

Water Displacement Worksheet Questions and Answers PDF

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Part 1: Building a Foundation

What is the primary principle behind the method of water displacement?

Hint: Think about the historical figure associated with buoyancy.

- Newton's Law
- Archimedes' Principle ✓
- Pascal's Law
- Bernoulli's Principle

■ The primary principle is Archimedes' Principle.

Which of the following are necessary tools for measuring volume using water displacement?

Hint: Consider the tools that can hold and measure liquid.

- Graduated cylinder ✓
- Overflow can ✓
- Thermometer
- Balance scale

■ Necessary tools include a graduated cylinder and an overflow can.

Explain in your own words how water displacement can be used to measure the volume of an irregularly shaped object.

Hint: Consider the steps involved in the process.

Water displacement measures volume by observing the change in water level when an object is submerged.

List two applications of water displacement in real-world scenarios.

Hint: Think about fields like engineering or environmental science.

1. Application 1

Measuring the volume of fish.

2. Application 2

Determining the density of rocks.

Applications include measuring the volume of aquatic organisms and determining the density of materials.

Part 2: Comprehension and Application

When an object is submerged in water, what does the change in water level represent?

Hint: Consider what the water level indicates about the object.

- The weight of the object
- The density of the object
- The volume of the object ✓**
- The surface area of the object

| The change in water level represents the volume of the object.

Why is it important to ensure an object is fully submerged when using water displacement?

Hint: Think about the accuracy of the measurement.

- To avoid inaccurate volume measurements ✓**
- To prevent air bubbles from forming
- To ensure the object floats
- To maintain the water temperature

| It is important to ensure full submersion to avoid inaccurate volume measurements.

A metal cube is submerged in water, and the water level rises by 15 mL. If the mass of the cube is 45 grams, calculate its density.

Hint: Use the formula $\text{density} = \text{mass}/\text{volume}$.

| **Density is calculated as 3 g/mL using the formula $\text{density} = \text{mass}/\text{volume}$.**

If a rock is placed in a graduated cylinder and the water level rises from 50 mL to 80 mL, what is the volume of the rock?

Hint: Calculate the difference in water levels.

- 30 mL ✓**
- 50 mL
- 80 mL
- 130 mL

| The volume of the rock is 30 mL.

Part 3: Analysis, Evaluation, and Creation

What could cause an error in measuring the volume of an object using water displacement?

Hint: Consider factors that might affect the measurement.

- Using a container with too large a scale
- Ensuring the object is dry before submersion
- Submerging the object partially ✓**
- Using a container with a lid

Errors can occur from partially submerging the object.

Analyze the potential issues that might arise if air bubbles are trapped on the surface of the object during water displacement.

Hint: Think about how air affects volume measurements.

- Overestimation of volume ✓**
- Underestimation of volume
- Accurate measurement of volume
- No effect on measurement

Trapped air bubbles can lead to an overestimation of volume.

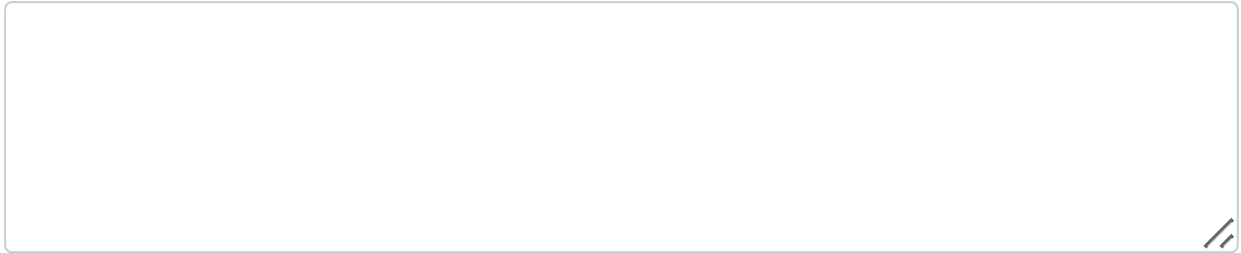
Evaluate the effectiveness of water displacement in measuring the volume of objects with varying densities.

Hint: Consider how density affects measurement accuracy.

Water displacement is effective for measuring volume regardless of density, but accuracy may vary with very low or high density objects.

Design an experiment using water displacement to determine the density of a composite material made of two different substances. Describe the steps and considerations involved.

Hint: Think about the materials and methods you would use.



An experiment could involve measuring the volume of the composite material and its mass to calculate density, considering factors like air bubbles and temperature.