

I See Erosion!

Name: _____



Erosion can happen on roads and parking lots due to rain, snow, and human impact. When water from rain or melting snow doesn't drain properly, it can wear asphalt and concrete down over time. This is called **runoff erosion**, where moving water carries away small pieces of the surface, creating cracks and potholes. Standing water can also weaken roads by seeping into them and freezing, causing more damage.

Another cause of erosion is **rock salt**, which is used to melt ice and make roads safer in winter. Rock salt, or **sodium chloride**, lowers the freezing point of water, preventing ice from forming. While it helps prevent slippery roads, it also speeds up erosion by breaking down concrete and asphalt. Over time, this leads to crumbling sidewalks, potholes, and costly repairs. Finding better ways to manage ice and water can help reduce this damage.



Time to investigate!

Look at the three photos of erosion below. What do you **observe** in each photo? Do you notice cracks, potholes, or areas where water may have caused damage?

A



B



C



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Research scientists study **water quality** in streams and runoff water to check for pollutions. They test for different types of pollution, including chemical pollution (like fertilizers and pesticides), industrial waste, like trash and plastic, as well as road salt (rock salt) used in winter. When rock salt washes into streams, it increases the amount of salt in the water, which can harm the fish and plants living there. It can also weaken the quality of roads, causing materials like concrete to break down faster.



Scientists check for salt pollution by **measuring salinity**, which is the **amount of salt dissolved in water**. High salinity levels can make it harder for freshwater animals/plants to survive, and for our roads to maintain their quality. To test this, scientists use special water quality tests and devices. Environmental scientists, hydrologists, and water quality specialists are the ones who do this important work. Their job is to help find solutions to keep our water clean and safe for both nature and people.

Part A

Go outside to look for signs of erosion caused by rock salt and water runoff around parking lots, roads, and sidewalks. Your job is to collect evidence; take photos, gather water samples, and make detailed observations. As you explore, take notes and draw sketches of what you see below.



Site 1
Erosion Observation



Site 2
Erosion Observation



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Part B Test Time!

Now that you have collected your water samples, it's time to test them! You will use the water quality tester to help you measure the salinity (the amount of salt in the water). This will help us determine if rock salt has affected the water in your area. Have your teacher help you!



Test # 1: _____ ppm



Test # 2: _____ ppm



What is ppm?

ppm (parts per million) means how many parts of salt there are for every **1,000,000** parts of water.

Part C Let's do some Math!

Now that you have found the test # 1 and 2. It's time to convert your data from...

ppm  ppt.

ppt (parts per thousand) means how many parts of salt there are for every **1,000** parts of water.

Conversion Example:

Example Test: **3,500 ppm**

To convert ppm to ppt, **divide by 1,000.**

$$3,500 \text{ ppm} \div 1,000 = 3.5 \text{ ppt}$$

Answer = 3.5 ppt

Test # 1: _____ ppm \div 1,000 =

Answer: _____ ppt

Test # 2: _____ ppm \div 1,000 =

Answer: _____ ppt

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Part D

Take your two water samples and use the salinity chart to determine where each sample belongs (freshwater, brackish water, or seawater).

Figure 1

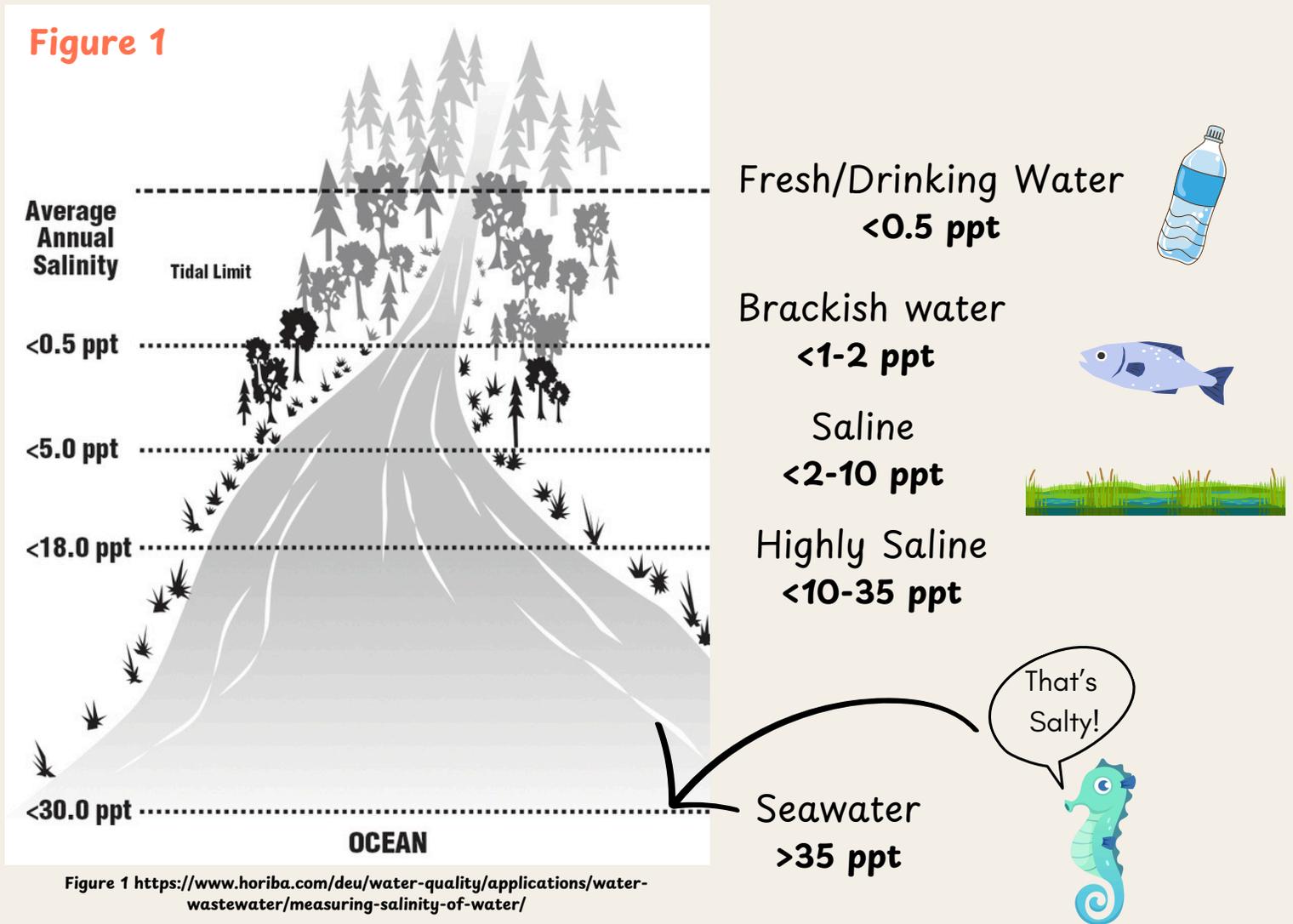


Figure 1 <https://www.horiba.com/deu/water-quality/applications/water-wastewater/measuring-salinity-of-water/>



Briefly explain if your samples have a high or low salinity? How could these levels of salinity affect the roads and/or the ecosystem in your area?
