

# 1. Water Thermometer

**Subject:** Physics

**Objective:** To use expansion and contraction of water to make a water thermometer.

**Logistics:** Involves the entire class. Students also can repeat the experiment at home.

**Materials:**

*clear glass wine or soda bottle*

*cork to fit bottle*

*drinking straw*

*wax candle*

*vegetable dye*

---

**Procedure:**

**Step 1:** Drill a hole in the cork about same size as drinking straw.

**Step 2:** Push straw through hole in cork with half of the straw above the cork and half below.

**Step 3:** Create an air and watertight junction between the straw and cork by dripping candle wax on the junction.

**Step 4:** Fill the bottle with water colored by vegetable dye.

**Step 5:** Press cork and straw assembly gently into the bottle so that the colored water rises a couple of inches above the top of the cork. This assembly is in essence a water-based thermometer.

**Step 6:** Place the corked bottle in a tub of hot water. In a little while, the level of the colored water in the straw will rise. Heat causes the water to expand.

**Step 7:** Place the bottle in a tub of cold water and the level of the colored water will go down. Cold causes the water to contract.

---

**Vocabulary:** *expansion, contraction, junction*

**What they Learn:** Children learn about the way water expands and contracts when heated and cooled and how this characteristic can be used to create a thermometer. They also learn something about laboratory technique in making an air- and water-tight connection.