



NEW MEXICO STATE UNIVERSITY

LESSON PLAN

**SUBJECT**

STEM

GRADE LEVEL

4-6 Grade

TOPIC

Brackish Water in NM

TIME

45 Minutes

LEARNING OUTCOMES

Students will be able to:

- Define brackish water
- Explain how brackish water forms
- Identify real-world examples (estuaries, wetlands, coastal systems)
- Understand why brackish ecosystems are important for humans and wildlife

WARM- UP

Is all groundwater in New Mexico drinkable? Why or why not?

INTRODUCTION

Brackish water is water that contains more salt than freshwater but less salt than ocean water. Although New Mexico does not have oceans, brackish water is very common in the state, especially underground. As water moves through rocks and soil, it dissolves minerals, increasing its salinity over time. Evaporation in dry regions like New Mexico also concentrates salts in water sources. Understanding brackish water is important because much of New Mexico's groundwater supply is brackish, which affects drinking water availability, agriculture, and long-term water sustainability.

ACTIVITY

Students will work in small groups to model how freshwater becomes brackish underground.

Materials (per group):

- 3 clear cups
- Water
- Salt
- Spoon
- Small amount of sand or soil (optional)
- Food coloring

Procedure:

- Cup 1: Freshwater Source. Fill with plain water and label "Mountain Runoff." Discuss how this represents fresh water entering aquifers.
- Cup 2: Underground Water Movement. Add sand/soil and a small amount of salt to water. Stir and label "Groundwater Flow." Explain how water dissolves minerals as it moves through rock.
- Cup 3: Evaporation Effect. Add extra salt to water and label "Closed Basin Water." Discuss how evaporation leaves salts behind, increasing salinity.
- Students compare the cups and determine which best represents brackish groundwater in New Mexico.

QUESTIONS

Comparison

- Which cup best represents drinking water in New Mexico? Why? Cup 1 because it has little to no dissolved salts and represents recent surface water sources.
- Which cup best represents brackish groundwater? Why? Cup 2 because groundwater often picks up dissolved minerals as it moves underground.
- How did salt get into the groundwater model? Salt represents minerals dissolving from rocks and soil into groundwater.
- How does groundwater become salty over time? Cup 2 because groundwater often picks up dissolved minerals as it moves underground.
- What role does evaporation play in salinity? Evaporation removes water but leaves salts behind, increasing concentration.

Real-World Scenarios

- Why is brackish water a challenge for NM communities? It cannot be used for drinking or irrigation without treatment, making water supplies more limited and expensive.
- How might climate change affect water salinity in NM? Higher temperatures and drought increase evaporation, which raises salinity levels.
- What solutions could help make brackish water usable? Desalination, water conservation, improved irrigation practices, and better groundwater management.

WRAP-UP DISCUSSION

Brackish water plays an important role in New Mexico even though the state has no oceans. As water moves through underground rocks and soils, it dissolves minerals that increase its salinity over time. In dry regions, evaporation further concentrates salts, making much of the state's groundwater brackish rather than fresh. Understanding how brackish water forms helps students recognize why water treatment, conservation, and sustainable management are critical for New Mexico's future water supply.

Why might brackish groundwater become an even bigger challenge for New Mexico in the future, and what is one solution that could help communities manage it?

Brackish groundwater may become a bigger challenge in the future because climate change, drought, and increased water use can raise salinity levels and reduce the availability of freshwater. One solution is desalination, which removes salt from brackish water, along with conservation practices and better groundwater management to protect water supplies.