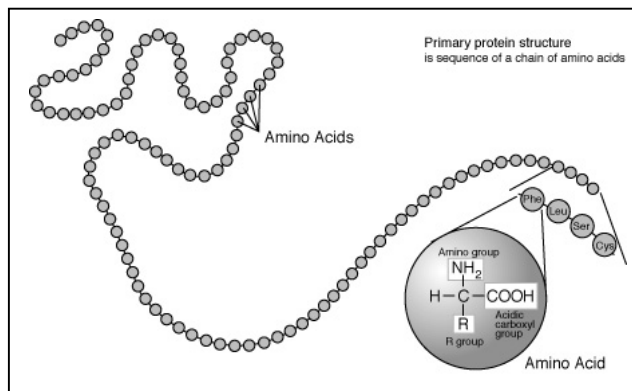


Name: _____ Date: _____

Partners: _____

The Gift of PROTEIN



Introduction

Bracelets are excellent ways to show someone you care about them. In this activity, you will create bracelets that represent an important macromolecule – protein! Proteins provide structure and support for living organisms, and are found in many types of foods, such as meat, eggs, milk, rice, and beans. Proteins are made up of a chain of monomers called amino acids. The picture above is a protein, and the circles represent amino acids. Our bodies need 20 different amino acids in order to make up all the different proteins required to keep us healthy. The amino acids combine in different order in different proteins because the order of the amino acids affects the structure and job of the protein. There are many types of proteins in our body. In this activity, you will create bracelets representing different proteins.

Materials

Beads, Stretchy String, Markers/crayons, Paper, String.

Procedure

- Choose one of the bracelet descriptions below
- Fill in the type of beads needed for each of the amino acids.
- Get the beads you need.
- Make your bracelet. Keep in mind that your bracelet will be about 20 beads. That means you will choose most of the beads in your bracelet. But it must contain the core beads listed for the appropriate bracelet you choose.
- Draw your bracelet making sure to label the amino acids located in the entire bracelet.
- Answer the questions in the back.
- Give your bracelet to someone. You will receive extra points if you show me that you gave the bracelet away as a gift.

Act Now Bracelet: This bracelet represents **enzymes**, which are proteins that catalyze thousands of chemical reactions in our cells. Give this bracelet to someone who needs to act on something or make a decision about something in their life.

A.Acid	Threonine	Tyrosine	Tyrosine	Lysine	Proline	Methionine	Methionine
Bead							

support Bracelet: This bracelet represents **keratin**, which is a protein that gives structure or support to our fingernails and toenails. Give this bracelet to someone to let them know you are available to support them. This bracelet says, “I support you.”

A.Acid	Phenylalanine	Serine	Aspartic Acid	Cysteine	Glutamic Acid	Glutamic Acid	Valine
Bead							

breathe Bracelet: This bracelet represents **hemoglobin**, which is a protein located on our red blood cells. It helps transport oxygen throughout our body. Give this bracelet to someone who might need to relax more often. This bracelet says, “I want you to take care of yourself and relax.”

A.Acid	Asparanine	Histidine	Serine	Serine	Histidine	Histidine	Asparanine
Bead							

health Bracelet. This bracelet represents **antibodies**, which are proteins that help the body fight off disease. Give this bracelet to someone who is in need of better health, either physically, emotionally, or mentally. This bracelet says, “I hope you feel better.”

A.Acid	Lysine	Isoleucine	Glutamine	Tyrosine	Arginine	Threonine	Proline
Bead							

Journey Well Bracelet: This bracelet represents **hormones**, which are proteins that travel throughout our body to help regulate metabolism. Give this bracelet to someone who is going on a trip soon. This bracelet says, “I hope you have a good trip.”

A.Acid	Alanine	Serine	Phenylalanine	Threonine	Arginine	Glutamine	Glycine
Bead							

Strength Bracelet: This bracelet represents **actin**, which is a protein that helps muscles contract. Give this bracelet to someone who could use some strength in life. This bracelet says, “Be strong.”

A.Acid	Asparagine	Histidine	Phenylalanine	Alanine	Isoleucine	Histidine	Asparagine
Bead							

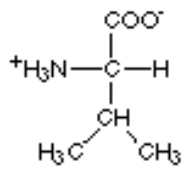
Table 1. List of Beads and Amino Acids (Example: The Round Red Bead = Valine)

Round Red = <i>Valine</i>	Round Green = <i>Asparagine</i>	Tri Green = <i>Arginine</i>	Tri Purple = <i>Threonine</i>
Round Blue = <i>Leucine</i>	Round Pink = <i>Glutamic Acid</i>	Tri Yellow = <i>Aspartic Acid</i>	Jewel Black = <i>Tyrosine</i>
Round Yellow = <i>Isoleucine</i>	Round White = <i>Glutamine</i>	Tri Red = <i>Glycine</i>	Jewel Green = <i>Tryptophan</i>
Round Orange = <i>Methionine</i>	Round Black = <i>Histidine</i>	Tri White = <i>Alanine</i>	Purple Stick = <i>Cysteine</i>
Round Purple = <i>Phenylalanine</i>	Tri Blue = <i>Lysine</i>	Tri Pink = <i>Serine</i>	Purple Star = <i>Proline</i>

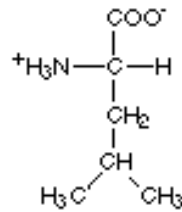
DRAW your Bracelet here. Make sure you write down the names of the amino acids in the core part of the protein bracelet (that is, the amino acids in the table). Also, draw the structure of one of the amino acids in your bracelet. The structures of the amino acids are on the next page.

Essential Amino Acids. The 20 Amino Acids We Need to be Healthy

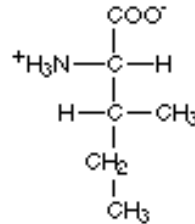
Amino acids with hydrophobic side groups



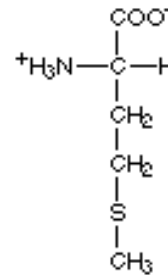
Valine
(val)



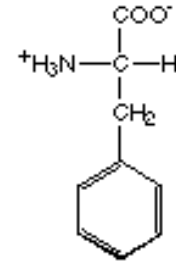
Leucine
(leu)



Isoleucine
(ile)

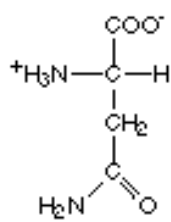


Methionine
(met)

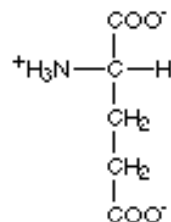


Phenylalanine
(phe)

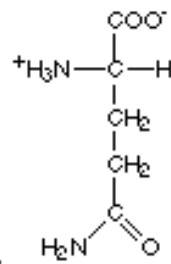
Amino acids with hydrophilic side groups



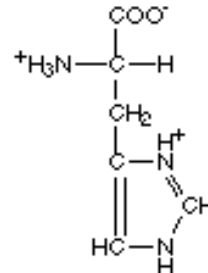
Asparagine
(asn)



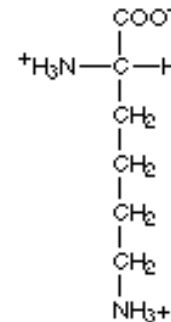
Glutamic acid
(glu)



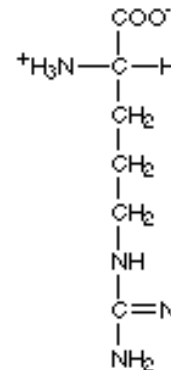
Glutamine
(gln)



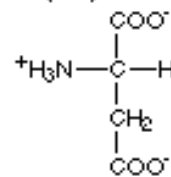
Histidine
(his)



Lysine
(lys)

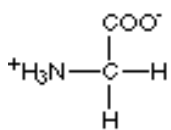


Arginine
(arg)

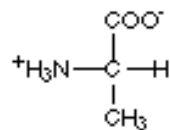


Aspartic acid
(asp)

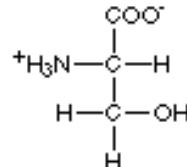
Amino acids that are in between



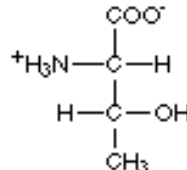
Glycine
(gly)



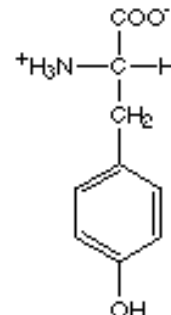
Alanine
(ala)



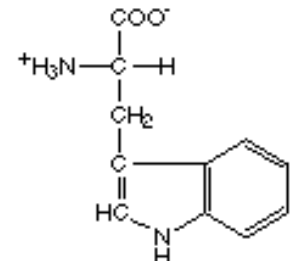
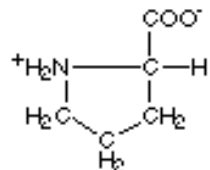
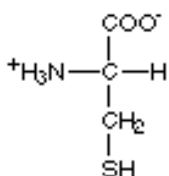
Serine
(ser)



Threonine
(thr)



Tyrosine
(tyr)



Tryptophan
(trp)

Questions

1. What kind of food do we eat to get protein?
2. Why do we eat protein?
3. Why is protein considered a polymer?
4. What are the monomers in protein?
5. List three different types of proteins and their functions
6. Proteins, carbohydrates, and fats are all considered macromolecules. What is the difference among them?
7. Why do different proteins have their amino acids in different orders?
8. Some people in the U.S. and in other parts of the world do not get enough protein in their diet. Given what you know about proteins, how would you convince people to donate money to programs that seek to increase the protein intake of people who do not have enough protein?

<p>Act Now</p> <p>To:</p> <p>From:</p> <p>This bracelet represents:</p> <p>Because:</p>	<p>Received by:</p>
<p>Support</p> <p>To:</p> <p>From:</p> <p>This bracelet represents:</p> <p>Because:</p>	<p>Received by:</p>
<p>Breathe</p> <p>To:</p> <p>From:</p> <p>This bracelet represents:</p> <p>Because:</p>	<p>Received by:</p>
<p>health</p> <p>To:</p> <p>From:</p> <p>This bracelet represents:</p> <p>Because:</p>	<p>Received by:</p>
<p>Journey Well</p> <p>To:</p> <p>From:</p> <p>This bracelet represents:</p> <p>Because:</p>	<p>Received by:</p>
<p>Strength</p> <p>To:</p> <p>From:</p> <p>This bracelet represents:</p> <p>Because:</p>	<p>Received by:</p>