

Vial Holder for Water Quality Testing

Two concerns when doing water quality testing are that vials and caps will get mixed up and that students will bump the table that the vials are on. A vial holder will reduce the possibility of either of these happening.

Build a holder to keep the vials upright and separate containers for the vial caps. The following directions describe how to use a $\frac{3}{4}$ inch board, a small piece of 2x2 and four $1\frac{1}{2}$ in diameter bottle caps.

Color code the vials and the chemical bottles with colored tape.



Yellow for pH



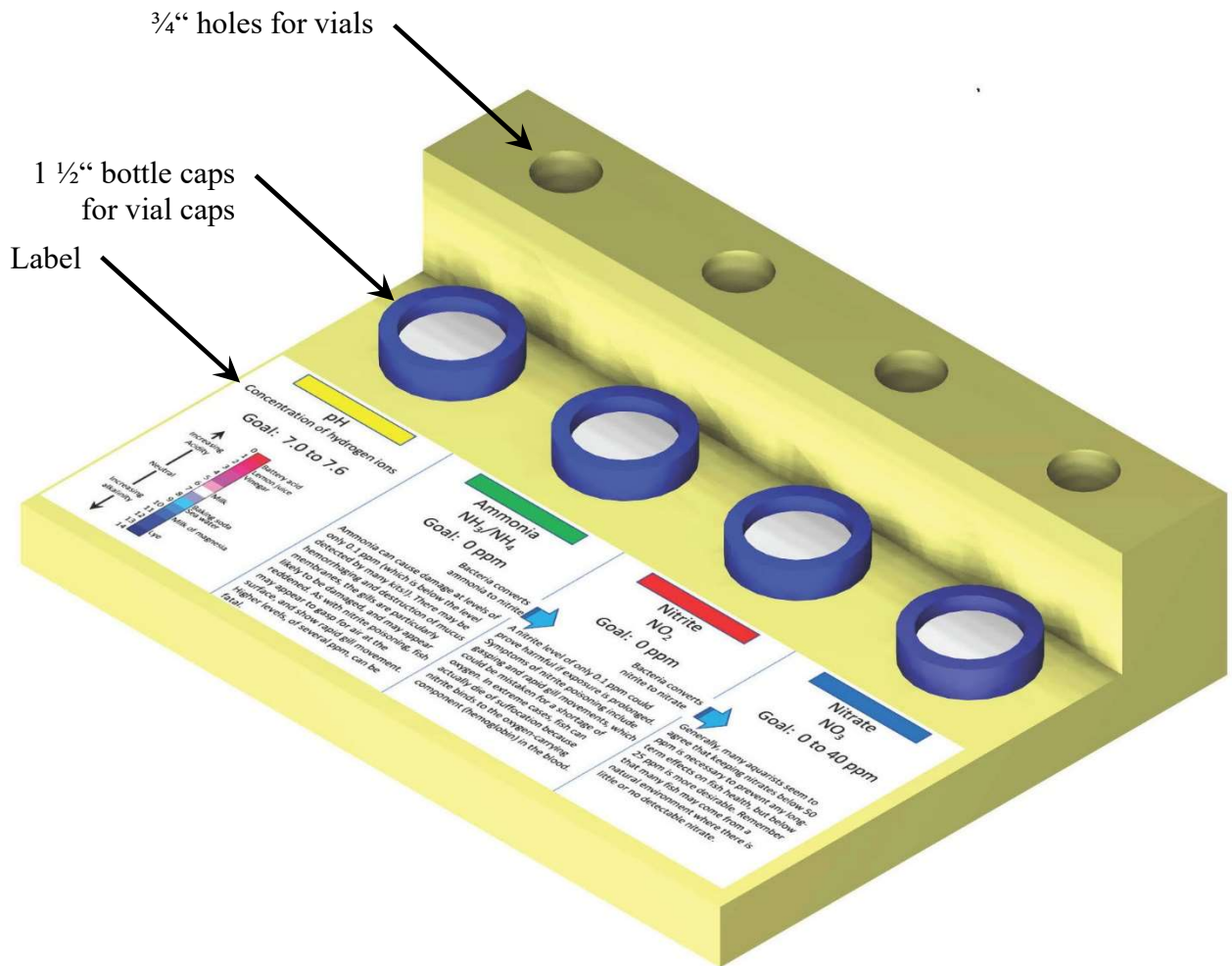
Green for Ammonia



Red for Nitrite

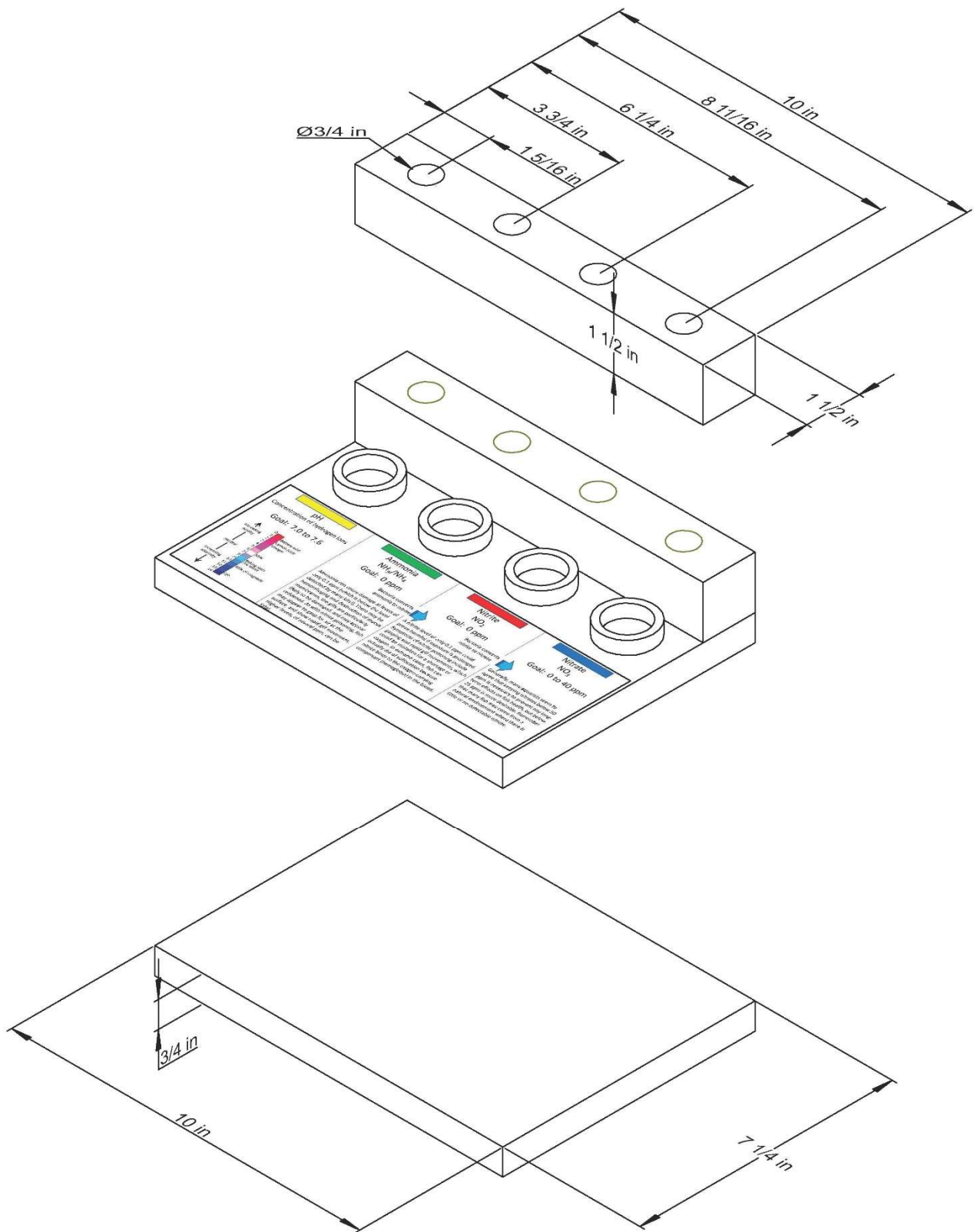


Blue for Nitrate

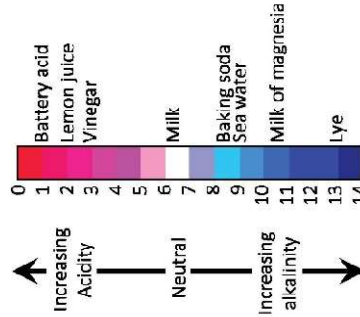


Vial Holder

Cut a piece of 3/4" wood (plywood) 10" x 7 1/4" and cut a 2x2 to 10" in length. Use four bottle caps that are 1" to 1 1/2" in diameter (detergent bottles or something similar). Laminate the instructions. Nail the wood together and glue the caps and label to the board after painting.



Dimensions

<p>pH Concentration of hydrogen ions</p> <p>Goal: 7.0 to 7.6</p>  <p>↑ Increasing Acidity Neutral ↓ Increasing alkalinity</p> <p>0 Battery acid 1 Lemon juice 2 Vinegar 3 4 5 6 Milk 7 8 Baking soda 9 Sea water 10 Milk of magnesia 11 12 13 Lye 14</p>	<p>Ammonia NH_3/NH_4</p> <p>Goal: 0 ppm</p> <p>Bacteria converts ammonia to nitrite</p>	<p>Nitrite NO_2</p> <p>Goal: 0 ppm</p> <p>Bacteria converts nitrite to nitrate</p>	<p>Nitrate NO_3</p> <p>Goal: 0 to 40 ppm</p>
<p>Ammonia can cause damage at levels of only 0.1 ppm (which is below the level detected by many kits!). There may be hemorrhaging and destruction of mucus membranes, the gills are particularly likely to be damaged, and may appear reddened. As with nitrite poisoning, fish may appear to gasp for air at the surface, and show rapid gill movement. Higher levels, of several ppm, can be fatal.</p>	<p>A nitrite level of only 0.1 ppm could prove harmful if exposure is prolonged. Symptoms of nitrite poisoning include gasping and rapid gill movements, which could be mistaken for a shortage of oxygen. In extreme cases, fish can actually die of suffocation because nitrite binds to the oxygen-carrying component (hemoglobin) in the blood.</p>	<p>Generally, many aquarists seem to agree that keeping nitrates below 50 ppm is necessary to prevent any long-term effects on fish health, but below 25 ppm is more desirable. Remember that many fish may come from a natural environment where there is little or no detectable nitrate.</p>	