



Why Is the Ocean Salty?

Video: 3:39 · Episode 007

Grades: 4–8 · Chemistry / Earth Science

Time: 30–45 min (video + worksheet + quiz)

Key term: evaporation (water turning into a gas and rising into the air)

Connects to NGSS: MS-ESS2-4 (the cycling of water through Earth's systems, driven by sunlight and gravity) · 4-ESS2-1 (weathering by water). Pairs with episode 001 (why ice floats).

The big idea

Rain picks up carbon dioxide from the air, which helps it break down rock and carry away tiny bits of dissolved salt. Rivers bring that salt to the sea (river water has salt too, just too little to taste). When the sun warms the ocean, water evaporates but the salt stays behind. Water makes a round trip; salt only travels one way, into the ocean. Over millions of years, it adds up.

One-line recap students should be able to say: "Rivers carry salt into the ocean, and only the water leaves."

Learning goals

- Explain where the ocean's salt comes from and why evaporation leaves it behind.
- Use the water cycle to explain why the ocean stays salty even though rivers add fresh water.
- Explain why most lakes are fresh, but lakes with no outlet (like Great Salt Lake) are salty.

How to use it

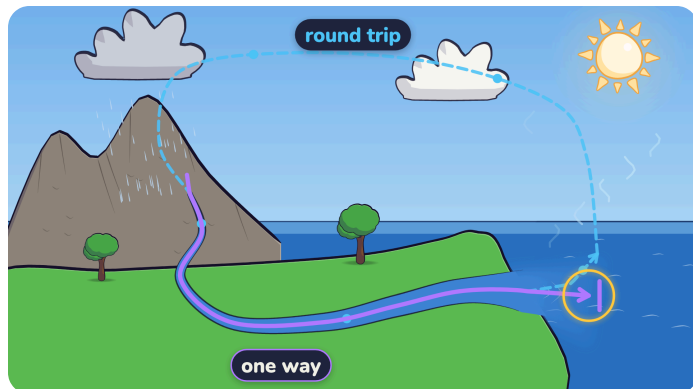
1. **Before watching (3 min):** students answer the prediction on the worksheet. Don't correct them yet.
2. **Watch (4 min):** play it straight through. Optional check-in pause when the purple "one way" arrow stops at the sea (about 2:14).
3. **Worksheet (10 min):** fill in the cycle diagram, then explain the crusty swimsuit.
4. **Discuss (10 min):** pick two or three discussion questions.
5. **Quiz (5 min):** six quick questions; answer key on the last page.

What the video simplifies: "bits of salt" are dissolved Na^+ and Cl^- ions ("ion" is never said). River salts are mostly calcium and bicarbonate, which sea life uses for shells, so sodium and chloride build up; much chloride came from volcanoes and seafloor vents. Sea spray carries a little salt into the air. Ocean saltiness is not fixed: some salt is trapped in seafloor sediment, and it has changed over geologic time.

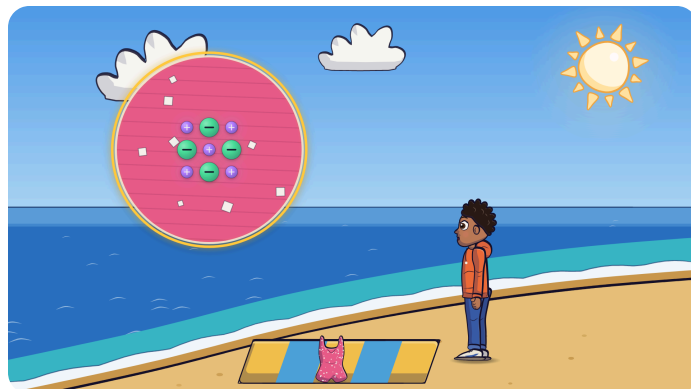


Make the Sun Leave the Salt Behind

Students make their own "sea water," let it evaporate, and see what the water leaves behind: the same thing that happens to the crusty swimsuit in the video, and to the ocean itself.



From the video: water makes a round trip; salt only goes one way



The water left. The salt stayed behind.

You need

- Warm water, table salt, a spoon, a clear cup
- A dark shallow dish or jar lid (salt shows up best on black), a sunny windowsill
- Optional: a hand lens, a dark piece of cloth

Steps

1. Stir 1 teaspoon of salt into half a cup of warm water until you can't see it. Is the salt gone?
2. Pour a thin layer into the dish. Dip a corner of the cloth in it too, if you have one.
3. Leave it in a sunny, warm spot for 1–3 days. Predict what you'll find.
4. Look with the hand lens. Where did the water go? What stayed?
5. Optional: compare with a dish of plain tap water. What's left in that one?

Safety: don't taste the experiment. Real sea water works too, but never drink it.

Talk about it

- The salt "disappeared" in step 1. Was it really gone? How do you know?
- Which way did the water go? Which way did the salt go?
- How is your dish like the ocean? How is it like Great Salt Lake?



Why Is the Ocean Salty?

Name: _____

Date: _____

Before you watch

Rivers pour fresh water into the ocean every day. So why doesn't the ocean get less salty? Make a guess.

While you watch

1. River water has salt in it, but _____ to taste.
2. Rain picks up a gas from the air: the same gas that makes _____ fizzy.
3. Rain slowly breaks down _____ and carries off tiny bits of salt.
4. When the sun warms the ocean, the _____ rises into the air, but the _____ stays behind.
5. Water turning into a gas and rising into the air is called _____.
6. Water makes a round trip. Salt only travels _____.

Draw it

Draw the trip. Use one color for the water's round trip and another for the salt's one-way trip. Label: rock, rain, river, ocean, cloud, sun.



Explain it

You swim at the beach, then let your swimsuit dry in the sun. Afterward it feels crusty. What is the crust, and why is it there?



Talk It Over, Then Check Yourself

Discussion questions

1. River water has a little salt in it. Why does river water taste fresh, but the ocean tastes salty?
2. If evaporation takes water out of the ocean, why doesn't the ocean dry up?
3. Most lakes are fresh, but Great Salt Lake is salty. What's different about it?
4. Rain falls on the ocean too. Does that rain bring salt? Where does rain's water come from?
5. What would happen to the ocean's saltiness if rivers stopped flowing for a while? If it rained a lot more?

Quiz

Name: _____

1. Where does most of the ocean's salt come from? (Circle one.)
A. Fish
B. Rocks on land, carried by rivers
C. Clouds
D. People
2. When ocean water evaporates, what goes up into the air?
A. Salt only
B. Water and salt
C. Water only
D. Nothing
3. True or false: river water has no salt in it at all. _____
4. Why is Great Salt Lake salty?
A. It's connected to the ocean
B. Water leaves it only by evaporation, so salt piles up
C. People add salt to it
D. It's very deep
5. What does rain pick up from the air that helps it break down rock?
A. Salt
B. Oxygen
C. Carbon dioxide
D. Dust
6. Finish the sentence: Water makes a round trip, but salt ...



Answer Key

Worksheet: while you watch

1. too little · 2. soda · 3. rock · 4. water; salt · 5. evaporation · 6. one way (into the ocean)

Draw it: Water: ocean → (evaporation) → cloud → rain → rock/mountain → river → ocean. Salt: rock → river → ocean, and it stops there.

Explain it: The crust is salt from the sea water. In the sun, the water evaporated into the air, and the salt couldn't come along, so it stayed on the swimsuit.

Quiz

1. **B.** Rain wears tiny bits of salt out of rocks, and rivers carry them to the sea (vents and volcanoes add some too).
2. **C.** Water only. The salt stays behind.
3. **False.** River water has a little salt, just too little to taste.
4. **B.** Rivers flow in, but no river flows out. Water leaves only by evaporation.
5. **C.** Carbon dioxide, the same gas that makes soda fizzy.
6. ... only travels one way: into the ocean.

Discussion: points to listen for

1. The river's salt is spread through a lot of water and keeps moving on to the sea. The ocean has collected salt for millions of years, and evaporation takes away only water.
2. Rivers and rain keep bringing water back: it's a cycle.
3. Most lakes have a river flowing out that carries their salt away. Great Salt Lake has no outlet: water leaves only by evaporation.
4. Rain is evaporated water, so it's fresh. Rain on the ocean adds water, not salt.
5. Less river water in: a little saltier near the coasts over time, since evaporation continues. More rain: a bit less salty at the surface. (Real ocean saltiness varies from place to place for these reasons.)

See Why · "We make invisible things visible." Free to copy for classroom and homeschool use.