

# Cold Water vs Hot Water

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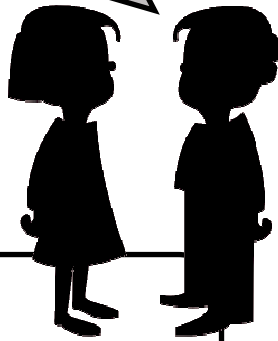
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Level

## Big Idea

Not all ocean water is the same temperature or density.

The activity is aimed at this level but can be modified to suit other levels.



## What you need to know

- Not all ocean water is the same temperature.
- Water near the Arctic and Antarctica is very cold.
- Water near the Equator is much warmer.
- This affects the density of the water which in turn affects how it moves in the ocean.
- Cold water is heavier (more dense) than warm water so it sinks and is replaced by warm water near the surface.
- Warm water will sit on top of cold water.
- Wind will mix up layers of warm and cold water.

## Learning Intentions

- ✓ We are learning what happens when cold and warm water mix.

## Success Criteria

- ✓ I can draw a diagram to show what happens when cold and warm water are mixed together and explain why this happens.

## Other Resources

### Building Science Concepts

Where's the water? (Level 1/2)  
Water and weather (Level 3/4)

### Connected

An interview with a glass of water (Number 2, 2002)

### Assessment Resource Bank

MW5001 – Heat convection in a hot water cylinder

## Curriculum Links

### Nature of Science

Investigating in science – Extend their experiences and personal explanations of the natural world through exploration, play, asking questions and discussing simple models. (L1/2)

### Material World

Properties and changes of matter – Observe, describe and compare physical properties of common materials and changes that occur when materials are mixed. (L1/2)

### Planet Earth and Beyond

Interacting systems – Describe how natural features are changed and resources affected by natural events. (L1/2)

### Key Competencies

Thinking – Think creatively about what they observe and make inferences on the observations.

### Using language, symbols and text –

Communicate their ideas and understanding of scientific events.

## What you need

- Iced water
- Very hot water
- Tap water
- Large clear container (250-500ml)
- 2 small containers (30ml)
- Red and blue food colouring
- 2 droppers
- Red and blue colouring pencils
- Paper

## What to do

Discuss the oceans in the world and what might be different about them? Guide the discussion to water temperature.

**Predict** - What do you think will happen when cold and warm water meet each other?

### What to do

1. Fill the large container  $\frac{3}{4}$  full with tap water and let it sit for awhile so that it becomes the same temperature as the room.
2. Half fill a small container with hot water.
3. Mix drops of red food colouring into the hot water to make it dark red.
4. Half fill the other container with iced water.
5. Mix drops of blue food colouring into the iced water to make it dark blue.
6. Using the dropper gently add drops of hot water to the water in the large container. Then add drops of blue iced water to the same container.

**Observe** what happens to the hot and cold water. Do they mix?

Draw pictures using red and blue colouring pencils to show what happens to the water. You might need to do several pictures over a period of time.

### Questions

What happens to the cold water? Why?

What happens to the warm water? Why?

What do you think will happen when cold water from the polar regions meet up with the warm water from the equator?

### What's Next?

Hold a straw to the edge of the top of the large container so that it is parallel to the water surface. Blow gently through the straw. What happens to the water?

