Checking Salt Content in Two Concentration Units

Base your answers on the information provided and your knowledge of chemistry. Use the 2025 Chemistry Reference Tables as needed.

A rinse model reports the same dissolved salt concentration in two liquids, 12 mg per liter of solution. The workshop must instead compare them in milligrams of salt per kilogram of solution. It requires a result of at most 11 mg/kg.

Liquid	Dissolved salt (mg/L)	Solution mass per liter (kg/L)
P	12	1.00
Q	12	1.20

1 Which liquid has more mass in one liter?

(1) P only

(2) Q only

(3) Both have the same mass.

(4) The table does not compare mass.

2 Calculate the concentration in mg/kg for each liquid and decide which meets the limit. [1]

Answer and work

3 A student says the two concentrations must be equal in both units because each liter contains the same salt mass. Explain what the statement omits. [1]

Answer and work

The workshop treats 0.50 L of P by adding 0.10 L of a salt-free diluent. The two choices have densities of 0.80 kg/L and 1.20 kg/L. The model adds the volumes and loses no mass. The treated solution must contain at most 10.0 mg salt per kilogram.

4 Determine which diluent meets the treated-solution requirement. Use both possible solution masses. [1]

Answer and work

5 Explain why a detector that reports only mg/L would give the same reading after either treatment. [1]

Answer and work