

## Quick Reference Card

Teaching Points	SMART Team Activity
<p><b>Amino Acids are the Building Blocks for Proteins</b></p> <ul style="list-style-type: none"> <li>Amino acids are identical, but different</li> <li>20 amino acids are determined by the composition of the sidechains</li> <li>Peptide bond is formed between the carbonyl carbon of AA#1 and the nitrogen of AA#2</li> <li>The formation of a peptide bond also produces a water molecule</li> </ul>	Molymod® Activity
<p><b>Proteins Fold in Aqueous Environments</b></p> <ul style="list-style-type: none"> <li>Water is polar</li> <li>Water likes to form hydrogen bonds</li> <li>Non-polar (hydrophobic) amino acids will move away from water and polar (hydrophilic) amino acids will interact with water</li> </ul>	Water Cup
<p><b>Linear Amino Acid Sequence Folds into Secondary Structures</b></p> <ul style="list-style-type: none"> <li>There are two secondary structures: alpha helix and beta sheet</li> <li>Secondary structures help organize the linear sequence as the protein folds</li> <li>The amino acid backbone has a different structure in an alpha helix or a beta sheet</li> <li>Amino acid sidechains have different chemical compositions</li> </ul>	Alpha Helix and Beta Sheet Construction Kit
<p><b>Laws of Biochemistry Determine Protein Folding</b></p> <ul style="list-style-type: none"> <li>Hydrophobic amino acids will localize away from an aqueous environment</li> <li>Hydrophilic amino acids will interact with water</li> <li>Charged amino acids will associate with one another</li> </ul>	Amino Acid Starter Kit
<p><b>Secondary Structures become Spatially Organized for Tertiary Folding</b></p> <ul style="list-style-type: none"> <li>Alpha helices and beta sheets arrange themselves in the next level of protein folding (Tertiary Structure)</li> </ul>	Protein Tertiary Structure (GFP and Beta-Globin)
<p><b>Protein Stabilization</b></p> <ul style="list-style-type: none"> <li>Protein folding may be stabilized through interaction with hetero atoms.</li> </ul>	Zinc Finger Folding Activity