Protein Structure

### Primary structure

The primary structure of a protein is a chain of amino acids held together by flexible peptide bonds. Of the materials in your bag, which could represent amino acids? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Which could represent the flexible peptide bonds? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Why do you think you have different colors of beads? (It’s not because I am lazy!) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Assemble a polypeptide chain, the primary structure of a protein. Sketch and label it here:

### Secondary Structure

The next level of protein folding is the secondary structure. The secondary structure of a protein is where the polypeptide twists and bends into different shapes. There are three categories of shapes: α-helix, β-pleats, and random. A single polypeptide chain can have one, two, or all three of these shapes!

Give your polypeptide chain secondary structure. Sketch and label it here:

### Tertiary Structure

Some proteins complete their folding at the 3rd level or tertiary structure. This is when the polypeptide chain folds on itself to create a 3D structure.

Give your polypeptide chain tertiary structure. Sketch it here:

### Quaternary Structure

Some proteins, like hemoglobin in your blood, require further folding to get to their final structure. This is the 4th level or quaternary structure. At this level of folding, polypeptide chains with tertiary structure bond with other polypeptide chains with tertiary structure to make a final protein. A protein with quaternary structure is made up of more than one polypeptide chain. Hemoglobin, the protein that carries oxygen around in your body, is made up of 4 polypeptide chains.

Create a hemoglobin molecule. Sketch it here:

Great job modeling the different levels of protein! Fill out this chart to summarize what you have learned.

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| Level | Brief description | Sketch |
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