



Name \_\_\_\_\_

# WATER CLOCKS

**Purpose:** To practice the skills used in designing an experimental investigation.

**Background Information:** For as long as we know, man has recorded the passage of time. Ancient peoples looked to the sky to measure time. The cycles of the moon, sun, planets, and stars were used to mark days, months, seasons, and years. Although these early methods were surprisingly accurate for measuring long amounts of time, eventually man needed to how to determine short periods. Man needed a clock. The first clocks were, again, based on the movement of a celestial object; the sun. Sun dial and obelisks used shadows created by the sun to mark time.

Water clocks were the first timekeepers that didn't depend on the observation of the sky. Several cultures used water clocks: the Saxons in ancient England used bowls with a hole in the bottom that would sink in a pool of water, Egyptians made complicated clocks that could measure 24 hour days and 365 day years. The Chinese invented a water clock that could tell time in hours and quarter hours.



Write your **LAB REPORT** on notebook paper.  
**Remember to use your *Science Handbook* as a reference.**

**The Problem:** To determine an efficient way to make a sinking water clock.

## PART 1: Make Observations

**Given These Materials:**

1 plastic tub	1 piece of foil 10cm	3 washers
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**Step 1:** Use your materials to create a sinking water clock. Can you make a clock that will sink in 10 seconds? 15 seconds?

**Step 2:** Make a data chart to record your observations.

**Step 3:** Make a list of variables that affect the sinking of the water clock.

## PART 2: Design an experiment

### Given These Materials:

1 plastic tub	6 washers	1 bead – no hole
1 bead – 2mm hole	1 bead – 3mm hole	1 bead – 4mm hole
1 large funnel	1 medium funnel	1 small funnel

Design an experimental investigation that tests the effect of one variable on the sinking of the water clock.

**Step 1:** Identify the **INDEPENDENT VARIABLE**, the **DEPENDENT VARIABLE**, and all of the **CONTROLLED VARIABLES**

**Step 2:** Write a **RESEARCH QUESTION** using the word affect.

**Step 3:** Write a **HYPOTHESIS** that shows the expected relationship between the variables. Use an **IF, THEN** statement.

**Step 4:** Design an **EXPERIMENTAL INVESTIGATION** to test your hypothesis.

- Write the step-by-step **PROCEDURE** you will follow during your investigation.
- List the materials you will use.
- Make the **DATA TABLE** to record your data and your reduced data.

**Step 5:** Conduct the experiment and record your data.

**Step 6:** Reduce your data.

**Step 7:** Make a **GRAPH** of your reduced data. Remember **DRY MIX** and **TAILS**. Use a piece of graph paper for the graph.

**Step 8: ANALYZE** your data: What story does the graph tell? What do you know about the effect of the independent variable on the dependent variable? What relationship(s) do you see?

**Step 9:** Write a **CONCLUSION**. Answer your original questions. Accept or reject your hypothesis. Use actual data [real numbers] to provide evidence for what you say. Reflect on your investigation; what worked well? What problems did you have and how did you solve them? Identify sources of error. How could this investigation be expanded?