

# National Chemistry Week 2023

## Milk of Magnesia: The Acid Neutralizer and The Magical Mood Ring

### Materials (For each individual demonstrator and student)

*Each table gets 1 stock container of each of Milk of Magnesia, Vinegar, and Red Cabbage juice.)*

- 1) Milk of Magnesia: 3 ml per student.
- 2) 1 plastic cup per student.
- 3) Red cabbage juice: 5 drops per experiment.
- 4) Vinegar: 4 mL per student
- 5) Dropper: 3 per table (1 for each of Milk of Magnesia, vinegar, and red cabbage stock containers at each table.)

### Preparation Instructions for Demonstrators:

**Lay out 1 cup on the table. 3 droppers (1 for Milk of Magnesia, 1 for vinegar and 1 for red cabbage juice).**

**Milk of magnesia bottle. Vinegar bottle. Red cabbage indicator solution.**

### Start Here

**Demonstrator:** Who here likes to eat French fries, pizzas, or fried foods in general?

Did you ever feel uneasiness in the stomach after that? Well, it is due to the building of acidity in the stomach.

Hello, young scientists! Today, we're embarking on an exciting adventure to discover the secret behind Milk of Magnesia and why it's our superhero against the villain known as acidity. Imagine our stomach as a magical kingdom, and our potions will help us defeat the evil acid monsters causing trouble in our tummies!

*Let's take 1 cup, add 3 mL of Milk of Magnesia to it with a dropper.*

This Milk of Magnesia is our hero, ready to face the acid monsters that might cause trouble in our stomachs. If we observe our superhero closely, you can see that it looks thick and hence very strong.



## National Chemistry Week 2023

It neutralizes acids due to its basicity which is the opposite of acidity.

Let's see just how strong our hero is!

**Demonstrator:** This beaker represents our stomach, a magical kingdom where the acid monsters sometimes get a bit too rowdy. But fear not, for Milk of Magnesia is here to bring peace.

**Demonstrator:** Our magical mood ring, the red cabbage juice is an indicator, which will help us visualize the acidity level in our stomach kingdom. Green represents a calm and happy kingdom.

*(The demonstrator adds 5 drops of red cabbage juice to the cup, turning the solution green.)*

**Demonstrator:** Let's record our observation in our worksheet. (Question 2, part I)

**Demonstrator:** Here come the acid monsters! 1 mL of vinegar represents a strong attack on our stomach. Let's see how our hero reacts!

*(The demonstrator takes a dropper and adds 1 mL of vinegar, symbolizing the acid monsters. Shake the solution well to see the color change slowly from pink to green. It may take some time.)*

*(The kids watch as the solution starts to change color.)*

**Demonstrator:** Now our magical mood ring is signaling to us by changing its color that there has been an acid attack.

To observe how much strength is left in our hero, let's see if our superhero is as thick and strong as we started.

*(The demonstrator asks the kids to look through the beaker and observe the suspension.)*

**Demonstrator:** Do you see that? It looks like our superhero has lost some strength.

**Demonstrator:** Let's record our observation in our worksheet. (Question 2, part IIa)

Now let's see how well our hero handles stronger acid monsters!

*(Add 1 more mL of vinegar to the cup.)*

**Demonstrator:** As we add more vinegar, our stomach kingdom is under a stronger attack and our magical mood ring starts to give a stronger change in color.



## National Chemistry Week 2023

*(The solution does change back from red to blue to green. Wait and shake well. The solution also becomes more transparent.)*

But fear not, our hero Milk of Magnesia is still fighting back, even in the face of this strong attack. It's using its magical powers to neutralize the acid monsters and bring back the calm, green kingdom we started with. However, it has lost its strength to a significant degree as indicated by the increasing transparency of the suspension.

*(Let the kids observe.)*

**Demonstrator:** Let's record our observation in our worksheet. (Question 2, part IIb)

**Demonstrator:** Now, add another mL of vinegar. Our stomach kingdom is facing a much stronger acid attack. The magical mood ring is getting angrier and turning the solution red, indicating the strength of the acid monsters.

**Demonstrator:** Now, with the addition of the 4th mL of vinegar, our stomach kingdom is facing a significant acid attack. The solution is now red, indicating that the acid monsters have taken over the peace of the stomach kingdom. Our solution is now clear indicating that our hero has lost its strength significantly after winning against the acid monsters.

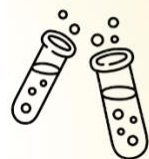
*(Wait for the kids' reaction.)*

*(The kids watch as the solution gradually changes color to red/violet)*

**Demonstrator:** Let's record our observation in our worksheet. (Question 2, part II c,d)

**Demonstrator:** And there you have it, young scientists! One mL of Milk of Magnesia can handle a strong acid attack. Remember, our hero Milk of Magnesia is not only a powerful shield for our stomachs but also a source of scientific wonder!





# The Healing Power of Chemistry



## 1. Here's the "Magic Word Search" puzzle!

Find these magical words.

VINEGAR, MAGNESIA, CABBAGE, HERO, ACIDITY, STOMACH

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| V | I | N | E | G | A | R | R | E | S | U | C | I | S | A | M |
| C | H | E | R | O | S | T | O | M | A | C | H | S | C | I | E |
| O | L | O | R | S | L | S | M | A | G | N | E | S | I | A | E |
| L | E | R | C | A | B | B | A | G | E | R | G | Y | S | T | O |
| R | O | I | M | E | C | M | O | N | S | T | E | R | O | L | O |
| T | O | M | A | G | N | E | S | I | A | I | T | Y | U | O | R |
| A | O | R | S | L | M | R | E | V | C | S | D | E | M | A | G |
| R | H | E | R | O | U | T | A | C | I | D | I | T | Y | S | W |

## 2. Scientific Observation Challenge:

- (I) What happens when you add the red cabbage juice to milk of magnesia?

## National Chemistry Week 2023

| (II) | Vinegar added. | Color change | Transparency |
|------|----------------|--------------|--------------|
| a    | 1 ml           |              |              |
| b    | 2 ml           |              |              |
| c    | 3ml            |              |              |
| d    | 4 ml           |              |              |

**3. What indicates the decreasing strength of the superhero? (Mark all that apply.)**

- a) The increasing transparency of the solution.
- b) The solution turning red.
- c) The green peaceful kingdom

**4. Why is Milk of Magnesia called a base?**

- a) Because it forms gas bubbles
- b) Because it can neutralize acids
- c) Because it's white in color

## National Chemistry Week 2023

5. Give wings to your imagination! Draw a picture of an acid monster attacking a stomach. Label the acid monster and the stomach. Then draw Milk of Magnesia fighting off the acid monster to save the stomach.

### ***At Home Experiment Challenge***

*Design your own experiment using lemon juice and baking soda and identify the acid and base in the reaction. Record your observations and explain the results to your peers.*

Great job! You've completed the Magical Science Adventure worksheet! Keep exploring the magical world of science!



## National Chemistry Week 2023

# HANDOUT

| ACID                                                                                 | BASE                                                                                         | INDICATOR                                                                                                                  |
|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Acids are substances that taste sour (like lemon) and can be harmful.                | Bases are substances that taste bitter (like soap) and feel slippery.                        | An indicator is a special substance that helps us identify whether a solution is an acid or a base.                        |
| They can be found in foods like citrus fruits and vinegar.                           | They can be found in substances like baking soda and Milk of Magnesia.                       | In our experiment, red cabbage juice is used as an indicator. It changes color to indicate the presence of acids or bases. |
| <b>Vinegar</b><br>Acetic Acid Solution<br>Chemical Formula: $\text{CH}_3\text{COOH}$ | <b>Milk of Magnesia</b><br>Magnesium Hydroxide<br>Chemical Formula: $\text{Mg}(\text{OH})_2$ | <b>Red Cabbage Indicator</b><br>Anthocyanins<br>Chemical Formula: $\text{C}_{15}\text{H}_{11}\text{O}^+$                   |

Acid and base react to give water and salt.

In this experiment, we use vinegar ( $\text{CH}_3\text{COOH}$ ) as the acid and Milk of Magnesia ( $\text{Mg}(\text{OH})_2$ ) as a base. The balanced chemical equation for this reaction is:

