

Hot and Cold – Convection

What is the Objective? Observe hot and cold water mixing to understand how convection currents create storms and other weather phenomena.

What you need:

- 2 clear juice glasses
- 1 clear drinking glass
- 4 ice cubes
- Warm water (about 100°F)
- Room temperature water
- Red and blue food coloring
- Spoon to stir
- Thermometer (optional)



What to do:

- Fill one juice glass with warm water and the second with room temperature water.
- Ask your learner to feel the temperature of each glass of water. Are they the same? Which one is warmer? Which is colder?
 - Add red food coloring to the water that is warmer.
- Add 2 ice cubes to the room temperature glass. Have your learner test the temperature again. Did the water get warmer or colder?
 - Add blue food coloring to the cold water.
- Now, fill the tall drinking glass 2/3 full with warm to hot water. Add a few drops of red food coloring and stir.
- Gently place 2 ice cubes into the tall drinking class and put one drop of blue food coloring on top of the ice cube.
- Observe what is happening!
 - Cold water is more dense (heavier) so it sinks to the bottom of the cup and will slowly cool down the less dense (lighter) warm water.



Notes for Adults:

- Be careful to use warm water, not boiling, so your learner stays safe.
- Do this activity outside, or in a location where the area can be wet.

STEM Connection:

- This demonstration represents convection air currents. Convection is a cycle that works when the sun heats the ground and then the ground heats the air.
- Warm air is less dense (lighter) so it rises higher into the sky. As the air rises, it starts to cool and may become a cloud. As the air becomes cooler, it becomes more dense than warm air, so it sinks to the surface.
- Convection can create intricate cloud patterns, help create thunderstorms or even produce a tornado!

Take it further:

- Discuss storm safety with your learner. This could include lightening, tornadoes and hurricanes.

