

# Water Properties Activity: Properties of Water in Biology

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## Middle School (NGSS Aligned) Teacher Guide

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### Overview

This guide supports implementation of the Water Properties Activity: Properties of Water in Biology using the 5E instructional model.

### Learning Objectives

- Students will observe how water behaves differently at various temperatures
- Students will discover why ice floats and why this matters for life
- Students will explore how water helps organisms stay cool
- Students will identify water's special properties through investigation

### Standards Alignment

- **MS-PS1-1:** Develop models to describe the atomic composition of simple molecules
- **MS-PS1-4:** Develop a model that predicts and describes changes in particle motion and temperature
- **MS-LS1-5:** Construct a scientific explanation for how environmental factors influence growth

### Prerequisites

- Basic understanding of molecules
- Temperature and states of matter
- Living things need water
- Basic graphing skills

## Time Estimate

45 minutes

## Materials Needed

- Computer/tablet with internet access
- Student Activity Sheet
- Colored pencils/markers
- Optional: Ice cubes for demo

## Teaching Tips by Phase

### Phase 1: ENGAGE (5-10 minutes)

- Start with the phenomenon or problem presented
- Elicit student predictions and prior knowledge
- Create cognitive dissonance if possible
- Build excitement for investigation

### Phase 2: EXPLORE (15-20 minutes)

- Allow students to investigate with minimal guidance
- Circulate and ask probing questions
- Encourage systematic data collection
- Note common discoveries and difficulties

### Phase 3: EXPLAIN (10-15 minutes)

- Have students share their findings first
- Build on their observations to introduce concepts
- Address misconceptions directly
- Connect to broader biological principles

### Phase 4: ELABORATE (10 minutes)

- Apply knowledge to new scenarios
- Make real-world connections

- Encourage deeper investigation
- Support transfer of learning

#### Phase 5: EVALUATE (5-10 minutes)

- Use varied assessment strategies
- Focus on conceptual understanding
- Provide immediate feedback
- Plan follow-up based on results

#### **Remember:**

The goal is student discovery through guided inquiry. Resist the urge to explain concepts before students have explored them!