Year 9 Science: Acids and bases: pH scale, alkalis and indicators

Name: _____ Date: _____

Try these without your notes first, then check the answer key.

Practice

1. A solution has pH 4. Is it acidic, neutral or alkaline, and what colour would universal indicator turn?

2. Magnesium oxide hardly dissolves in water. Is it a base, an alkali, or both?

3. You need to check whether a farmer's paddock soil is pH 5.8 or 6.2. Which method should you use, and why?

4. Why is it a bad idea to identify a liquid in the lab by tasting it, even though acids taste sour?

5. Oven cleaner has pH 13 and lemon juice has pH 2. Which is further from neutral, and what does that tell you about handling it?

Fix the mistake

6. Correct this statement: "pH 2 is only a little more acidic than pH 3, because the numbers are just 1 apart."

7. Correct this statement: "The higher the pH number, the stronger the acid."

8. Correct this statement: "Alkali and base mean the same thing."

9. Correct this statement: "Litmus paper tells you the pH of a solution."

Answer key (for parents and tutors)

1. A solution has pH 4. Is it acidic, neutral or alkaline, and what colour would universal indicator turn?
   Acidic, because it is below 7; universal indicator turns orange.
2. Magnesium oxide hardly dissolves in water. Is it a base, an alkali, or both?
   A base only. It neutralises acids, but an alkali must dissolve in water.
3. You need to check whether a farmer's paddock soil is pH 5.8 or 6.2. Which method should you use, and why?
   A pH meter, because universal indicator cannot tell apart values only 0.4 apart.
4. Why is it a bad idea to identify a liquid in the lab by tasting it, even though acids taste sour?
   The liquid could be corrosive or poisonous, and tasting is never a safe lab test.
5. Oven cleaner has pH 13 and lemon juice has pH 2. Which is further from neutral, and what does that tell you about handling it?
   Oven cleaner: it is 6 units above 7, while lemon juice is 5 units below. It is a strong alkali and corrosive, so wear gloves and eye protection and rinse any splash with plenty of water.
6. Correct this statement: "pH 2 is only a little more acidic than pH 3, because the numbers are just 1 apart."
   Each step on the pH scale is a tenfold change, so pH 2 is ten times more acidic than pH 3.
7. Correct this statement: "The higher the pH number, the stronger the acid."
   Acids are below 7 and get stronger as the number goes down; a high pH means a strong alkali.
8. Correct this statement: "Alkali and base mean the same thing."
   An alkali is a base that dissolves in water, so every alkali is a base, but insoluble bases such as copper oxide are not alkalis.
9. Correct this statement: "Litmus paper tells you the pH of a solution."
   Litmus only shows acid or alkali; you need universal indicator for a rough pH number or a pH meter for an exact one.