

DEMONSTRATION 2: The Candle	QUESTIONS/ANSWERS
<div data-bbox="237 277 639 682" data-label="Image"> </div> <p data-bbox="186 625 751 772">A pasta bowl is filled with water and green food colouring, an unlit candle is placed standing in the middle of the water. The candle is then covered with a jar.</p> <div data-bbox="178 787 561 1096" data-label="Image"> </div> <p data-bbox="586 806 751 1108">The candle is lifted temporarily; the candle is lit and covered again. As the flame goes out, something unexpected occurs.</p>	<p data-bbox="781 258 1336 409">1. <i>Initially, why is there no water in the jar.</i> The pressure of the air inside the jar is still equal to the atmospheric pressure pushing down on the water. With equal forces per unit area, nothing happens yet.</p> <p data-bbox="776 470 1339 527">2. <i>Why does water eventually move into the jar after the candle is lit?</i></p> <p data-bbox="776 562 1339 1016">While the flame appears, oxygen inside the jar is consumed. This in itself does not reduce the number of gas molecules inside the jar because the combustion of hydrocarbons (such as wax) produces both carbon dioxide and water. But the water condenses against the cold glass jar, and the hot expanding CO<sub>2</sub> slips under the jar's lips and dissolves in the water. (Some may even bubble out, but you don't always see bubbles if you repeat the experiment) Suddenly there is less pressure inside the jar. The external pressure remains unchanged, and its weight is able to push some of the water into the jar. There is still water remaining outside because of the lingering inert nitrogen from the air within the jar.</p> <p data-bbox="808 1018 1307 1075">3. <i>Why does the water occupy 1/5<sup>th</sup> of the jar's volume after the oxygen is consume.?</i></p> <p data-bbox="776 1108 1339 1199">The height of the liquid inside the jar divided by the jar's total height approximately equals the percent of oxygen in the air.</p>
<p data-bbox="362 1264 574 1289"><b>OBSERVATIONS</b></p> <p data-bbox="191 1293 751 1413">Initially there is practically no water in the jar. But after the flame is extinguished, water moves into the jar, approximately filling about one fifth of its volume.</p>	