**NATURAL SCIENCES**

**Gr. 9 - LESSON PLAN -** **MATTER & MATERIALS**

|  |  |  |  |
| --- | --- | --- | --- |
| **TOPIC:** COMPOUNDS | | | |
| Sub-topic: Names of Compounds | | **Duration**: 1 Hour | |
| **CONTENT & CONCEPTS** (CAPS p63)  **KEY CONCEPTS**   1. Chemical reaction 2. Chemical formula 3. Names of compounds according to their elements. | | | |
| **Specific Aims:** | Specific Aim 1: ‘Doing Science’ | | **X** |
| Specific Aim 2: ‘Knowing the subject content and making connections’ | | **X** |
| Specific Aim 3: ‘Understanding the uses of Science’ | |  |
| **LESSON OBJECTIVES:**   1. Learners will be able to write the names of compounds as indicated on page 63 of the CAPS Document. 2. Learners will be able to make models of different compounds | | | |
| **RESOURCES REQUIRED**:   * Periodic Table Poster * Siyavula Sasol Inzalo (Learner book) page 163 | | | |
| **TEACHING & LEARNING ACTIVITY**:  **Introduction**  **Briefly review and revise concepts dealt with in Grade 8, focusing on compounds**  As each element has a unique name for example:   * Hydrogen * Lithium   **Remember the first 20 elements learnt in grade 8. How did you memorize them? Do you remember Mnemonics…**  **Hi!** – H; **He** – He; **Lies** – Li; **Because** – Be; **Boys** – B; **Can** – C; **Not** – N; **Operate** – O; **Fireplaces** – F;  **New** – Ne; **Nation** – Na; **Might** – Mg; **Also** – Al; **Sign** – Si; **Peace** – P; **Security** – S; **Clause** - Cl  **A** – Ar; **King** – K; **Can** – Ca  LEARNERS MAY RECITE THIS MNEMONIC AS A WAY OF MEMORIZING THE FIRST 20 ELEMENTS.  **The teacher provides the following explanation to the learners**    Each **compound** has a unique name. How is a compound formed?   * A compound is formed when TWO or more different elements combine chemically. * Each atom in a compound are held by chemical bonds * Compounds are formed during **chemical reaction (when elements/ componds combine to form new substances)** * Each compound can be written as a **formula**, for example.   **H2O; NaCl; CuSO4**  What is a **formula**?   * This is a notation that shows which elements the compound is made up of. * It indicates the total number of atoms in one unit of the compound * It indicates the ratio in which atoms of different elements are bonded to each other * It gives the total number of atoms in one unit of a compound.   For example, the formula for Copper Sulphate is CuSO4   * It consists of copper (Cu), Sulfur (S) and oxygen (O) * It contains 1 Cu, 1 S, 4 O - atoms * The ratio in which Cu: S: O is bonded, is 1: 1: 4 * In total there are 6 atoms (1 + 1 + 4)   **The teacher further explains how compounds are named**  NAMING OF COMPOUNDS  Compounds get their names from elements they are compiled of.  **Steps for naming a compound**   1. **Identify the elements in a compound**   For example, NaCl consists of the elements sodium (Na) and chlorine (Cl)   1. **First write the name of the metal or hydrogen**   NaCl Sodium…  H2SO4 hydrogen…   1. **If the compound contains only TWO elements name, the first element and change the end of the second element to – ide**   Flourine changes to fluoride NaF is sodium flouride  Chlorine changes to chloride NaCl is sodium chloride  Nitrogen changes to nitride Cu3N2 is copper nitride   1. **If the compound contains three elements, one of which is oxygen, name the element that is not oxygen and change the end of the name to – ate**   **SO4 sulfate**  **CO3 carbonate**  **The teacher should explain that there are exceptions to the above rules, for example;**  OH is called hydroxide | | | |
| **ASSESSMENT:**  **Learners do the following assessment individually**   1. **Complete the following table**  |  |  |  |  | | --- | --- | --- | --- | | **NAME** | **FORMULA** | **NUMBER OF ATOMS** | **RATIO IN WHICH ATOMS ARE COMBINED** | | **Sulfur dioxide** | **SO2** |  |  | | **Potassium Chlorate** | **KClO3** |  |  | | **Ammonium hydroxide** | **NH4OH** |  |  | | **Iron oxide** | **Fe2O3** |  |  |  1. **Write down the names of the following compounds**  |  |  | | --- | --- | | **FORMULA OF THE COMPOUND** | **NAME OF THE COMPOUND** | | **NaCl** |  | | **H2S** |  | | **MgCl2** |  |   **PRACTICAL ACTIVITY**  **This activity will be done in groups BUT under teacher supervision**  **In this activity we are going to make models (using beads, beans or plasticine or playdough) of several elements and compounds including:**   * **water (H2O),** * **oxygen (O2),** * **carbon monoxide (CO),** * **carbon dioxide (CO2),** * **copper oxide ( CuO)**   **PLEASE NOTE:**  If you are not sure how to arrange the atoms, here is an important tip: the atom that comes first in the name (it will usually also be the first atom in the formula) must be placed at the centre of the molecule. All the other atoms must be placed around it. They will be bonded to the atom at the centre, but not to each other. | | | |

**NATURAL SCIENCES**

**Gr. 9 - LESSON PLAN -** **MATTER & MATERIALS**

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| --- | --- | --- | --- |
| **TOPIC:** CHEMICAL REACTIONS | | | |
| Sub-topic: Chemical Equations | | **Duration**: 1 hour | |
| **CONTENT & CONCEPTS** (CAPS p64)  **KEY CONCEPTS**  Chemical reactions can be represented with:   1. Models 2. Symbols 3. Words | | | |
| **Specific Aims:** | Specific Aim 1: ‘Doing Science’ | |  |
| Specific Aim 2: ‘Knowing the subject content and making connections’ | | **X** |
| Specific Aim 3: ‘Understanding the uses of Science ’ | |  |
| **LESSON OBJECTIVES:**   1. Learners will be able to explain what a chemical reaction is. 2. Learners will be able to represent chemical equations as:   A) Models  B) Symbols  C) Words | | | |
| **RESOURCES REQUIRED**:   * English Dictionary * Textbooks: e.g Siyavula Explore Gr. 9A | | | |
| **TEACHING & LEARNING ACTIVITY**:  **Introduction**  RECAP OF GRADE 8 WORK  In grade 8 Matter and Materials we learnt about the chemical reactions for the first time. Can you remember the main ideas about chemical reactions?  Teacher will ask learners probing questions such as:   * What is a chemical reaction?   **It is a process whereby one set of chemical substances react with each other to form a new set of chemical substances.**  **Chemical reactions occur when elements and/ compounds combine to form new substances.**  **PLEASE NOTE:**   * A chemical reaction is accompanied by **chemical change**. * A re-arrangement of atoms occurs to form new **products**. * The properties of **product(s)** differ from the original **reactants.** * **No atoms are lost or gained in chemical reactions, they are simply re-arranged – this means that the number of atoms of each type on the left should be equal to the number of atoms of those that are on the right.** * What is the difference between reactants and products?   **Reactants are substances that react with one another whilst products are the new substances that are made during chemical reaction.**   * What is the meaning of the arrow when writing a **chemical equation**? *(Please inform learners to refrain from using an equal sign when expressing a chemical equation in writing).*   The teacher explains to the learners that: A chemical equation is the symbolic representation of a chemical reaction in the form of symbols and formulae, wherein the reactant entities are given on the left-hand side and the product entities on the right-hand side.  React with each other  Form other atoms or molecules  Atoms or molecules  In mathematic equations we use an equal sign (=) for example 2 + 2 = 4, but in scientific chemical equations, we use an arrow (→), for example C + O2→ CO2.  CHEMICAL REACTIONS CAN BE REPRESENTED AS:   1. **Word equations**   When we represent a chemical reaction in terms of words, we write a word equation. For example, when hydrogen gas reacts with oxygen gas to form water, we can write a word equation for the reaction as follows:  hydrogen + oxygen→ water  To the left of the arrow, we have the 'before' situation. This side represents the substances we have before the reaction takes place. They are called the reactants. What are the reactants of this reaction? To the right of the arrow we have the 'after' situation. This sides represents the substances that we have after the reaction has taken place. They are called the products. What is the product of this reaction?  2. **Picture equations**  The same reaction of hydrogen reacting with oxygen, can also be represented in pictures called sub-microscopic diagrams. The diagram below shows that the atoms in two hydrogen molecules (H2) and one oxygen molecule (O2) on the left rearrange to form the two water molecules (H2O) on the right of the arrow. Hydrogen atoms are white circles and oxygen atoms are red circles.    What kind of representation is this: macroscopic, sub-microscopic, or symbolic?  Now we are going to convert our sub-microscopic picture to a symbolic one:  What is the product of the above reaction? What are the reactants of the above reaction? Write their formulae.  3. **Chemical equations ( Symbols )**  When we represent a chemical reaction in terms of chemical formulae (symbols), it is called a chemical equation. The chemical equation for the above reaction would be as follows:  2 H2 + O2→2 H2O  What kind of representation is this: macroscopic, sub-microscopic, or symbolic?  We still have reactants on the left and products on the right. | | | |
| **ASSESSMENT**  **LEARNERS WILL COMPLETE THIS ACTIVITY INDIVIDUALLY**  **Name Of Learner:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Grade:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **Natural Sciences Test**  **Consolidation of Chemical equations**  1. Write the following chemical equations as word equations: [2 x 3 = 6]  a) C + O2 → CO2  b) Mg + O2 → MgO  2. Write the following word equations as chemical equations: [2 x 3 = 6]  a) sulfur + oxygen → sulfur dioxide  b) carbon monoxide + water → carbon dioxide + hydrogen  3. Write the following picture equations as chemical equations. [2 x 3 = 6]  • The red circles represent oxygen (O) atoms.  • The white circles represent hydrogen (H) atoms.  • The grey circles represent carbon (C) atoms.  • The yellow circles represent sulfur (S) atoms.    4. Write the following chemical equations as picture equations: [2 x 4 = 8]  a) CH4 + 2 O2 → CO2 + 2 H2O  b) CS2 + 3 O2 → CO2 + 2 SO2 | | | |

**ACTIVITY 1:** Drawing water

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**INSTRUCTIONS:**

The instruction for this activity is simple: Draw a picture of water. You may use the space below for your drawing.

|  |
| --- |
|  |

Your drawing may look like one of the diagrams below. They all represent water. But which one is correct?



They are all correct!

The three diagrams above all represent water, but they are very different from each other. We say that they are three different **representations** of the same thing, namely water.

**ACIDS AND BASES EXPERIMENTS**

###### **Materials**

* Milk of Magnesia - almost any brand will work. Make sure the primary ingredient is magnesium hydroxide - Mg(0H)2
* Universal Indicator - this is available from a chemical supplier. Cabbage Juice Indicator will work in place of Universal Indicator, but the colour change is not as dramatic.
* Vinegar

1. Place about 100 mL of Milk of Magnesia in a 500 mL beaker and dilute with tap water until the beaker is about half full.
2. Add about 10 mL of Universal Indicator. (The Universal Indicator will provide the sharp colour change you see in the video). Remember that Universal Indicator will turn red on the far acidic end of the scale and dark blue on the alkaline side.
3. Stir to create a steady mix of the liquids by hand. You'll see that the solution turns a light blue, indicating that it is slightly basic due to the small amount of the Mg(OH)2.
4. While stirring the solution, add 10-20 mL of vinegar (it doesn't have to be precise) and observe the rapid colour change. The mixture quickly changes to red because the acid disperses throughout the beaker.
5. The acid neutralizes the small amount of hydroxide ion from the Mg(0H)2 that has dissolved first, then turns the solution acidic. However, as more of the Mg(0H)2 from the suspensions gradually dissolves into solution, the acid is neutralized and eventually the solution becomes basic.
6. You'll hear screams of "Do it again!"... and why not? Add more vinegar and watch as the liquid goes from red to orange to yellow to green and eventually settles at the bluish-purple colour. In other words, the mixture changes through the entire Universal Indicator colour range!
7. In time, all of the vinegar (acid) will react with the magnesium hydroxide and the solution will remain red.

**How Does It Work?**

Milk of magnesia is a liquid used as an antacid and, sometimes, a laxative. Also known as magnesium hydroxide or Mg(OH)2, the solution is taken orally. The original concentrated formula was concocted by a man named Charles Henry Phillips in 1880 and sold under the brand Phillips' Milk of Magnesia. Today, the rights to the name "milk of magnesia" appear to be owned by Bayer Corporation and, interestingly, "Phillips' Milk of Magnesia" is owned by Sterling Drug.

Milk of magnesia is an alkaline suspension, meaning that it undergoes a neutralizing reaction when encountering anything acidic. This makes it an effective combatant of excess stomach acid when taken internally. Too much hydrochloric acid (HCl) excreted by the parietal cells in the stomach can lead to indigestion, heartburn, and stomach ulcers. Milk of magnesia in the form of an antacid is dosed from 500 mg-1500 mg (0.02-0.05 oz) and readily enters the stomach, where the hydroxide ions in milk of magnesia combine with the hydrogen ions in HCl to calm over activity in the stomach.

**Assessment Task**

**Investigation into pH**

Table A below shows the pH values in different parts of the digestive system.

**Table A**

|  |  |
| --- | --- |
| **Organ** | **pH Range** |
| Mouth | 6.5 – 7.5 |
| Stomach | 2 |
| Small intestine | 7.5 – 8 |

A scientist tested 3 different enzymes to find out how they reacted in different pHs. Table B shows his data.

(Note: Rate of enzyme activity was measured in *grams of product produced per minute by the enzyme* i.e. g/min.)

**Table B**

**pH Rate of enzyme activity (g/min)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Enzyme A** | **Enzyme B** | **Enzyme C** |
| **1** | 100 | 0 | 0 |
| **2** | 250 | 0 | 0 |
| **3** | 80 | 0 | 0 |
| **4** | 10 | 10 | 0 |
| **5** | 0 | 60 | 0 |
| **6** | 0 | 180 | 60 |
| **7** | 0 | 260 | 180 |
| **8** | 0 | 20 | 260 |
| **9** | 0 | 0 | 20 |
| **10** | 0 | 0 | 0 |

The scientist knows that the three enzymes are:

Salivary amylase – secreted by the salivary glands in the mouth.

Pancreatic proteinase – secreted by the pancreas into the small intestine.

Gastric proteinase – secreted by the stomach.

Unfortunately, the scientist cannot remember which set of data (Enzyme A, B and C) corresponds with which enzyme. Help him to solve his problem by doing the following:

1. Draw a graph showing the data in Table B. [20]
2. From the graph, work out which enzyme is which and label it clearly on your   
   graph. [6]
3. We talk about the stomach having a ‘pH of 2’. What does the term ‘pH’ mean? Write a paragraph to explain what the term means. Your answer should include a discussion of what acids and bases are, as well as what pH and the pH scale means. [14]

4. For this question, you will need to do some research on the pH values of certain common substances.

This table is a pH scale. Some common examples of substances at each pH are given muddled below the scale. Redraw the table into your workbook and insert the correct example next to each pH value. [30]

|  |  |
| --- | --- |
| **pH** | **Examples** |
| **1** |  |
| **2** |  |
| **3** |  |
| **4** |  |
| **5** |  |
| **6** |  |
| **7** |  |
| **8** |  |
| **9** |  |
| **10** |  |
| **11** |  |
| **12** |  |
| **13** |  |
| **14** |  |

Pure water, blood Ammonia, non-phosphate detergents

Sodium hydroxide (NaOH) Stomach acid, hydrochloric acid, battery acid

Urine, milk, saliva Tomatoes, grapes, banana

Soap Oven cleaner

Egg white, sea water Lemon juice

Black coffee, bread, normal rainwater Washing soda (Na2CO3 – sodium carbonate)

Sodium bicarbonate, phosphate detergents

Vinegar, wine, acid rain, orange juice, certain soft drinks, beer

**[60 marks]**

**Suggested Solutions**

|  |  |  |
| --- | --- | --- |
| **Question number** | **Possible marks** | **Solution** |
| **1** | 20 |  |
| **2** | 6 | Enzyme A is gastric proteinase. ✓✓  Enzyme B is salivary amylase. ✓✓  Enzyme C is pancreatic proteinase. ✓✓  Label on graph clearly. |
| **3** | 20 | Learner paragraphs will differ, but this is a guideline answer:  pH refers to the concentration of hydrogen ions in a substance, ✓ which is a measure of the acidity ✓ or alkalinity ✓ of a substance. Chemically speaking, acids are substances whose individual molecules are proton donors. ✓ These substances release hydrogen ions (H+) when they dissolve in  water. ✓ Hydrochloric acid (HCl), for example, separates into H+ and Cl-. ✓ Bases, on the other hand, are proton acceptors. ✓ They will combine with hydrogen ions in solution. ✓ Sodium hydroxide (NaOH) is a base. It separates into Na+ and OH- ions in water and the OH- will accept an H+ to form water. ✓ A neutral substance neither donates protons nor accepts them. ✓  Acids dissolved in water are called acidic solutions. ✓ Bases dissolved in water are called basic solutions or alkaline solutions. ✓ If the right amount of base is added to an acid, it will neutralise the acid (or one can say that the base is neutralised!). ✓  How does one measure whether an acid is very acidic or only mildly acidic? Similarly with a base – how do you know if a base is mild or strong? The pH scale is used to measure acidity and alkalinity. ✓ The H+ concentration in a solution determines pH. ✓ The pH scale ranges from 0 to 14, ✓ with 0 being extremely acidic, ✓ 7 (in the middle) being neutral, ✓ and 14 being extremely basic. ✓ A change in one unit on the pH scale means a tenfold change in the concentration of H+. ✓ |
| **4** | 30 | See table in Appendix of Assessment Tools.  Add two marks for neatness of table. |

**Assessment Task**

**Acids and Bases**

Acids and bases are found all over our homes. Scientists use the pH scale to measure how acidic or basic a liquid is. Not all acids are dangerous, we even have acids in our bodies. In fact, bases can be just as dangerous. Any liquid which has a pH that is on either extreme of the pH scale can be considered very dangerous.

**Graph showing the pH of some common household substances**

Use the above graph to answer the following questions:

1. Categorise the household substances as either acidic solutions, alkaline solutions or neutral solutions.

|  |  |  |
| --- | --- | --- |
| **Acids** | **Bases** | **Neutral** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

[12]

2. Why do you think that rainwater has a much lower pH than pure water? [2]

3. Identify the most dangerous acid and the most dangerous base. [2]

4. Record these liquids from the graph on the diagram representing the pH scale. [3]

The pH scale

1 2 3 4 5 6 7 8 9 10 11 12 13 14

5. Your teacher has provided you with a selection of the substances in the graph that have been suitably diluted. Investigate the properties of acids and bases and write your observations in the table below.

|  |  |  |
| --- | --- | --- |
| **Property** | **Acidic solution** | **Alkaline solution** |
| The liquid tastes … |  |  |
| The liquid feels … |  |  |
| Reaction with bromothymol blue indicator |  |  |
| Reaction with litmus paper |  |  |

[8]

6. Pepsin is an enzyme that is released in the stomach and is responsible for breaking food proteins down.

Use the graph showing the function of pepsin at various pH-levels to answer the following questions:

Enzyme

function

1 2 3 4 5 6

pH

6.1 Name the independent variable. [2]

6.2 Name the dependent variable. [2]

6.3 What pH would you estimate stomach acid is in order for pepsin to function most   
efficiently? (You can give a range.) [2]

6.4 If somebody is suffering from indigestion or acid reflux, what would you   
recommend they take? How effective do you think drinking milk will be? [2]

**[35 marks]**

**Suggested Solutions**

|  |  |  |
| --- | --- | --- |
| **Question number** | **Possible marks** | **Solution** |
| 1 | 12 | 1 mark (✓) for each correctly identified acid, base or neutral substance   |  |  |  | | --- | --- | --- | | **Acids** | **Bases** | **Neutral** | | lemon juice | caustic soda | pure water | | vinegar | dishwashing soap |  | | wine | oven cleaner |  | | tomatoes |  |  | | milk |  |  | | bananas |  |  | | black coffee |  |  | | rainwater |  |  | |
| 2 | 2 | Rainwater has dissolved gases from air pollution and is not pure water. |
| 3 | 2 | Most dangerous acid = lemon juice.  Most dangerous base = caustic soda. |
| 4 | 3 | 1 mark for each: – correct order ✓  – correct pH ✓  – neatness ✓  Household substances arranged in order:  Lemon juice, vinegar, wine, tomatoes, bananas, black coffee, rainwater, milk, pure water, dishwashing soap, oven cleaner, caustic soda. |
| 5 | 8 | |  |  |  | | --- | --- | --- | | **Property** | **Acidic solution** | **Alkaline solution** | | The liquid tastes | sour | nasty | | The liquid feels | normal | slippery | | Reaction with bromothymol blue indicator | yellow | blue | | Reaction with litmus paper | red | blue | |
| 6 | 8 | 6.1 Independent variable – pH. ✓✓ (2 marks)  6.2 Dependent variable – enzyme function. ✓✓ (2 marks)  6.3 pH range of 1 – 3. ✓✓ (2 marks)  6.4 Give an antacid or alkaline solution like bicarbonate of soda. ✓  Milk is actually slightly acidic and will therefore not provide much relief. ✓  (2 marks) |
| **TOTAL MARKS** | | **35** |

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**Acids and Bases worksheet**

**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Grade\_\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_\_\_**

|  |  |
| --- | --- |
| What is an **acid**?  How does it taste? |  |
| What are hydronium ions?  How are hydronium ions formed? |  |
| Acids are ***corrosive****.*  What does this mean? |  |
| * What is an **indicator**? * What is litmus paper? * What **colors** are they available in? * How do they change with acids and bases? |  |
| Name one use for each of the following acids: **Sulfuric Acid , Hydrochloric Acid, Nitric Acid, Citric Acid and Carbonic Acid**. |  |
| What is a **base**?  How does it **taste** and **feel**? |  |
| Name 3 substances that contain bases. See Fig. 5 |  |
| Discuss some uses of the following bases: Sodium Hydroxide, Calcium Hydroxide, and Magnesium Hydroxide |  |
| What does a **strong acid** do in water?  Name some examples of strong acids. |  |
| What does a **weak acid** do in water?  Name some examples of weak acids. |  |
| What’s the difference between a strong base and a weak base? |  |
| What is a **neutralization reaction?**  What forms when an acid and base neutralize each other? |  |
| What is the **pH of a solution**? |  |
| What does a **“7”** on the pH scale mean? What is one of the only **substances** that have a pH of 7? |  |
| What is the pH of acidic solutions?  What is the pH of basic solutions? |  |
| What is a salt?  What **salt** do you think would form from Hydrochloric Acid (HCl) neutralizing Sodium Hydroxide (NaOH)? |  |

**EXPERIMENT/ INVESTIGATION FOR ACIDS OR BASES**

**Required materials**

* Red cabbage leaves
* Water
* Bowl
* Colanders (food strainer)
* Vinegar
* Lemon juice (fresh squeezed or lemonade)
* Bicarbonate of soda (aka: baking soda)
* Milk of Magnesia
* Tap water
* Distilled water
* Several glass jars of the same size (vials preferred)
* Eye-dropper (optional)

**Step-By-Step Procedure**

**1.** Cut your cabbage leaves into small pieces.

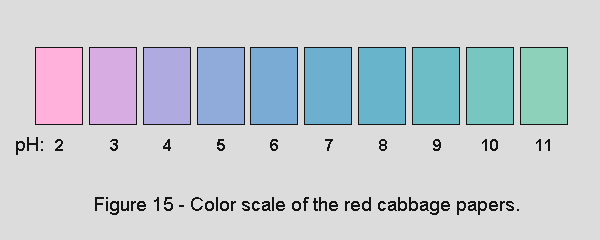
**2.** Boil several cups of water. They'll need to be enough water to submerge your cut cabbage pieces later on.

**3.** Place your cut cabbage in a bowl. Pour the boiling water into the bowl. Let the cabbage pieces soak for at least thirty minutes (your water should become a dark-purplish/redish colour depending on the cabbage).

**4.** Separate the cooled "cabbage juice" from the leaves. You can either take the cabbage out with a holed-spoon or pour the bowl of cabbage juice into a strainer over another bowl, allowing the strainer to filter-out the cabbage pieces.

**5.** Line up your glass jars, about one or two inches apart. Pour some of each chemical (vinegar, lemon juice, bicarbonate of soda, and laundry detergent) into each jar.

**6.** Now it's time to test if your chemical is an acid or a base. Pour a dash of your cabbage juice into each jar/vial. To avoid pouring too much, you may want to use an eye-dropper. You may also need to swirl your mixture around a bit. What happens to each mixture of cabbage juice and chemical? If your mixture turned pink, your chemical is an acid. If your mixture turns blue or green, your chemical is a base.



**FORMAL ASSESSMENT: ACIDS AND BASES**

**Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Grade:\_\_\_\_\_\_\_\_\_\_\_**

**Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Complete the table by following step 6, and answer the questions that follow. (18)**

|  |  |  |
| --- | --- | --- |
| **TABLE 1 – MEASURING THE PH OF SUBSTANCES** | | |
| **SUBSTANCE** | **OBSEVATION**  **(What do you see?)** | **pH**  **(according to scale)** |
| Tap water |  |  |
| Distilled water |  |  |
| Vinegar |  |  |
| Lemon Juice |  |  |
| Bicarbonate of Soda |  |  |
| Milk of magnesia |  |  |

1. What is the pH of the tap water and the distilled water respectively? **(2)**

\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_

2.1 What colour change was observed when vinegar was added to the indicator? **(1)**

The purple/red indicator turned\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2.2 What is the ph value of the vinegar according to the scale provided? **(1)** \_\_\_\_\_\_\_\_\_\_\_\_\_\_

3.1 What colour change was observed when the lemon juice was added to the indicator?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **(1)**

3.2 What is the ph value of the lemon juice according to the scale provided? **(1)**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4.1 What colour change was observed when the Bicarbonate of Soda was added to the indicator?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **(1)**

4.2 What is the ph value of the Bicarbonate of Soda according to the scale provided? \_\_\_\_\_\_\_\_\_\_\_\_\_\_ **(1)**

4.1 What colour change was observed when the Milk of Magnesia was added to the indicator?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **(1)**

4.2 What is the ph value of the Milk of Magnesia according to the scale provided? \_\_\_\_\_\_\_\_\_\_\_\_\_\_ **(1)**

5. What was kept constant when doing the experiment? **(2)**

The amount of\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ added to the amount of

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_was kept constant.

6. What is your conclusion based on the table that you have completed**. (6)**

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**[40]**