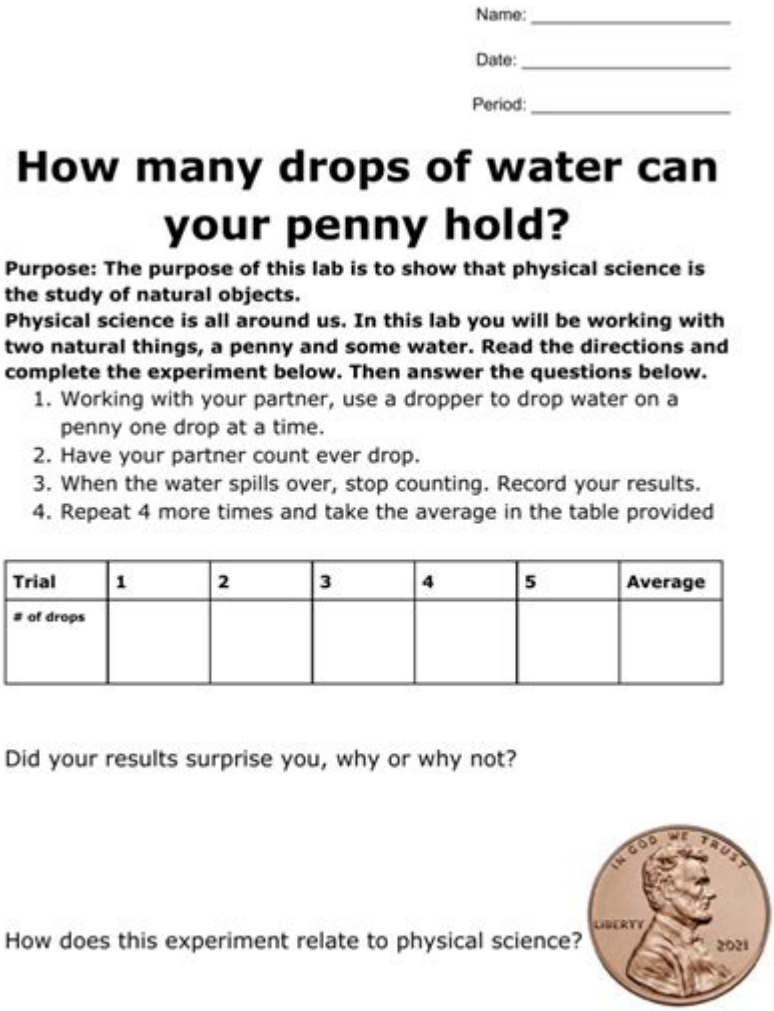
Water Drops On A Penny Worksheet



Name: _____

Date: _____

Period: _____

How many drops of water can your penny hold?

Purpose: The purpose of this lab is to show that physical science is the study of natural objects.
Physical science is all around us. In this lab you will be working with two natural things, a penny and some water. Read the directions and complete the experiment below. Then answer the questions below.

1. Working with your partner, use a dropper to drop water on a penny one drop at a time.
2. Have your partner count ever drop.
3. When the water spills over, stop counting. Record your results.
4. Repeat 4 more times and take the average in the table provided

Trial	1	2	3	4	5	Average
# of drops						

Did your results surprise you, why or why not?

How does this experiment relate to physical science?

Water drops on a penny worksheet is an engaging educational activity that allows students to explore the concepts of surface tension, cohesion, and measurement through hands-on experimentation. This activity not only enhances understanding of scientific principles but also fosters critical thinking and observational skills. In this article, we will delve into the purpose of the worksheet, the materials required, the procedure to conduct the experiment, and the scientific concepts that underpin the activity. Additionally, we will discuss how teachers can integrate this experiment into their curriculum to enhance student learning.

Purpose of the Water Drops on a Penny Worksheet

The primary aim of the water drops on a penny worksheet is to provide students with a practical understanding of surface tension and how it affects

the behavior of liquids. This worksheet serves several educational purposes:

1. Understanding Surface Tension: Students will learn how surface tension allows certain objects to float on the surface of water.
2. Measurement Skills: The activity promotes skills in measurement and quantitative analysis as students count the number of water drops that can fit on a penny.
3. Scientific Inquiry: The worksheet encourages students to formulate hypotheses, conduct experiments, and analyze results, fostering a scientific mindset.
4. Visual Learning: The use of visuals and hands-on activities caters to different learning styles, making the concepts more accessible.

Materials Required

Before conducting the experiment, it is essential to gather all necessary materials. Here's a list of items typically required for the water drops on a penny worksheet:

- Pennies: Clean and dry pennies are the main focus of the experiment.
- Water: Clear water is used to observe the effects of surface tension.
- Pipette or Dropper: This tool helps in delivering precise amounts of water to the penny.
- Paper Towels: These are useful for cleaning up spills or drying pennies.
- Ruler: For measuring the diameter of the penny (if necessary).
- Worksheet: A printed worksheet for recording observations and results.

Procedure for the Experiment

To successfully conduct the water drops on a penny experiment, follow these steps:

Step 1: Prepare the Workspace

- Ensure that the workspace is clean and free of any debris.
- Gather all the materials listed above and have them within reach.

Step 2: Observe the Penny

- Take a penny and examine its surface. Discuss with students the properties of the penny, such as its shape, material, and any markings.
- Explain that the surface tension of water is a key factor in this experiment.

Step 3: Conduct the Experiment

1. Fill the Droplet Tool: Use the pipette or dropper to draw water from a container.

2. Place Water Drops on the Penny:
- Hold the penny flat on a table.
- Slowly release one drop of water onto the center of the penny.
- Observe how the drop forms a dome shape without spilling over the edges.
3. Count the Drops:
- Continue adding drops one at a time until the water begins to spill over the edge of the penny.
- Count and record the number of drops that the penny can hold before overflowing.
4. Repeat the Experiment:
- For accuracy, repeat the experiment several times, ensuring to dry the penny between trials.

Step 4: Record Observations

- On the worksheet, students should record:
- The number of drops each time.
- Any variations in the shape of the water drops.
- Any observations regarding the penny's surface after the experiment.

Scientific Principles Behind the Experiment

The water drops on a penny experiment is a practical illustration of several scientific concepts:

Surface Tension

- Surface tension is the cohesive force that causes liquid molecules to stick together at the surface. This phenomenon allows the water drops to maintain a spherical shape on the penny.
- The water molecules are attracted to each other (cohesion) and to the molecules of the penny (adhesion). However, the cohesive forces are stronger, leading to the formation of droplets.

Cohesion and Adhesion

- Cohesion: Refers to the attraction between molecules of the same substance. In this case, water molecules are cohesive, which is why they form droplets.
- Adhesion: Refers to the attraction between molecules of different substances. Water molecules are attracted to the surface of the penny, but the cohesive forces keep the droplets intact.

Measurement and Data Analysis

- Students will engage in quantitative analysis as they measure the number of water drops. This helps them develop skills in data collection and interpretation.
- The results can be graphed to visually represent the findings, further

enhancing their understanding of the relationships between the variables involved.

Extensions and Variations

To deepen the learning experience, educators can incorporate various extensions and variations to the water drops on a penny worksheet:

1. Comparative Experiments: Use different coins (e.g., a nickel, dime, or quarter) to compare how surface tension varies with different materials and shapes.
2. Temperature Effects: Conduct the experiment with warm and cold water to observe how temperature affects surface tension.
3. Soap Experiment: Introduce a drop of dish soap to see how it affects the surface tension of water, demonstrating a practical application of the concept.
4. Measurement with Different Liquids: Test other liquids such as oil or vinegar to compare their surface tension to that of water.

Conclusion

The water drops on a penny worksheet is a valuable educational tool that engages students in hands-on science. Through this experiment, students gain a deeper understanding of surface tension, cohesion, and adhesion while refining their measurement and observational skills. By incorporating various extensions and variations, teachers can further enrich the learning experience, fostering a more comprehensive understanding of the underlying scientific principles. This activity not only makes science accessible and enjoyable but also encourages curiosity and exploration in young minds. By fostering an environment of inquiry, educators can inspire the next generation of scientists and thinkers.

Frequently Asked Questions

What is the purpose of a 'water drops on a penny' worksheet?

The worksheet is designed to help students understand the concepts of surface tension and cohesion by experimenting with how many water droplets can fit on the surface of a penny.

What scientific concepts can students learn from the 'water drops on a penny' experiment?

Students can learn about surface tension, cohesion, adhesion, and the properties of water, as well as the effects of various factors like temperature and penny cleanliness on droplet formation.

How can students conduct the 'water drops on a penny' experiment?

Students can use a clean penny and a dropper to carefully place water droplets on the penny's surface, counting how many droplets can fit before spilling over.

What materials are needed for the 'water drops on a penny' worksheet activity?

Materials needed include a penny, a dropper, water, and optionally, a paper towel for cleanup and a ruler for measuring the diameter of the droplets.

What variations can be included in the 'water drops on a penny' worksheet?

Variations can include testing different liquids, using pennies of different ages or materials, or measuring the size of droplets to compare with the number of droplets that fit.

How does the cleanliness of the penny affect the results of the experiment?

A clean penny allows for better adhesion of water droplets due to reduced contamination, while a dirty penny can disrupt surface tension, resulting in fewer droplets fitting.

What observations should students make during the 'water drops on a penny' experiment?

Students should observe the shape and size of the droplets, how they interact with the penny's surface, and any changes that occur as they add more drops.

How can the 'water drops on a penny' experiment be linked to real-world applications?

This experiment can be linked to real-world applications such as understanding how water behaves on different surfaces, which is important in fields like engineering, materials science, and environmental studies.

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