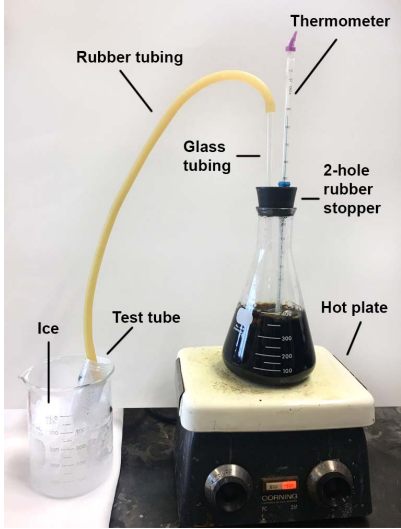


Fractional Distillation Experiment - KEY

Question:	How can we separate a mixture of water and rubbing alcohol?
Hypothesis:	Use distillation - we can heat the mixture and separate the liquids because water and rubbing alcohol have different boiling points.
Procedure: (draw a detailed, labeled diagram of the set-up)	 <p data-bbox="841 541 1401 611">Students should have a diagram similar to this, with labels describing the components.</p>
Observations:	<p data-bbox="402 1052 1382 1083">These may be written out, or bulleted as shown below. Sample observations:</p> <ul data-bbox="451 1087 1471 1388" style="list-style-type: none"> • The liquid mixture in the flask started boiling at 82°C • Steam went into the tube, then down to the test tube in ice • Liquid droplets fell into the test tube—this should be rubbing alcohol • After continued heating, the liquid in the flask started to boil again at 100°C • Vapor moved through the tube to the test tube • Liquid droplets fell into a clean test tube—this should be water • We did a waft test of the liquids. The first liquid smelled like alcohol. The second liquid had no smell.
Summary:	<p data-bbox="402 1398 1463 1503">The summary addresses PS1.A in that pure substances have characteristic physical properties that can be used to identify them. In this case, water and rubbing alcohol have different boiling points, a physical property we can use to separate them.</p> <p data-bbox="402 1507 1500 1793">A sample summary: <u>Liquids</u> can be <u>separated</u> based on the physical property of <u>boiling point</u> in a process called <u>distillation</u>. We can separate a mixture of <u>water</u> and <u>rubbing alcohol</u> because they have different boiling points; this physical property can be used to identify these different substances. Rubbing alcohol has a lower boiling point than water, so when we heat the mixture, the rubbing alcohol boils first. We can collect the vapor and let it cool and condense back into liquid rubbing alcohol. If we keep heating the liquid, the water boils, and we can collect the water vapor, let it cool, and condense it back into liquid water.</p>