Rock Storage Secrets

How physical rock properties hold natural resources.

4.11.C "determine the physical properties of rocks that allow Earth's natural resources to be stored there."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline every sentence that includes the exact term *porosity*, *permeability*, or *impermeable*. Circle each natural resource named, so you can connect rock properties to what rocks can store.

Underground Rock Storage

1. Rocks beneath the ground can hold useful natural resources, including groundwater, oil, and natural gas. Their ability to store these materials depends on physical properties. One property is porosity, the amount of open space, called pores, inside a rock. Sandstone often has many pores. Water, oil, or gas can fill those tiny spaces, much as water fills spaces in a sponge.

2. Porosity alone does not tell whether a resource can move through rock. Permeability is a rock's ability to let fluids or gases travel through connected pores. A rock may have pores that are not connected, so it can store some water but let little water flow. Well-connected pores make sandstone permeable, allowing groundwater or oil to move toward a well.

3. Resources remain trapped when a layer above the storage rock blocks their escape. Shale is often impermeable because its very small pores are poorly connected. An impermeable shale layer can act as a cap rock over porous, permeable sandstone. Oil and natural gas may collect below the shale, while groundwater can also be stored in underground rock layers called aquifers.

2 ANSWER WITH EVIDENCE

Use the passage

1. How does porosity help a rock store groundwater, oil, or natural gas?

2. What is permeability, and what must the pores be like for a rock to be permeable?

3. A rock has many pores, but the pores are not connected. Which property is low, and what happens to water movement?

4. Explain how porous, permeable sandstone and impermeable shale can work together to trap oil or natural gas.

3 YOUR TURN

Your own words

Create a three-sentence description of a different underground rock storage site. Name a resource, describe the storage rock using porosity and permeability, and describe a rock layer above it that helps keep the resource underground.

ANSWER KEY # Rock Storage Secrets

GRADE 4 · TEKS 4.11.C

PART 1 · READ AND MARK

Underline every sentence that includes the exact term *porosity*, *permeability*, or *impermeable*. Circle each natural resource named, so you can connect rock properties to what rocks can store. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How does porosity help a rock store groundwater, oil, or natural gas?	**Porosity provides open pore spaces inside a rock that can be filled with water, oil, or gas.**
2	What is permeability, and what must the pores be like for a rock to be permeable?	**Permeability is a rock's ability to let fluids or gases travel through it. Its pores must be connected.**
3	A rock has many pores, but the pores are not connected. Which property is low, and what happens to water movement?	**Its permeability is low, and little water can flow through the rock.**
4	Explain how porous, permeable sandstone and impermeable shale can work together to trap oil or natural gas.	**The sandstone stores and allows oil or gas to move through connected pores. The impermeable shale above it acts as a cap rock and blocks escape.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

A porous, permeable limestone layer stores groundwater in its connected pores. Above it, an impermeable clay layer slows the water's escape. This arrangement can store groundwater underground as an aquifer.

Accept scientifically sound resource-storage descriptions that connect pore space to storage, connected pores to movement, and an impermeable upper layer to trapping. For Question 3, distinguish low permeability from porosity.