Name:
Science Class:
Teacher:
Hand in day:

Y8 Science
Term 1 Homework Booklet
Chemistry

	Hand in Date	Parents Signature
Acids and Alkalis		
Homework 1		
Homework 2		
Homework 3		
Homework 4		
Homework 5		

Acids and Alkalis Homework 1:

Comprehension Task

If you look around your kitchen you may find some acids to eat or drink. Citrus fruits such as lemons and oranges contain citric acid. Vinegar used to pickle foods and flavour chips contains ethanoic acid. Fizzy drinks contain carbonic acid. Acids tend to taste sour.

Acids also have industrial uses and are found in car batteries and used to make fertilisers and explosives. These tend to be more dangerous acids like sulfuric acid, H_2SO_4 and nitric acid, HNO_3.

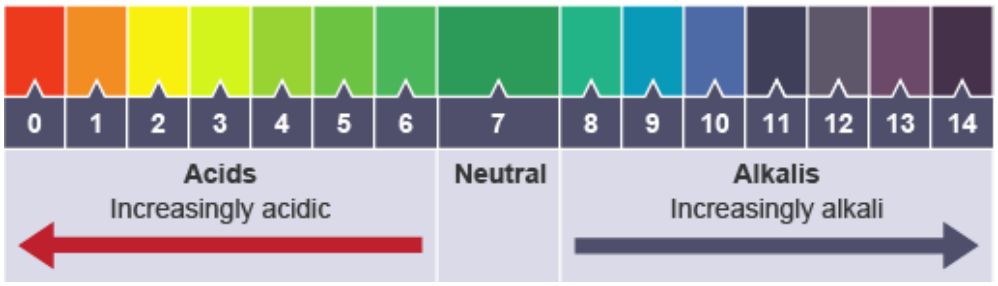
Acids can be dangerous when they are concentrated because they can be corrosive. This means that they can destroy skin and attack metals if spilled. Dilute acids, mixed with a lot of water, are much safer but they can still be an irritant. Irritants may cause a rash or reddening of the skin if spilled.

Alkalis have many uses as cleaning products, and are found in products like bleach, oven cleaner and washing powder. They are also found in toiletries such as soap, shampoo and toothpaste. Magnesium hydroxide is a safe alkali used to treat acid indigestion.

Many alkalis can also be dangerous, like sodium hydroxide NaOH, and potassium hydroxide KOH. They can also be corrosive. More dilute alkalis can also be an irritant. Alkalis also feel soapy to touch and can be difficult to wash from the skin.

Acids and alkalis are not easy to identify by sight, as they all look like colourless solutions when dissolved in water. We must use indicators to identify them. Indicators change colour in acids and alkalis. Most indicators only have 2 colours, one colour in acids, and a different colour in alkalis.

Universal indicator is a special indicator which goes lots of different colours depending on how strong or weak the acid or alkali is. Each colour matches a number on the pH scale from 0 up to 14.



pH 7 in the middle of the scale means neutral (neither an acid or an alkali) like water.

Numbers less than 7 mean acids, numbers above 7 mean alkalis.

The further away from pH 7 a substance is, the more dangerous it will be.

Questions

1. What sort of fruits contain citric acid?

2. What is the name of the acid in vinegar?

3. What is the chemical formula of sulfuric acid?

4. What does the word corrosive mean?

5. What does the word irritant mean?

6. What sort of products often contain alkalis?

7. What is magnesium hydroxide used for?

8. What do indicators do in acids and alkalis?

9. What pH number means neutral?

10. What do numbers less than pH 7 on the scale mean?

Acids and Alkalis Homework 2:

Use your knowledge organiser to complete the table below, showing what colour these substances would appear in universal indicator and litmus paper.

Substance	pH	Colour in universal indicator	Colour using red litmus paper	Colour using blue litmus paper
Lemon Juice		**Yellow**		
Baking soda	**9**			
Battery acid		**Red**		
Water	**7**			

Find the chemical formulae of the following acids and alkalis. You will need to use the internet to search for the answers. eg. 'Chemical formulae of phosphoric acid'.

You will need to be able to recognise and name the acids and alkalis from their chemical formulae.

Substance	pH	Chemical formulae
Phosphoric acid	1	H_3PO_4
Hydrochloric acid	1	
Sulfuric acid	1	
Nitric acid	1	
Sodium hydroxide	14	
Potassium hydroxide	14	
Copper Oxide	N/A	

Acids and alkalis Homework 3:

Complete the equations below by filling in the gaps.

Acids react with alkalis to make a salt and water.

acid + base (or alkali) → metal salt + water

(where the name of the salt depends on the acid used – see knowledge organiser)

eg. hydrochloric acid + sodium hydroxide → sodium chloride + water

1. hydrochloric acid + potassium hydroxide → _____ + water

2. sulfuric acid + _____hydroxide → sodium sulfate + water

3. hydrochloric acid + copper oxide → _____ + water

4. nitric acid + calcium hydroxide → _____ + water

5. sulfuric acid + _____ → lithium sulfate + water

6. _____ + _____ → calcium chloride + water

7. _____ + zinc oxide → zinc sulfate + water

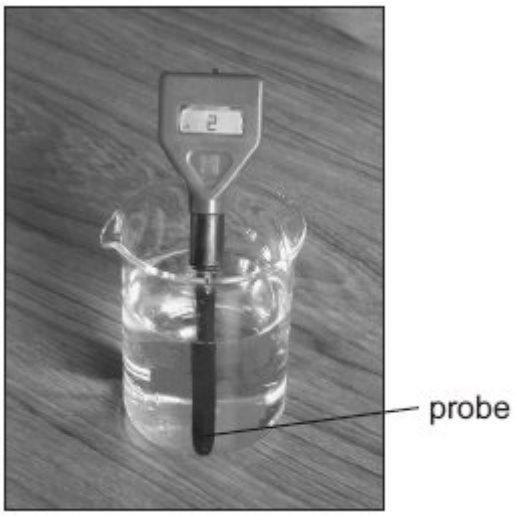
8. _____ + _____ → sodium nitrate + water

9. hydrochloric acid + iron oxide → _____ + water

10. nitric acid + _____ → potassium nitrate + water

Acids and Alkalis Homework 4:

Molly used a pH sensor to test different liquids. She dipped the probe of the sensor into each liquid and recorded the pH value in a table.



(a) In the table below, tick **one** box for each liquid to show whether it is **acidic**, **neutral** or **alkaline**. One has been done for you.

liquid	pH value	acidic	neutral	alkaline
alcohol	7			
dilute hydrochloric acid	2	✓		
distilled water	7			
vinegar	3			
sodium hydroxide solution	11			

2 marks

(b) Between each test Molly dipped the probe into distilled water.

(i) Why did she do this?

.....

.....

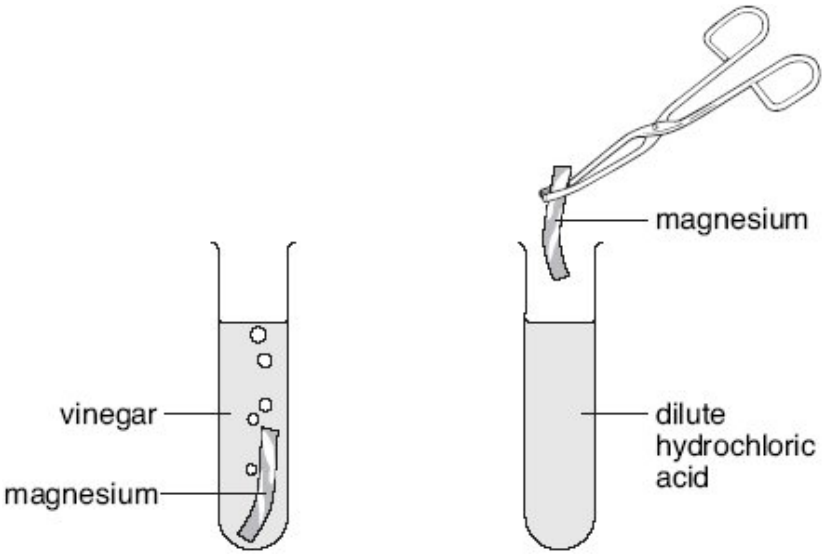
1 mark

(ii) Which other liquid in the table could Molly use between tests to have the same effect as distilled water?

.....

1 mark

(c) Molly put a piece of magnesium into a test-tube containing 20 cm^3 of vinegar. She put another piece of magnesium into a test-tube containing 20 cm^3 of dilute hydrochloric acid.



(i) Molly thought that magnesium would react more vigorously with hydrochloric acid than with vinegar.
What information in the table made Molly think this?

.....

.....

1 mark

(ii) How would Molly be able to tell if a more vigorous reaction took place with hydrochloric acid than with vinegar?

.....

.....

1 mark

(d) (i) Complete the word equation for the reaction between magnesium and hydrochloric acid.

magnesium + hydrochloric acid → ..... ……..……+ .....

2 marks

(ii) After some time this reaction stopped. Why did the reaction stop?

.....

.....

1 mark

maximum 9 marks

Acids and alkalis Homework 5:

This question is about copper sulfate.

(a) The formula of copper sulfate is $CuSO_4$

The table below shows information about the atoms in copper sulfate.

Complete the table.

Element	Symbol	Relative number of atoms in $CuSO_4$
	Cu	
Sulfur		
		4

(3)

Copper oxide and sulfuric acid react to produce copper sulfate and water.

(b) Complete the word equation for this reaction.

_____ _____ + _____ _____ → _____ _____ + water

(1)

(c) What type of substance is copper oxide?

Tick (✓) **one** box.

A base ☐

A metal ☐

A salt ☐

An acid ☐

(1)

A student planned to make blue copper sulfate crystals.

This is the method the student used.

1. Add 25 cm^3 of dilute sulfuric acid to a conical flask.

2. Gently warm the dilute sulfuric acid.

3. Add 2 g of black copper oxide to the dilute sulfuric acid.

4. Stir the mixture.

5. Evaporate some of the water from the mixture using an electric heater.

6. Leave the mixture to cool.

Not all the copper oxide reacted. The student did not remove the excess copper oxide.

(d) What would the product look like after step 6?

Tick (✓) **one** box.

Black powder only	☐
Blue crystals and black powder	☐
Blue crystals only	☐
Blue solution only	☐

(1)

(e) The student should have filtered the mixture after step 4.

Draw a diagram of the apparatus the student could use.

You should label:

- the pieces of equipment used
- where the excess copper oxide collects.

(3)

(f) What equipment should the student use to measure:

- 2 g of copper oxide
- 25 cm^3 of dilute sulfuric acid?

Draw **one** line from each measurement to the most suitable piece of equipment.

Measurement	Equipment
	Balance
2 g of copper oxide	Beaker
	Measuring cylinder
25 cm^3 of dilute sulfuric acid	Metre rule
	Thermometer

(2)

(Total 11 marks)