

Lesson – Factors Affecting Infiltration

THE FOLLOWING VIDEO HAS BEEN APPROVED FOR
ALL AUDIENCES
BY THE EARTH SCIENCE TEACHERS ASSOCIATION OF AMERICA, INC


THE VIDEO HAS BEEN RATED

1	INTELLIGENT UNDER 15 REQUIRES TEACHER ASSISTANCE
STRONG EARTH SCIENCE LANGUAGE, DETAILED DIAGRAMS, AND SUPER AWESOMENESS	

- I can divide the earth's surface into layers
- I can describe the factors that affect infiltration
- I can explain porosity
- I can describe permeability
- I can define capillarity
- I can describe factors that affect runoff

Need 3 things

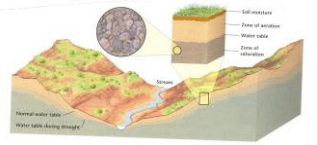
1. Underground water tunnels
2. One must vent to the top
3. Water must come in contact with a rock rich in silica
 - The silica dissolves in the hot water than coats & seals the channels allowing water and steam to be forced through the channels at high pressure; otherwise, the pressure would be dissipated through various cracks and side-channels.

Water at a depth of 23 meters (75 ft) is around 120 °C (248 °F), but cannot boil because of the weight of the water pushing down on it from above. However heat makes some of the water expand pushing the water up. When this water is forced up to around 16 meters (52 ft), some of the water may be above boiling point, which sets off the chain reaction: the pressure decrease allows more water to boil and flash boil into steam, which drives the unboiled water further up the conduit. As this happens closer and closer to the surface, with increasing velocity, the water and steam is forced out, and it is this mixture of water and steam that forms the eruption.

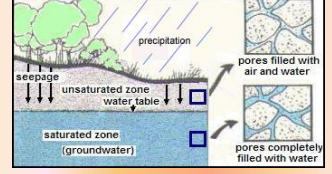
Earth's surface divided into 2 zones:

Zone of Saturation
-Part of Earth's surface that is FILLED with ground water



-Upper surface of this zone is called the **WATER TABLE**

Zone of Aeration
-ABOVE the water table where particles are filled with air & water




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Factors Affecting Infiltration

SLOPE of the LAND
- **STEEPER** the slope, the **LESS** the Infiltration

Less time to SEEP into GROUND



DEGREE of SATURATION
-More **SATURATED** the ground, the **LESS** infiltration

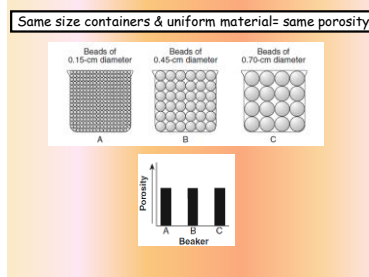
POROSITY
-Amount of open space between particles

-**GREATER** the porosity the **GREATER** infiltration

Low Porosity

High Porosity

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3 factors that effect porosity are:

SHAPE
Well-rounded particles have **GREATER** porosity

The diagram compares two types of particles: 'Rounded' and 'Angular'. The 'Rounded' section shows a grid of smooth, circular particles with significant open space between them. The 'Angular' section shows a grid of sharp, irregular particles that pack together more tightly, leaving less open space. A label 'A' is placed between the two diagrams.

PACKING
More closely packed the particles, the lower the porosity

The diagram shows two arrangements of particles. 'Loosely packed' shows particles with large gaps between them, while 'Closely packed' shows particles packed more tightly together with smaller gaps.

SORTING
-Material with well-sorted particles has high Porosity

The diagram shows two arrangements of particles of different sizes. 'Well-sorted' shows uniform-sized particles with consistent gaps. 'Poorly sorted' shows larger particles with smaller particles filling the gaps between them, resulting in lower porosity.

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PERMEABILITY
-Ability of a material to allow fluid to pass through it

-Materials can be porous & yet impermeable

EXAMPLES:

The examples are: **CORK** (a porous, permeable material), **SPONGE** (a highly porous and permeable material), and **SHALE** (a porous material that is impermeable).

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CAPILLARITY
-Ability of water to RISE in small openings

The diagram shows a tube partially submerged in water. The water level inside the tube rises above the level in the reservoir, labeled as 'Capillary Rise'. The reservoir level is labeled 'Reference Point'.

-**SMALLER** the particle size, the **GREATER** the capillarity

The diagram shows three test tubes containing water. The water level rises in each tube. From left to right, the particle size of the material at the bottom of the tubes decreases, and the height of the capillary rise increases.

DECREASE in Particle SIZE (LEFT to RIGHT)

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Factors Affecting Runoff

- Rate of precipitation > Rate of Infiltration
- Ground is 100% saturated
- Slope of surface to GREAT to allow infiltration



• Water is not evaporating fast enough



VEGETATION

Ground with grasses, trees, & other plant types have HIGH infiltration



LAND-USE

Impermeable surface like roads, parking lots, & buildings decrease infiltration

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