



Primary

Focus

## Science

EXERCISE 10

### Parent Objective

To introduce your child to the concept of forming a hypothesis, followed by experimentation.

*"...so nature, through the mechanism of the experiment, gives us an infinite series of revelations, unfolding for us her secrets."*

**Dr. Maria Montessori, The Montessori Method**



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**Judy Laidlaw**

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Maria Montessori's Education of the Inquisitive Mind

# Which freezes first, hot or cold water?

### Materials:

2 small containers that can safely hold boiling water, plus a measuring cup, tape, marker, and cold & boiling water.

### Preparation:

With your child, gather the needed materials and lay out on a surface near your freezer. Boil the water. Using the tape and marker, label containers to identify as either "hot" or "cold."

### Instructions:

1. Explain to your child that you would like him or her to make a hypothesis, explaining that this means making a determination about what one thinks is going to happen.
2. Ask, "Which do you think will freeze first, the cold water or the boiling hot water?"
3. Invite your child to help measure exactly  $\frac{1}{2}$  cup cold water into one of the containers.
4. Next measure exactly  $\frac{1}{2}$  cup boiling water into the second container.
5. Immediately set both containers inside your freezer.
6. After 45 minutes, check to see if the water in either container is frozen. If not, repeat checking at 10-minute intervals.
7. Ultimately, you will discover that the water in the container that held boiling water will freeze first.





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# Which freezes first, hot or cold water?

### Scientific Explanation:

Water freezes at 32 degrees Fahrenheit. However, hot water evaporates much faster than cold water. Once placed in the freezer, the hot water quickly evaporates, which results in much less water in the hot-water container than in the cold-water container. Consequently, the hot water actually cools down faster and freezes first.

