 **KENYA JUNIOR SCHOOL EDUCATION ASSESSMENT**

**KEJSEA ENDTERM ONE 2025**

**GRADE 9**

**905/2- INTEGRATED SCIENCE (PRACTICAL)**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

**School: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

**Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

**Duration:** 2 Hours  
**Total Marks:** 50 marks

**FOR FACILITATOR’S USE ONLY**

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| --- | --- | --- | --- | --- |
| SCORE RANGE | 40-50 | 28-40 | 14-27 | 0-13 |
| LEVEL | EXCEEDING EXPECTATION | MEETING EXPECTATION | APPROACHING EXPECTATION | BELOW EXPECTATION |
| LEARNER’S SCORE |  |  |  |  |
| TICK LEVEL |  |  |  |  |

**General Instructions:**

1. **Follow Instructions Carefully**: Pay close attention to every step of the procedure and any specific instructions.
2. **Lab Safety**: Always follow safety procedures, wear protective gear like goggles, and handle chemicals with care.
3. **Precise Measurements**: Make sure to measure accurately when using equipment like balances, thermometers, and measuring cylinders.
4. **Data Recording**: Record observations clearly and organize data in tables or charts where necessary.
5. **Time Management**: Complete each experiment in the given time frame and avoid rushing. Focus on performing the experiment properly.
6. **Conclusion and Discussion**: After completing the experiment, draw conclusions based on your results. Be ready to explain your findings clearly.

**Integrated Science Practical**

1. **Experiment 1: Determination of the pH of Various Solutions**
   * **Objective**: To determine the pH of different substances (e.g., water, vinegar, lemon juice, soap solution).
   * **Materials**: pH paper, test tubes, pipettes, various solutions.
   * **Procedure**:
2. Use a pipette to place each solution in a test tube
3. Dip a piece of pH paper into each.
4. Record the color change
5. Determine the pH value by comparing it to the pH scale.

**Questions**:

* + - 1. What is the pH of lemon juice and soap solution?

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* + - 1. What is the significance of pH in daily life?

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1. **Experiment 2: Investigating the Rate of Reaction**
   * **Objective**: To investigate the effect of concentration on the rate of a chemical reaction.
   * **Materials**: Hydrochloric acid, sodium thiosulfate, conical flasks, stopwatch.
   * **Procedure**:
2. Mix hydrochloric acid with sodium thiosulfate
3. Observe the reaction.
4. Record the time taken for the solution to become cloudy at different concentrations.

**Questions**:

* + - 1. How does concentration affect the rate of the reaction?

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* + - 1. What factors influence the rate of reaction?

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1. **Experiment 3: Investigating the Effect of Light on Photosynthesis**
   * **Objective**: To investigate the effect of light on the rate of photosynthesis in a plant.
   * **Materials**: Beaker, water, a leafy plant (e.g., Elodea), light source.
   * **Procedure**:
2. Place the plant in water,
3. Expose it to different light intensities,
4. Observe the oxygen bubbles produced.

**Questions**:

* + 1. How does the light intensity affect photosynthesis?

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* + 1. What is the importance of photosynthesis to life on Earth?

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1. **Experiment 4: Determining the Density of Solids and Liquids**
   * **Objective**: To determine the density of a solid and a liquid.
   * **Materials**: Solid object (e.g., metal), balance, measuring cylinder.
   * **Procedure**:
2. Measure the mass of the solid and the volume of the liquid,
3. Calculate the density (density = mass/volume).

**Questions**:

* + 1. What is the formula for calculating density?

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* + 1. How does the density of an object determine whether it floats or sinks in a liquid?

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1. **Experiment 5: Measuring the Effect of Temperature on the Solubility of a Substance**
   * **Objective**: To investigate how temperature affects the solubility of salt in water.
   * **Materials**: Salt, water, beaker, thermometer, stirring rod.
   * **Procedure**:
2. Heat water to different temperatures
3. Add salt, recording the amount dissolved at each temperature.

**Questions**:

* + 1. How does temperature affect the solubility of salt?

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* + 1. What are some applications of solubility in everyday life?

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**MARKING SCHEME**

**Experiment 1: Determination of the pH of Various Solutions**

* **What is the pH of lemon juice and soap solution?**
  1. **Lemon juice**: pH around 2-3 (acidic).
  2. **Soap solution**: pH around 9-11 (alkaline).
* **What is the significance of pH in daily life?**

pH affects the acidity or alkalinity of substances, influencing chemical reactions. In daily life, pH is important for maintaining the balance of soil for plants, the health of the human body (e.g., blood pH), and the effectiveness of cleaning products.

**Experiment 2: Investigating the Rate of Reaction**

* **How does concentration affect the rate of the reaction?**
  + Increasing the concentration of the reactants increases the rate of the reaction. This is because more molecules are available to collide and react, which leads to more frequent reactions.
* **What factors influence the rate of reaction?**
  + The rate of reaction is influenced by:
    - **Concentration of reactants**
    - **Temperature** (higher temperatures increase the rate)
    - **Surface area** of the reactants (smaller pieces react faster)
    - **Presence of a catalyst** (which speeds up the reaction without being consumed)
    - **Nature of the reactants** (some react more readily than others)

**Experiment 3: Investigating the Effect of Light on Photosynthesis**

* **How does light intensity affect photosynthesis?**

As light intensity increases, the rate of photosynthesis also increases, up to a certain point. Beyond this point, the rate levels off because other factors (like CO₂ or temperature) become limiting.

* **What is the importance of photosynthesis to life on Earth?**

Photosynthesis is crucial because it produces oxygen and organic compounds that are essential for the survival of plants, animals, and humans. It also forms the basis of most food chains.

**Experiment 4: Determining the Density of Solids and Liquids**

* **What is the formula for calculating density?**

**Density** = Mass / Volume.

* + - Mass is measured in grams (g).
    - Volume is measured in cubic centimeters (cm³) or liters (L).
* **How does the density of an object determine whether it floats or sinks in a liquid?**
  + An object will float in a liquid if its density is less than the density of the liquid. If the object’s density is greater than the liquid’s, it will sink.

**Experiment 5: Measuring the Effect of Temperature on the Solubility of a Substance**

* **How does temperature affect the solubility of salt?**
  + As temperature increases, the solubility of most solid solutes (like salt) in water increases. This is because the molecules move faster and can break apart the solute more effectively at higher temperatures.
* **What are some applications of solubility in everyday life?**
  + Solubility is important in processes like:
    - **Cooking**: Dissolving sugar or salt in water for recipes.
    - **Medicine**: Dissolving drugs for proper absorption.
    - **Environmental**: Managing the solubility of pollutants in water bodies.

**RUBRICS**

**General Rubric Format**

| **Experiment/Trial** | **Observation/ Description** | **Measurement/Value (Unit)** | **Calculated Value** | **Conclusion/Analysis** |
| --- | --- | --- | --- | --- |
| Example: pH of solution | Solution turns red | pH value: 3 | N/A | Acidic nature of the solution |
| Example: Rate of reaction | Clear to cloudy | Time: 60 sec | Rate: 1/60 sec | Rate increases with concentration |

**Table 1: Investigating the pH of Solutions**

| **Solution** | **Observation** | **pH Value** | **Conclusion** |
| --- | --- | --- | --- |
| Lemon juice | Solution turns red (acidic) | 3 | Lemon juice is acidic. |
| Soap solution | Solution turns blue (alkaline) | 9 | Soap solution is alkaline. |
| Distilled water | No color change (neutral) | 7 | Distilled water is neutral. |

**Table 2: Rate of Reaction (Concentration vs Time)**

| **Trial** | **Concentration (mol/L)** | **Time (s)** | **Rate (1/time)** | **Conclusion** |
| --- | --- | --- | --- | --- |
| Trial 1 | 0.5 | 120 | 1/120 | Lower concentration slows reaction rate. |
| Trial 2 | 1.0 | 60 | 1/60 | Higher concentration speeds up reaction. |
| Trial 3 | 1.5 | 40 | 1/40 | Further increase in concentration increases rate. |

**Table 3: Solubility of Salt in Water at Different Temperatures**

| **Temperature (°C)** | **Amount of Salt Dissolved (g)** | **Conclusion** |
| --- | --- | --- |
| 20 | 25 | Solubility increases with temperature. |
| 40 | 35 | Solubility increases with temperature. |
| 60 | 45 | Solubility increases with temperature. |

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