What Flows Through?

Use pH and conductivity data to investigate liquids.

CHE.9.1 "Enrichment: Analyze and interpret data to describe the properties of acids, bases, and salts."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the two sentences that explain what pH readings show. Circle the conductivity readings in the table, then number the samples from 1 to 4, starting with the strongest conductor.

Four Liquids, Two Measurements

1 A science club tests four labeled liquids after a demonstration. The students measure pH and electrical conductivity, which shows how easily current passes through a liquid. They use clean probes at the same temperature and record the results below. These values describe these prepared samples, not every possible mixture.

RESULTS FOR FOUR PREPARED LIQUIDS

Sample	pH	Conductivity (µS/cm)
Lemon juice	2.4	1,200
Baking soda solution	8.3	900
Table salt solution	7.0	2,000
Distilled water	7.0	3

2 On the pH scale, readings below 7 indicate acidic conditions, while readings above 7 indicate basic conditions. A reading near 7 is close to neutral. Acids and bases can each produce mobile ions in water, so both may conduct electricity. Conductivity measures current flow, not whether the ions came from an acid or a base.

3 A salt is an ionic compound, and its dissolved ions can also carry current. Some salt solutions are close to neutral, while others are acidic or basic. Compare the pH and conductivity readings together, rather than treating a high conductivity value as proof of a salt. Concentration and temperature can also change conductivity, so these readings describe these samples.

2 ANSWER WITH EVIDENCE

Use the passage

1. What acid-base property does the pH show for lemon juice and for baking soda solution?

2. Table salt solution and distilled water have the same pH. What does their conductivity difference suggest about the particles in each?

3. Does lemon juice's conductivity reading show that it is a salt solution? Explain using evidence from the passage.

4. Does the table salt solution's pH show that all salt solutions are neutral? Explain.

3 YOUR TURN

Your own words

An unknown water-based sample has a pH of 9.4 and a conductivity of 650 µS/cm. In three or four sentences, describe its acid-base property, what its conductivity suggests about particles in it, and why these data cannot prove whether it is a salt solution.

What Flows Through?

PART 1 · READ AND MARK

Underline the two sentences that explain what pH readings show. Circle the conductivity readings in the table, then number the samples from 1 to 4, starting with the strongest conductor. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What acid-base property does the pH show for lemon juice and for baking soda solution?	**Lemon juice is acidic because its pH is 2.4, below 7. Baking soda solution is basic because its pH is 8.3, above 7.**
2	Table salt solution and distilled water have the same pH. What does their conductivity difference suggest about the particles in each?	**Table salt solution conducts much more strongly, 2,000 versus 3 µS/cm, because it contains many more mobile ions than distilled water.**
3	Does lemon juice's conductivity reading show that it is a salt solution? Explain using evidence from the passage.	**No. Lemon juice conducts electricity, but acids can also produce mobile ions, so conductivity alone does not identify a salt solution.**
4	Does the table salt solution's pH show that all salt solutions are neutral? Explain.	**No. This sample has a pH of 7.0, but the passage states that other salt solutions can be acidic or basic.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

The sample is basic because its pH is above 7. Its conductivity suggests that mobile ions are present. The data cannot prove it is a salt solution because bases can conduct electricity, and some salt solutions are basic.

Accept answers that use pH to identify acidic or basic conditions and recognize that conductivity indicates mobile ions, not a substance's identity. The listed measurements apply only to these prepared samples.