

ESA Study Guide Year 10 Science

Chapter 3: Acids and bases Then and now

Questions from page 45 of *ESA Study Guide Year 10 Science*

Understanding

1. Which acids are considered to be dangerous?

2. What does 'corrosive' mean?

3. Name three acids found in food.

4. Which acid can be linked to the wealth of a country? Explain why.

5. Name two foods that contain citric acid.

6. Many foods contain acids. For example, apples contain malic acid and yoghurt contains lactic acid. What taste do these foods have that is caused by the acid?

Thinking

1. Suggest a reason soft-drink makers use phosphoric acid in their products rather than an organic acid such as citric acid.

2. Suggest a reason vinegar has been known about and used by people for so many years.

3. Explain why the chemist George de Hevesy dissolved two gold Nobel Prize medals in acid.

Answers are provided on page 296 of *ESA Study Guide Year 10 Science*

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Chapter 3: Acids and bases Acids and bases

Questions from pages 48, 49 of *ESA Study Guide Year 10 Science*

Understanding

1. Name and give the formula of two acids that contain hydrogen and oxygen.

2. Name and give the formula of an acid that does not contain oxygen.

3. For each of the following statements, write either 'True' or 'False'.
 - a. Acids and bases do not react with each other: _____
 - b. Acids and bases neutralise each other: _____
 - c. Acids mixed with bases make stronger bases: _____
 - d. Bases that are soluble in water turn red litmus blue: _____
 - e. Acids taste sour: _____
 - f. Acids feel slippery: _____
 - g. Acids turn litmus from red to blue: _____
4.
 - a. NaOH is used in drain cleaners. Write in words the chemical name for NaOH.

 - b. Is NaOH an acid or is it a base? Explain your answer.

5. Give the name and symbol of the ions formed when acids react in water.

Thinking

1. A small piece of magnesium ribbon is added to a test tube containing concentrated hydrochloric acid. Another piece is added to a test tube containing dilute hydrochloric acid. Predict the rate of bubbling in each test tube. Explain your answer.

2. Write a definition for a base. _____

Contributing

Acid rain is a mixture of weak acids, formed when acidic gases dissolve in water in the atmosphere. Find out how acid rain forms; *and* the effect of acid rain on plants, animals, people, and structures such as buildings and bridges. Prepare a poster to show this.

Answers (except for 'Contributing') are provided on page 296 of *ESA Study Guide Year 10 Science*

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Chapter 3: Acids and bases Measuring acidity

Questions from pages 51, 52 of *ESA Study Guide Year 10 Science*

Understanding

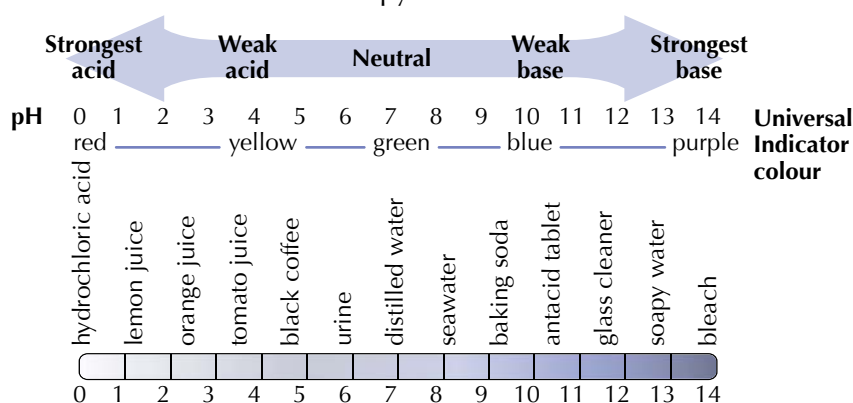
- Complete the sentence by filling in the missing words.

pH is a measure of the ratio of **a.** _____ ions to hydroxide **b.** _____ in a solution.

- Explain the difference between a 'dilute' acid and a 'weak' acid.

- From the following diagram, give the pH of solutions of:

- hydrochloric acid _____
- distilled water _____
- baking soda _____
- urine _____
- soapy water _____



- Is a solution with a pH of 2 a stronger or a weaker acid than a solution with a pH of 5?

- Complete the following table.

	Acid solution	Alkaline solution	Neutral solution
Colour with red litmus paper			
Colour with blue litmus paper			

Thinking

- Explain why Universal Indicator is more useful for measuring pH than litmus indicator is.

- In terms of hydrogen ions and hydroxide ions, explain why a solution of vinegar is an acid.

- In terms of hydrogen ions and hydroxide ions, explain why a solution of ammonia is a base.

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- c. In terms of hydrogen ions and hydroxide ions, explain why a solution of pure water is neutral.

3. Explain why it would not be a good idea to use a solution of sodium hydroxide to neutralise stomach acid.

4. Mark was suffering from indigestion. He decided to drink a glass of lemonade to help get rid of the indigestion. Explain why lemonade would not help indigestion.

5. Explain whether or not drinking a glass of water with a teaspoon of baking soda dissolved in it would:

- a. help prevent dental cavities _____

- b. help relieve heartburn. _____

6. Complete the following table.

Substance	Colour of Universal Indicator	pH	Description
Sea water		8	
Lemon juice		2	
Battery acid		1	Strong acid
Blood	Green	7.4	
Rainwater		6.3	

Answers are provided on page 297 of *ESA Study Guide Year 10 Science*

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Chapter 3: Acids and bases Chemical properties of acids

Questions from pages 56, 57 of *ESA Study Guide Year 10 Science*

Understanding

1. Explain what is meant by a 'neutralisation reaction' and give an example.

2. Which metal salt forms when magnesium carbonate reacts with hydrochloric acid?

3. Name an acid and a carbonate that react to form copper sulfate.

4. What causes the bubbling when an acid is added to a carbonate?

5. What causes the fizzing when an acid is added to a reactive metal?

6. Complete the following word equations.
 - a. hydrochloric acid + calcium hydroxide \rightarrow _____ + water
 - b. _____ + magnesium oxide \rightarrow magnesium nitrate + water
 - c. sulfuric acid + _____ \rightarrow zinc sulfate + water + carbon dioxide gas
 - d. _____ + zinc \rightarrow zinc chloride + hydrogen gas
7. Why does toothpaste contain a weak base?

8. Explain briefly how baking powder makes cakes rise.

Thinking

1.
 - a. What type of reaction occurs when sulfuric acid solution is added to some copper carbonate?

 - b. Write a word equation for the reaction in **a**.

 - c. Describe one observation you would expect to make when the reaction in **a** takes place.

2. Sodium nitrate is a food additive that kills bacteria. It is found naturally in leafy green vegetables. Sodium nitrate can be made from sodium carbonate. Write a plan to show how you could produce some sodium nitrate crystals.

Answers are provided on page 298 of *ESA Study Guide Year 10 Science*