

**Record the temperature of each beaker at five minute intervals up to 30 minutes:**

Water alone may increase slightly due to the kinetic energy imparted by stirring, calcium chloride should increase until it dissolves into solution, ammonium nitrate should decrease until entirely reacted.

**Which beaker(s) rose in temperature? Which beaker(s) fell in temperature?**

Ammonium nitrate cools the water, calcium chloride warms it. Water alone may rise slightly if vigorously stirred.

**Why would the beaker with no reaction change in temperature?**

The energy imparted to the water by stirring will heat the water slightly.

**What might happen to the temperature after the calcium chloride and ammonium nitrate fully dissolve in solution? Where does heat energy flow from, and where does it end up?**

Temperature will revert to room temperature after the substance reacts fully. Heat energy flows between the chemical bonds of the added substance and water to the surroundings (elsewhere in the water, the beaker, a student's hand that touches the beaker).

The "cold" solution takes heat energy from its surroundings, the "warm" solution gives energy to its surroundings.

**(For thought) Imagine, instead of beakers, the reactions were performed in styrofoam cups or coffee mugs. Would the temperature return to room temperature faster or slower than in glass beakers?**

The same reactions would occur, but heat energy would not as easily transfer to the air. So temperature changes might be greater, and remain longer.