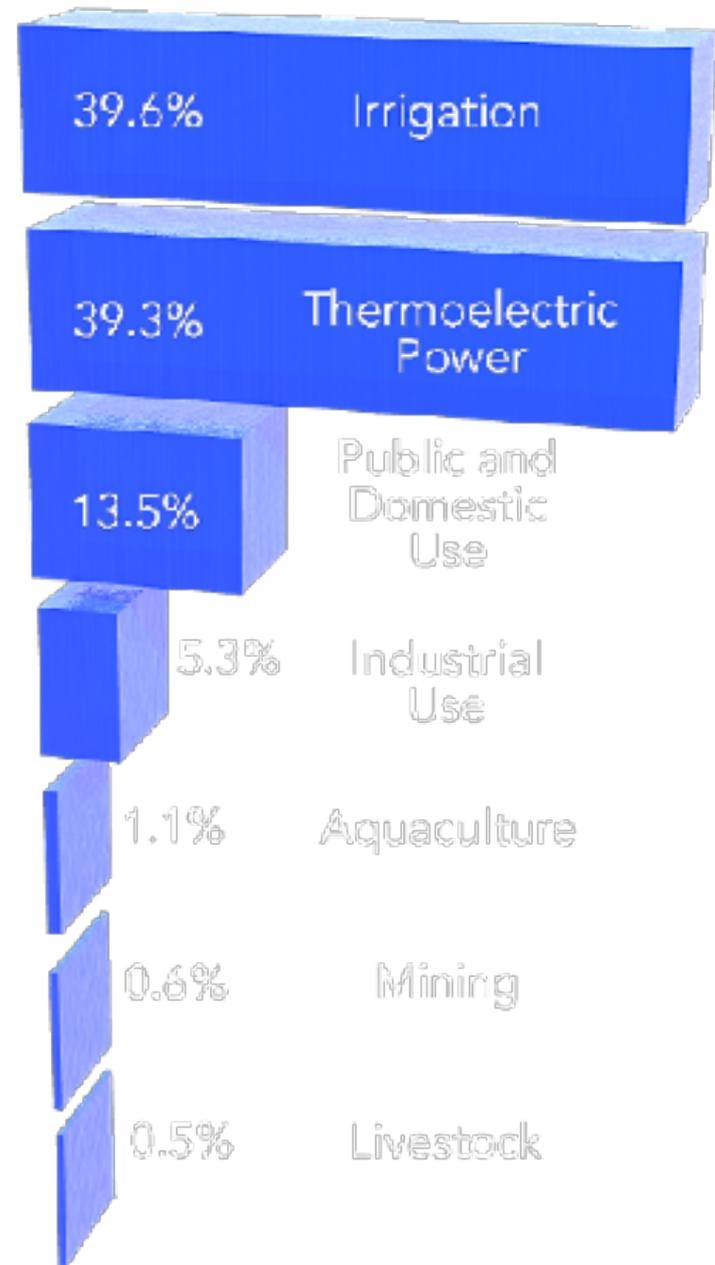


# Water Use in U.S.



Some water is used and then returned to system, so not “used up”

## Freshwater Usage



# Measuring Volumes of Water



Acre-foot: amount of water to cover one acre (nearly a football field) to a depth of 1 foot

- *What are some settings where water is present underground (groundwater)?*
- *Draw a simple sketch of your thoughts*

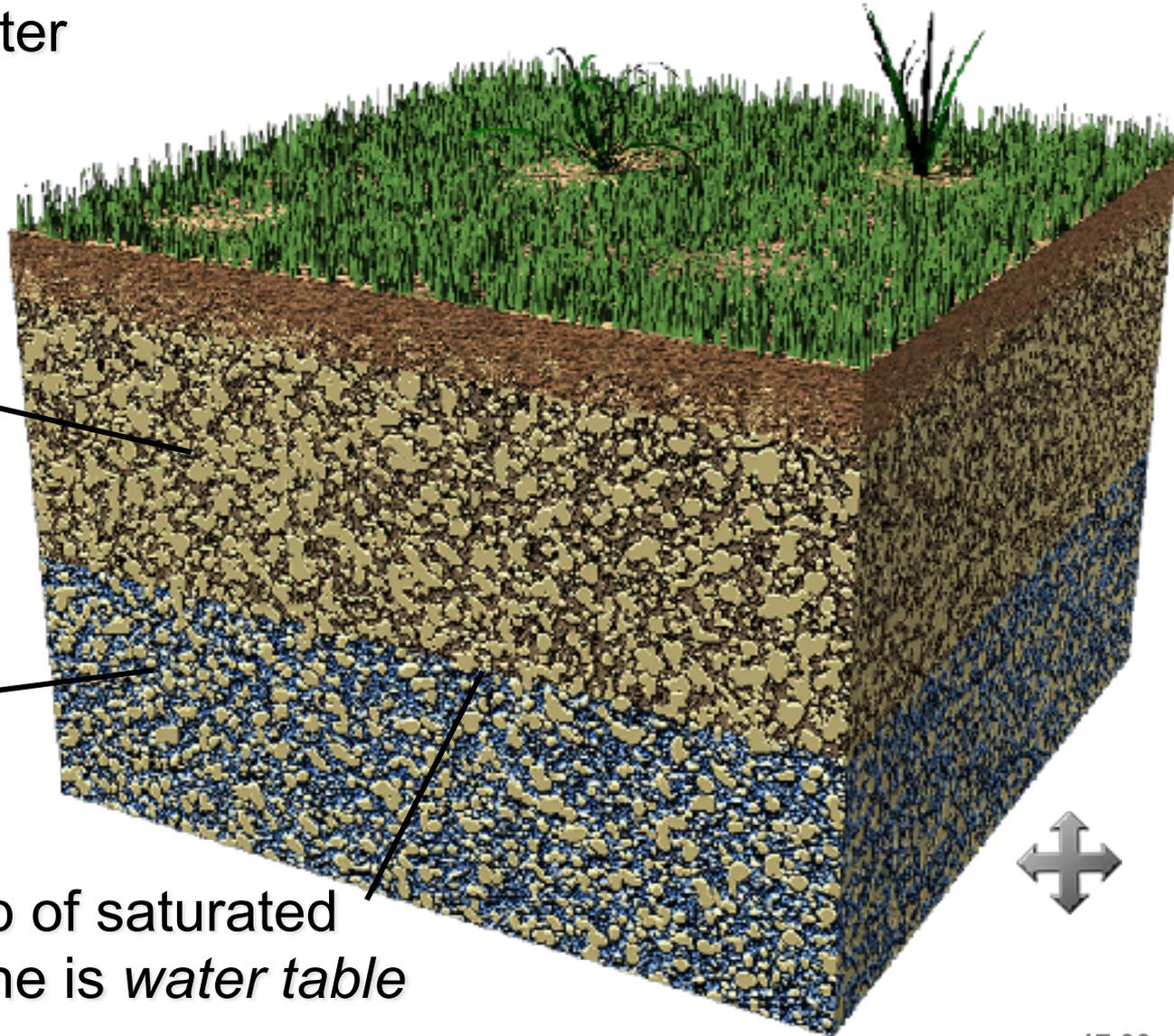
# Groundwater Between Grains

Most groundwater  
in *pore spaces*  
between grains  
and clasts

Pores in upper  
parts generally  
unsaturated

Below, pores  
saturated with  
groundwater

Top of saturated  
zone is *water table*

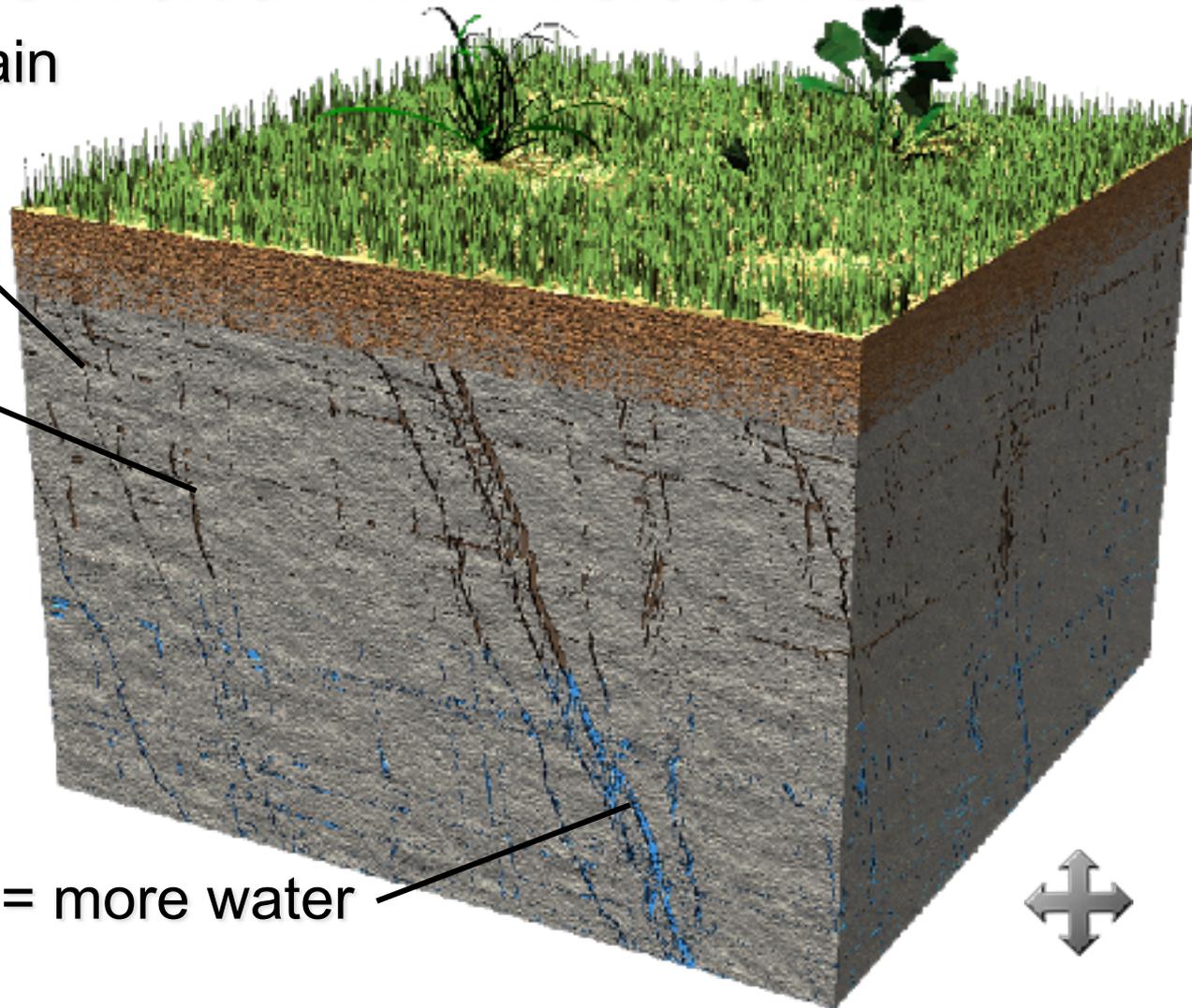


# Groundwater in Fractures

*Fractures* can contain groundwater

May be the only pathways for water, if interconnected

More fractures = more water

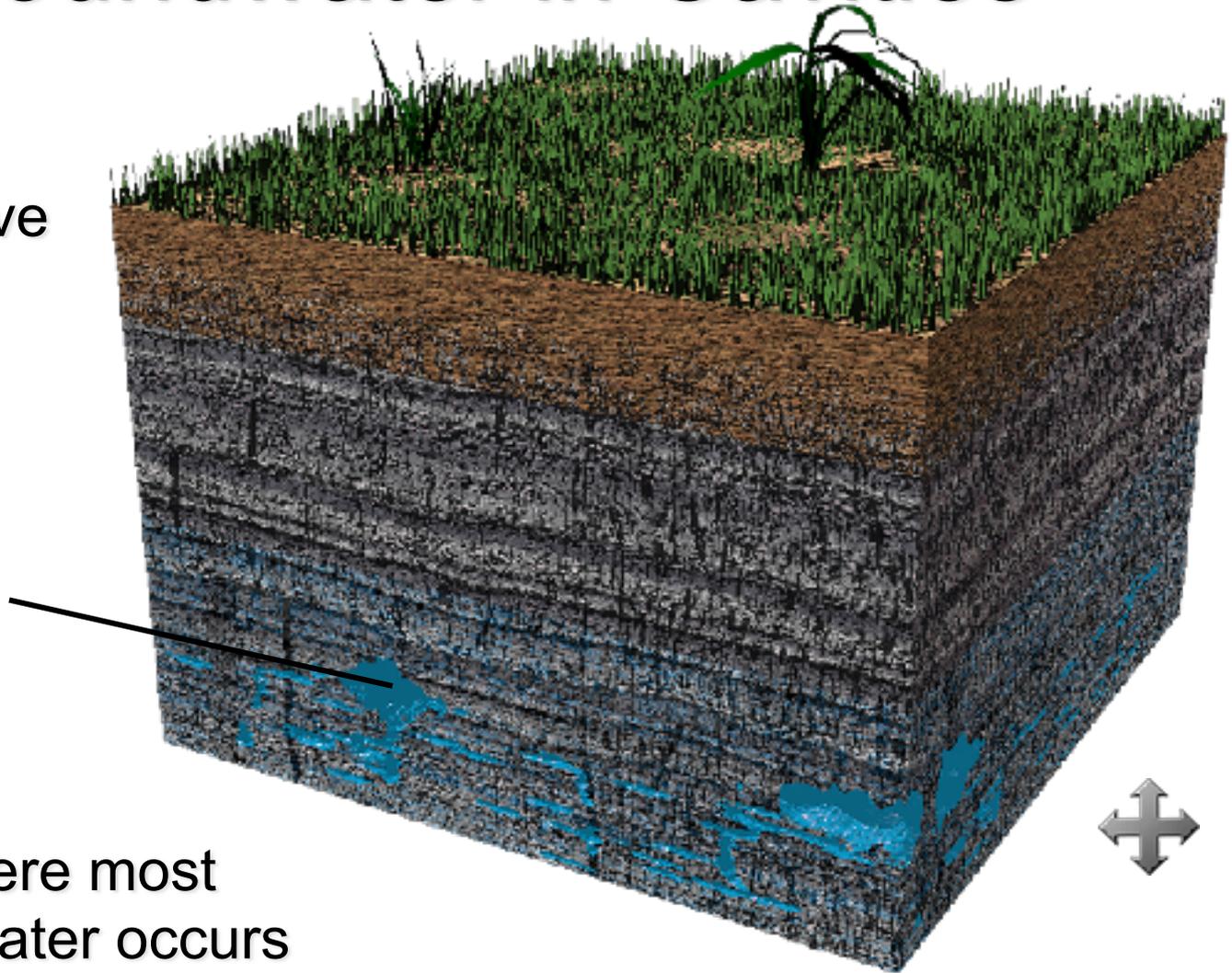


# Groundwater in Cavities

Some rocks,  
especially  
limestone, have  
*cavities*

Cavities can  
contain  
groundwater

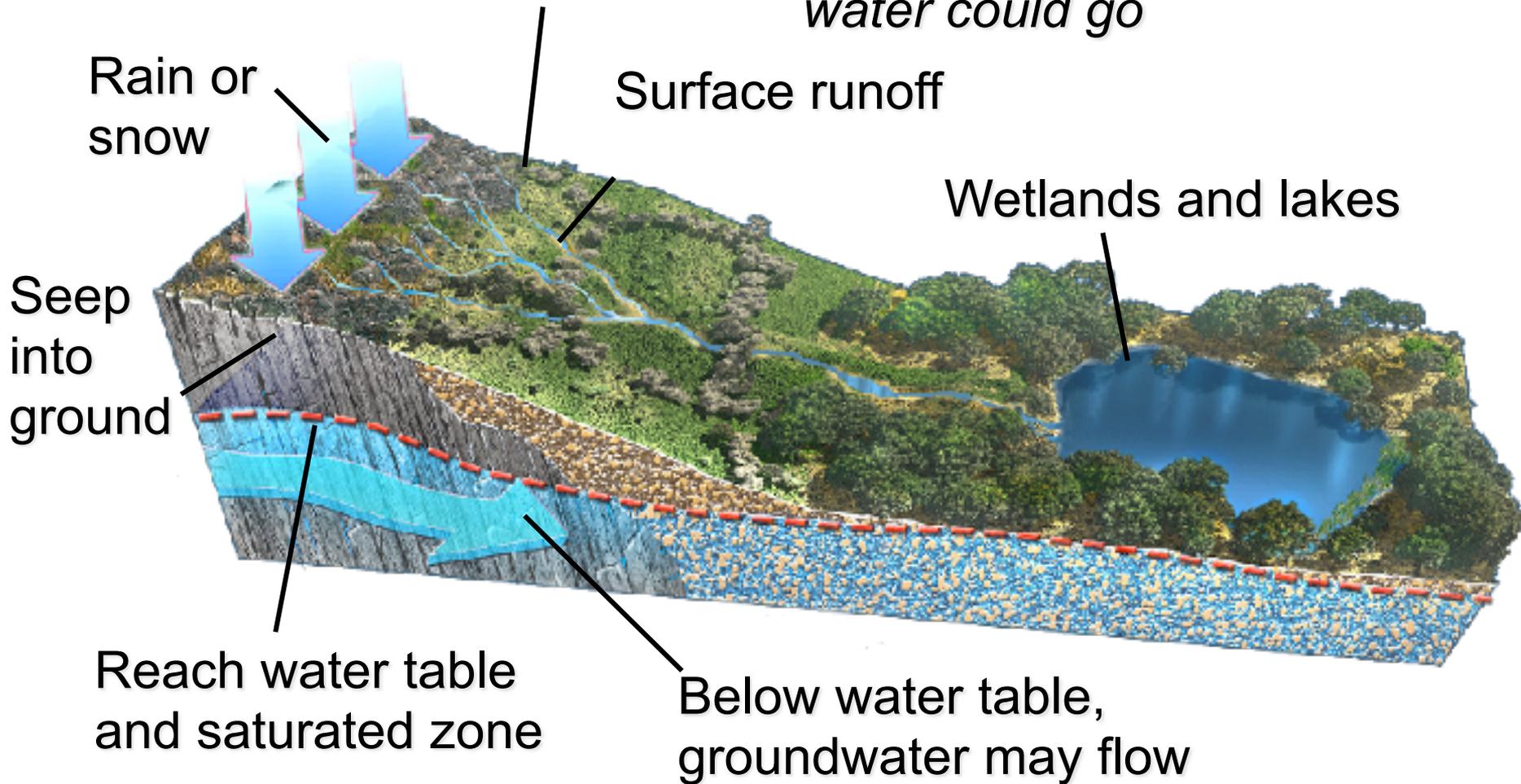
NOT where most  
groundwater occurs



# How Does Groundwater Accumulate?

Rain or snowmelt can evaporate or used by plants

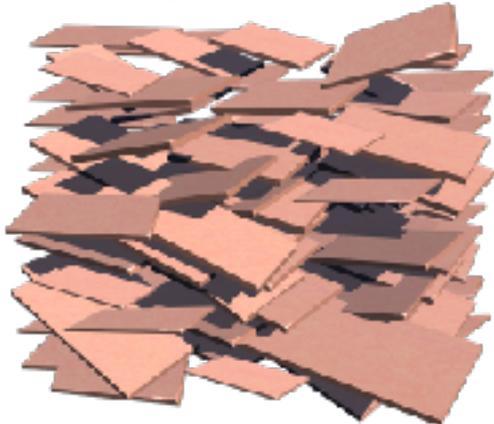
*Observe this figure and note all the places where water could go*



# Porosity: Proportion of Open

Space  
Which of the following have lower porosity and which have higher porosity?

High porosity



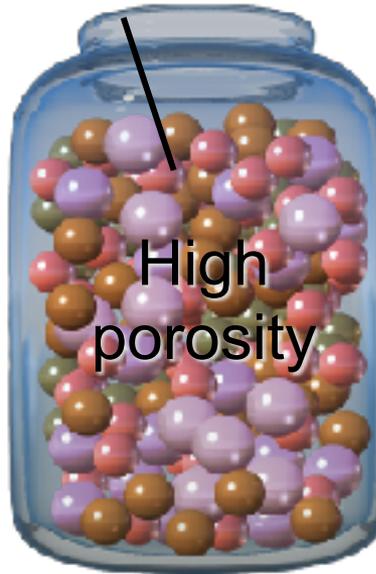
Clay particles do not fit tightly

Crystals in granite fit tightly

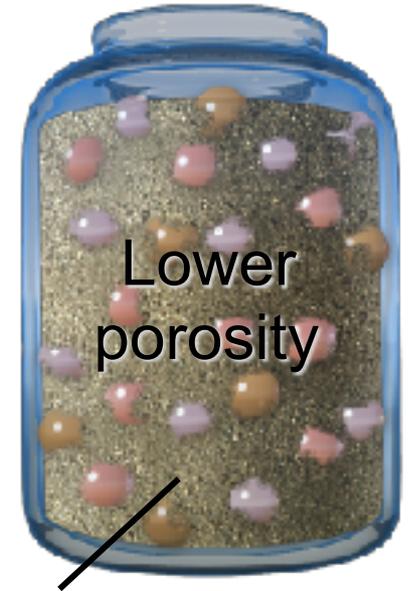


Low porosity

Rounded, sorted clasts do not fit tightly



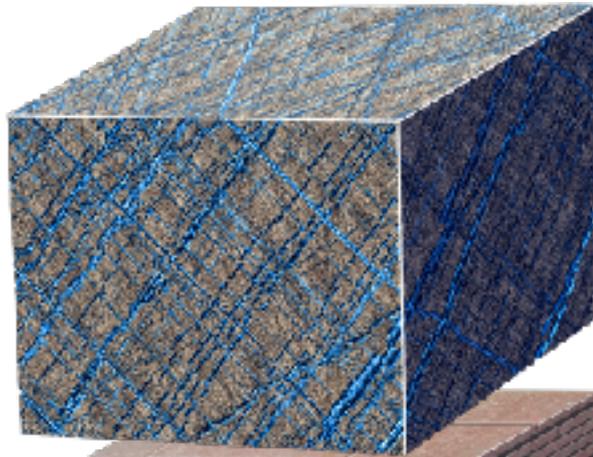
Poorly sorted clasts fit more tightly



# Permeability: Pores Connected So

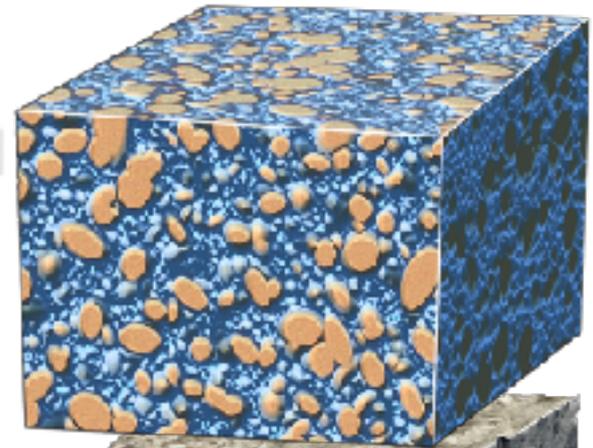
Fluids Flow  
Which of the following have lower permeability and which have higher permeability?

Higher permeability



Granite with many fractures

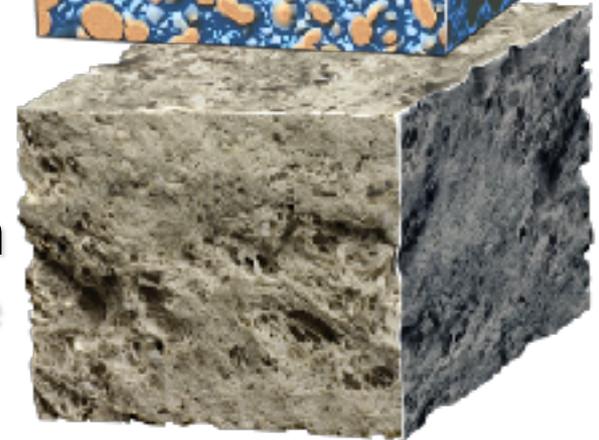
High permeability



Loosely cemented gravels



Compacted clay (shale)



Porous volcanic rock with separate pores

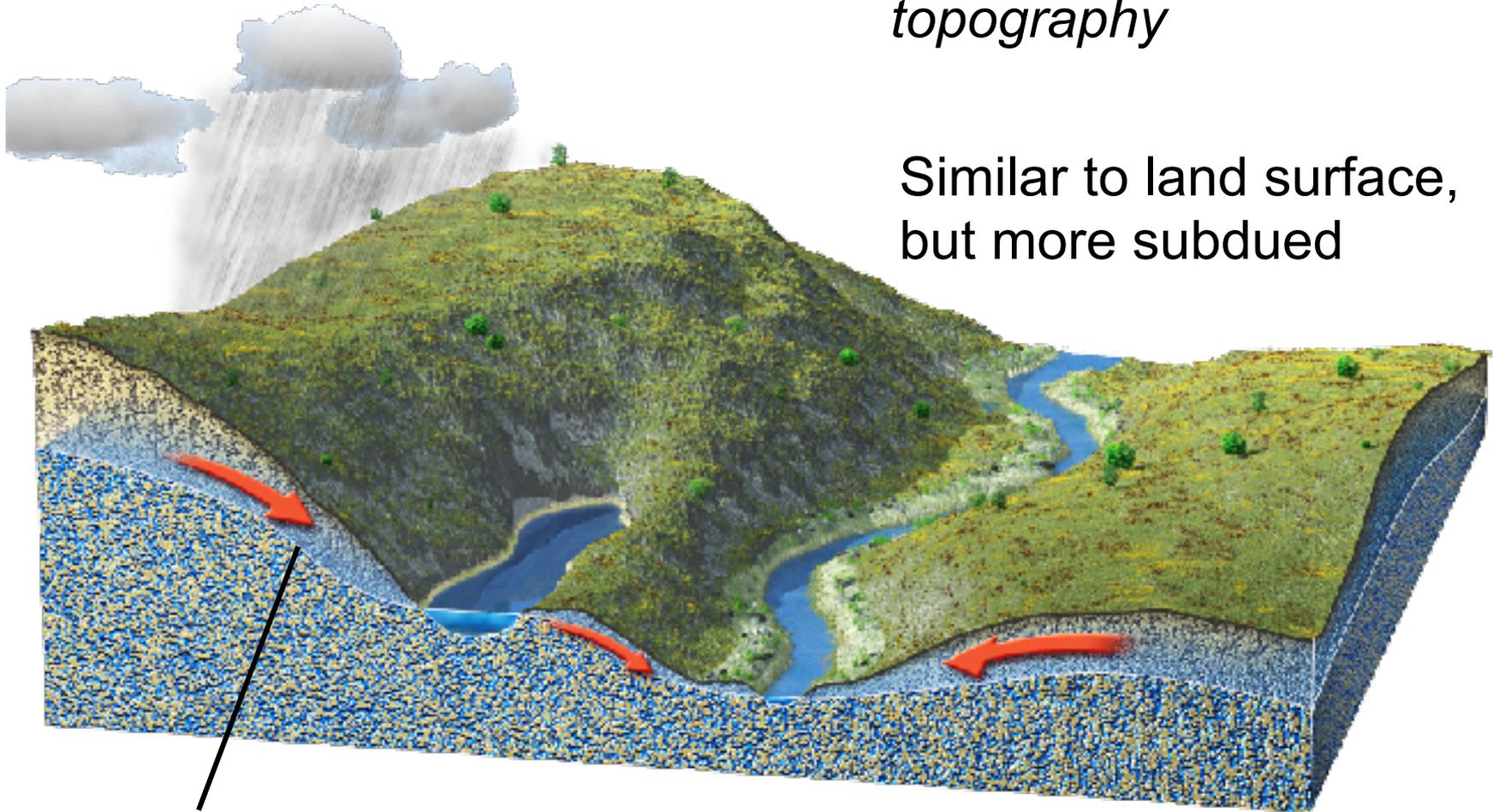
Low permeability

Low permeability

What is the Geometry of the Water Table?

*Observe how the water table interacts with topography*

Similar to land surface, but more subdued



Groundwater flows down slope of water table

Water table cuts across rock units

# How Does Slope of the Water Table Influence Groundwater Flow?

