

WEEK: 15

Week Beginning: 29-6-20

Subject: SCIENCE

Year: 8

Lesson Objective:

- Go over homework questions
- Acids and Alkalis
- Neutralisation reactions
- Recap of balancing equation using acid and alkalis

Keywords/ Concepts

- Balancing, acid, alkali, neutralisation

Class Worksheets

- Questions below
- Notes

Homework

- Questions below

Additional Notes

- Attach all the classroom worksheets and homework worksheets to this lesson plan and email together.
- Assume the students don't have revision guides and workbooks. Attach all the pages you want them to have.

Balancing Equations

Q1 Write down how many atoms of each element are present in the formulas written below. The first one has been done for you.

- a) Carbon dioxide CO_2 1 carbon (C), 2 oxygen (O)
- b) Copper sulfate CuSO_4 1 Copper, 1 Sulfur, 4 Oxygens
- c) Sodium chloride NaCl 1 Na, 1 Cl
- d) Iron oxide Fe_2O_3 2 Iron, 3 Oxygen
- e) Ammonia NH_3
- f) Water H_2O
- g) Copper oxide CuO

Q2 Complete the following word equations by writing in the correct product after the arrow.

- a) Aluminium + oxygen \rightarrow
- b) Magnesium + oxygen \rightarrow
- c) Sodium + chlorine \rightarrow

Q3 Joshua wants to write a balanced symbol equation for burning calcium in oxygen.

- a) What does a balanced symbol equation show?

There are the same number of elements on both sides of the equation.



- b) Write down the word equation for this reaction.

Calcium + Oxygen \rightarrow Calcium Oxide

- c) Write down the chemical formula for each of the reactants in this reaction.

Ca and O_2

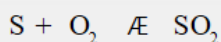
- d) Use your answers to parts a)-c) to help you write a balanced symbol equation for burning calcium in oxygen. The chemical formula for calcium oxide is CaO .

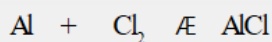
$2\text{Ca} + \text{O}_2 \rightarrow 2\text{CaO}$

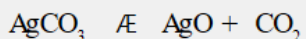
Section 6 — Chemical Changes

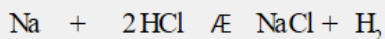
Balancing Equations

Q4 Write the letter B next to all the following equations that are balanced, and U next to those that are unbalanced.









Q5 Oxygen can be removed from iron oxide using carbon. The word equation and symbol equation for this reaction is shown below. The symbol equation is not balanced.



a) Count up the number of atoms of each element on each side of the symbol equation above and write them in this table.

Element	Number of atoms	
	Left side of the equation	Right side of the equation
Fe		
O		
C		

b) Try and balance the oxygen atoms in the equation. What numbers do you need to put in front of Fe_2O_3 and CO_2 to make the number of oxygen atoms on each side of the equation the same? Put these numbers in the gaps next to these molecules in the equation below.

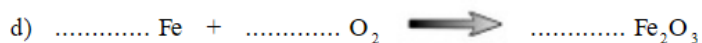
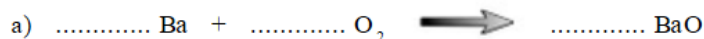


c) Use your answer to parts a) and b) to work out the numbers you need to multiply the carbon (C) and iron (Fe) atoms by to balance the equation. Write the complete balanced equation below.



Balancing Equations

Q6 Balance the following symbol equations. A gap has been left in front of each substance in the equations, but you may not need to write a number in every gap to balance the equation.



Start by working out what numbers you need to multiply the Fe₂O₃ and O₂ by to balance the Os on both sides of the equation.

Q7 Ashia needs help with her chemistry homework. She's tried to balance the chemical equations below, but she thinks she has got some wrong. Write down the correctly balanced equation on the line below each equation she has got wrong.



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Section 6 — Chemical Changes

Answers from last week's homework

Pages 110-112 — Balancing Equations

- Q1 b) 1 copper (Cu), 1 sulfur (S), 4 oxygen (O)
 c) 1 sodium (Na), 1 chlorine (Cl)
 d) 2 iron (Fe), 3 oxygen (O)
 e) 1 nitrogen (N), 3 hydrogen (H)
 f) 2 hydrogen (H), 1 oxygen (O)
 g) 1 copper (Cu), 1 oxygen (O)
- Q2 a) aluminium oxide
 b) magnesium oxide
 c) sodium chloride
- Q3 a) How many of each chemical react or are made in a reaction.
 b) calcium + oxygen \rightarrow calcium oxide
 c) Ca (calcium), O₂ (oxygen)
 d) $2\text{Ca} + \text{O}_2 \rightarrow 2\text{CaO}$
- Q4 $\text{Na} + 2\text{HCl} \rightarrow \text{NaCl} + \text{H}_2$ and $\text{Al} + \text{Cl}_2 \rightarrow \text{AlCl}$ are unbalanced.

Q5 a)

Element	Number of atoms	
	Left side of the equation	Right side of the equation
Fe	2	1
O	3	2
C	1	1

- b) $2\text{Fe}_2\text{O}_3 + \text{C} \rightarrow \text{Fe} + 3\text{CO}_2$
 c) $2\text{Fe}_2\text{O}_3 + 3\text{C} \rightarrow 4\text{Fe} + 3\text{CO}_2$
- Q6 a) $2\text{Ba} + \text{O}_2 \rightarrow 2\text{BaO}$
 b) $2\text{HCl} + \text{Mg} \rightarrow \text{MgCl}_2 + \text{H}_2$
 c) $2\text{HCl} + \text{CuO} \rightarrow \text{CuCl}_2 + \text{H}_2\text{O}$
 d) $4\text{Fe} + 3\text{O}_2 \rightarrow 2\text{Fe}_2\text{O}_3$
- Q7 a) This equation is correctly balanced.
 b) $\text{Ca} + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2$
 c) $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$
 d) $2\text{ZnO} + \text{C} \rightarrow 2\text{Zn} + \text{CO}_2$
 e) This equation is correctly balanced.
 f) $2\text{C}_2\text{H}_6 + 7\text{O}_2 \rightarrow 4\text{CO}_2 + 6\text{H}_2\text{O}$
 g) This equation is correctly balanced.

Classwork

1. What pH does the strongest acid on a pH chart have?
2. What pH does the strongest alkali on a pH chart have?
3. What pH do neutral solutions have?
4. What colour would universal indicator go if it was mixed with:
 - a. A strong acid?
 - b. A neutral solution?
 - c. A strong alkali?
5. What is neutralisation?







6. Outline the method to make common salt – sodium chloride?

7. What salts do sulfuric acids make?

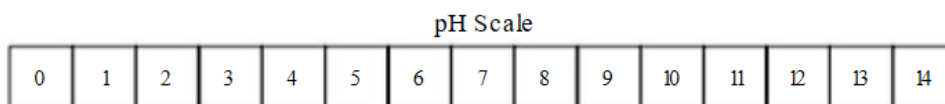
8. What salts do nitric acids make?

Acids and Alkalis

Q1 For each item, decide whether it's an acid, alkali, or if it's neutral. Write your answer in the box underneath each picture.

 Apple <input style="width: 100px; height: 20px;" type="text"/>	 Orange <input style="width: 100px; height: 20px;" type="text"/>	 Lemonade <input style="width: 100px; height: 20px;" type="text"/>
 Bleach <input style="width: 100px; height: 20px;" type="text"/>	 Water <input style="width: 100px; height: 20px;" type="text"/>	 Washing Powder <input style="width: 100px; height: 20px;" type="text"/>

Q2 Write the following labels on the pH scale shown below:
i) Strong Acid, ii) Weak acid, iii) Neutral, iv) Strong alkali, v) Weak alkali.



Q3 Complete the table below, filling in the gaps with the words given.

pH8 yellow pH1 red weak acid pH13 strong alkali
 weak alkali strong acid purple blue green pH6 pH7 neutral

Useful Substance	pH value	Colour with Universal Indicator	Acid, Alkaline or Neutral
a) Hydrochloric acid in stomach			
b) Rain water			
c) Sodium hydroxide			
d) Tap water			
e) Washing up liquid			

Acids and Alkalis

Q4 Jasmine has a sample of nitric acid and a sample of sodium hydroxide. She adds some universal indicator to each sample to find out their pH.

a) i) Name one other indicator that changes colour in an acid and an alkaline solution.

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ii) What colour does this indicator turn in an acidic solution?

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iii) What colour does this indicator turn in an alkali solution?

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b) Why is universal indicator the best indicator for Jasmine to use in this experiment?

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Q5 Bob and Linda are trying to make a salt. They have a bottle of acid and a bottle of alkali which when reacted together will make a salt and water.

a) They want to test the pH of the acid and alkali before they mix them together. Bob suggests that they add a few drops of universal indicator to each bottle to test their pH.

Describe a better way of testing the pH of the acid and alkali.



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b) Bob and Linda react some of the acid and alkali together and test the pH of the solution made using universal indicator. The indicator turns yellow.

i) Is the solution acidic, neutral or alkaline?

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ii) What colour will the indicator turn when the right amounts of acid and alkali have been combined to make a solution of salt and water?

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Section 6 — Chemical Changes

Neutralisation Reactions

Q1 Acid and alkali combined will give a salt and water, if they are mixed in the right amounts.

a) What is the name given to this type of reaction?

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b) What is the pH of the resulting solution of salt and water?

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c) Put the correct acid into each equation. Some acids may be used more than once.

Nitric acid produces nitrate salts.
Sulfuric acid produces sulfate salts.
Hydrochloric acid produces chloride salts.

i) Sodium hydroxide + \rightarrow Sodium sulfate + water

ii) Sodium hydroxide + \rightarrow Sodium nitrate + water

iii) Calcium hydroxide + \rightarrow Calcium chloride + water

iv) Calcium hydroxide + \rightarrow Calcium sulfate + water

Q2 Fill the blanks using the words below.

alkali neutralisation acid green water nitrate
universal indicator indicator sulfuric acid chloride

Salts are prepared by the of an and an

..... This also gives

To make sure the acid and alkali are added in the right amounts an

is used to test the solution. is a good indicator

to use. It goes in a neutral solution. The type of acid used will give

a particular salt. For example will give a sulfate,

hydrochloric acid will give a and nitric acid will give

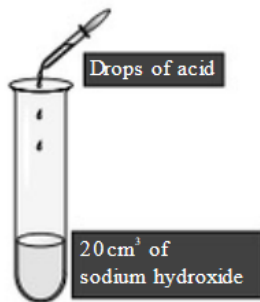
a All these are types of salts.

Neutralisation Reactions

Q3

You can make a salt solution by neutralising sodium hydroxide with hydrochloric acid, as shown.

1. A few drops of hydrochloric acid is added to a test tube containing 20 cm³ of sodium hydroxide.



2. A small sample of the solution in the test tube is removed and checked to see if the pH is neutral.
3. Repeat this process until you have a neutral solution.

- a) Why do you keep checking to see if the pH is neutral?

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- b) Name an indicator that would be suitable to use.

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- c) Why do you not add the indicator to the test tube at the beginning, instead of taking samples of the mixture out?

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- d) Acids and alkalis are dangerous substances. Suggest one safety precaution you should take when doing this experiment.

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- e) Give the chemical name of the salt formed in this experiment.

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Section 6 — Chemical Changes

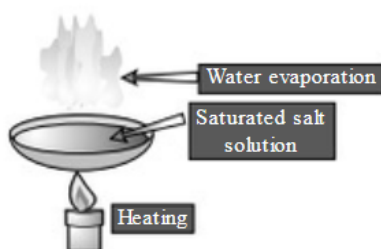
Neutralisation Reactions

Q4 Brenda makes a neutral salt solution by reacting hydrochloric acid with potassium hydroxide.

a) Name the salt in the salt solution.

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b) Brenda wants to use the solution to produce salt crystals. She pours the salt solution into a heat-proof dish and heats it using a Bunsen burner. She heats the solution until half the original amount of the solution is left in the dish. This solution is a saturated salt solution.



i) Describe what happens to the solution while it is being heated.

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ii) What is a saturated salt solution?

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c) Brenda leaves the dish containing the saturated salt solution to cool on a window sill. She comes back after a day and the dish is filled with large salt crystals.

i) Complete these sentences.

The faster the cooling of the solution, the the crystals.
The slower the cooling of the solution, the the crystals.

ii) Describe one way Brenda could change her experiment to produce smaller salt crystals from the solution.

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