**Protein Synthesis Lab:**

**Creating a Rice Krispy Treat “Protein”**

**INTRODUCTION:** A gene is a piece of DNA containing a sequence of nucleotides strung together in a unique order. The order of nucleotides in a gene provides a code that instructs the cell how to form a specific protein. Every unique protein in a cell is encoded by a unique sequence of nucleotides found in the cell’s DNA. In essence, a gene provides the recipe for how to create a certain type of protein written in the “language” of nucleotides: A, C, G, and T.

 In order for a protein to be made, the DNA sequence for the gene is first transcribed into a complementary strand of messenger RNA (mRNA). This mRNA is then read by a ribosome, using tRNAs carrying amino acids, to piece together the protein. The code for each codons that are recognized by anticodons on the tRNAs.

 In this exercise, you will be simulating this process. You will be given a DNA sequence that you will have to decode into an mRNA sequence and then into an amino acid sequence. If you do the decoding correctly, you will have created the recipe for making a unique rice Krispy treat “protein”.

**Chart #1: Use this chart to translate the codons (not the anticodons of the tRNAs!) in your mRNA sequence into your protein’s amino acid sequence.**



**Chart #2: Use your Amino Acid Sequence to decode the instructions for making your Rice Krispy Treat Protein**

|  |  |
| --- | --- |
| Amino Acid  | Instruction |
| Alanine  | Add 1 drop of yellow food coloring  |
| Arginine  | Add 1 drop of blue food coloring  |
| Asparagine  | Place 5 marshmallows in a plastic container with butter  |
| Aspartic Acid  | Add 1 drop of red food coloring  |
| Cysteine | Stir to coat rice krispies  |
| Glutamic Acid  | Microwave on high power for 5 seconds  |
| Glutamine  | Add 50 ml of M&Ms and 50 ml of gummy bears  |
| Glycine  | Fold wax paper to press mixture into a flat slab. (Do not eat your creation….yet!)  |
| Histidine  | Add 100 ml of M&Ms  |
| Isoleucine  | Microwave on high power for 30 seconds  |
| Leucine  | Microwave on high power for 1 minute  |
| Lysine | Add 1 drop of green food coloring |
| Methionine  | Place 1 tablespoon of butter in plastic container  |
| Phenylalanine  | Add 200 ml of water  |
| Proline  | Fold wax paper to mold mixture into a ball. (Do not eat your creation….yet!)  |
| Serine  | Stir until smooth  |
| Stop  | Clean up: thoroughly clean all containers and utensils with soap and warm water then answer the analysis and conclusion questions  |
| Threonine  | Add 300 ml of rice krispies  |
| Tryptophan  | Scoop out mixture onto a piece of wax paper  |
| Tyrosine  | Add 100 ml of gummy bears  |
| Valine  | Place 15 marshmallows in plastic container with butter  |

**Gene #1** Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period: \_\_\_\_\_ Date: \_\_\_\_\_\_\_

**Protein Synthesis Lab:**

**Creating a Rice Krispy Treat “Protein”**

1. Transcribe the following DNA sequence into an mRNA sequence:

(Note: the sequence has been separated into each three-nucleotide codon set)

TAC-CAC-ACC-AGC-TAG-AGT-CTA-TGC-GTA-ACG-ACC-CCT-ATT

\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_

1. Write the tRNA anticodons that recognize the above mRNA sequence:

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

1. Using the mRNA sequence and Chart #1, write out the amino acid sequence for your gene:

\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-

1. Using the amino acid sequence and Chart #2, write out the step-by-step recipe for making your rice krispy treat “protein”. Before actually making your “protein”, have the instructor check your recipe for accuracy. Once your “protein” is made, answer the questions on the analysis and conclusions sheet.

Analysis Questions:

1. Describe in detail what your protein looks like. Did it turn out as expected? Why or why not?
2. What effect would deleting the fifth nucleotide of your DNA sequence have upon your protein?
3. How would changing the eleventh nucleotide of your DNA sequence from a G to a T change your amino acid sequence? How would this mutation change what your protein looks like?
4. What would be the effect upon your protein if the 19th, 20th and 21st nucleotides of your DNA sequence were deleted? Would you consider this a necessarily bad mutation? Why or why not?
5. Compare your protein created by another group and answer the following:
6. How are the two proteins physically different?
7. Why, specifically, are the two proteins different?

Conclusion:

1. If you were given the physical description of a protein (i.e. color, shape, size) how might you determine the particular DNA code that coded for that protein?
2. Describe why it is important that DNA replication be accurate and that mutations be avoided.
3. You may now eat your protein!

**Gene #2** Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period: \_\_\_\_\_ Date: \_\_\_\_\_\_\_

**Protein Synthesis Lab:**

**Creating a Rice Krispy Treat “Protein”**

1. Transcribe the following DNA sequence into an mRNA sequence:

(Note: the sequence has been separated into each three-nucleotide codon set)

TAC-CAC-AAC-AGC-TAG-AGT-CTA-TGC- GTA-ACG-ACC-CCT-ATT

\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_

1. Write the tRNA anticodons that recognize the above mRNA sequence:

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

1. Using the mRNA sequence and Chart #1, write out the amino acid sequence for your gene:

\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-

1. Using the amino acid sequence and Chart #2, write out the step-by-step recipe for making your rice krispy treat “protein”. Before actually making your “protein”, have the instructor check your recipe for accuracy. Once your “protein” is made, answer the questions on the analysis and conclusions sheet.

Analysis Questions:

1. Describe in detail what your protein looks like. Did it turn out as expected? Why or why not?
2. What effect would deleting the fifth nucleotide of your DNA sequence have upon your protein?
3. How would changing the eleventh nucleotide of your DNA sequence from a G to a T change your amino acid sequence? How would this mutation change what your protein looks like?
4. What would be the effect upon your protein if the 19th, 20th and 21st nucleotides of your DNA sequence were deleted? Would you consider this a necessarily bad mutation? Why or why not?
5. Compare your protein created by another group and answer the following:
6. How are the two proteins physically different?
7. Why, specifically, are the two proteins different?

Conclusion:

1. If you were given the physical description of a protein (i.e. color, shape, size) how might you determine the particular DNA code that coded for that protein?
2. Describe why it is important that DNA replication be accurate and that mutations be avoided.
3. You may now eat your protein!

**Gene #3** Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period: \_\_\_\_\_ Date: \_\_\_\_\_\_\_

**Protein Synthesis Lab:**

**Creating a Rice Krispy Treat “Protein”**

1. Transcribe the following DNA sequence into an mRNA sequence:

(Note: the sequence has been separated into each three-nucleotide codon set)

TAC-CAC-AAC-AGC-TAG-AGT-CGA-TGC- GTA-ACG-ACC-GGG-ACT

\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_

1. Write the tRNA anticodons that recognize the above mRNA sequence:

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

1. Using the mRNA sequence and Chart #1, write out the amino acid sequence for your gene:

\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-

1. Using the amino acid sequence and Chart #2, write out the step-by-step recipe for making your rice krispy treat “protein”. Before actually making your “protein”, have the instructor check your recipe for accuracy. Once your “protein” is made, answer the questions on the analysis and conclusions sheet.

Analysis Questions:

1. Describe in detail what your protein looks like. Did it turn out as expected? Why or why not?
2. What effect would deleting the fifth nucleotide of your DNA sequence have upon your protein?
3. How would changing the eleventh nucleotide of your DNA sequence from a G to a T change your amino acid sequence? How would this mutation change what your protein looks like?
4. What would be the effect upon your protein if the 19th, 20th and 21st nucleotides of your DNA sequence were deleted? Would you consider this a necessarily bad mutation? Why or why not?
5. Compare your protein created by another group and answer the following:
6. How are the two proteins physically different?
7. Why, specifically, are the two proteins different?

Conclusion:

1. If you were given the physical description of a protein (i.e. color, shape, size) how might you determine the particular DNA code that coded for that protein?
2. Describe why it is important that DNA replication be accurate and that mutations be avoided.
3. You may now eat your protein!

**Gene #4** Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period: \_\_\_\_\_ Date: \_\_\_\_\_\_\_

**Protein Synthesis Lab:**

**Creating a Rice Krispy Treat “Protein”**

1. Transcribe the following DNA sequence into an mRNA sequence:

(Note: the sequence has been separated into each three-nucleotide codon set)

TAC-CAC-AAC-AGC-TAG-AGT-CGA-TGC- ATA-ACG-ACC-CCT-ATT

\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_

1. Write the tRNA anticodons that recognize the above mRNA sequence:

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

1. Using the mRNA sequence and Chart #1, write out the amino acid sequence for your gene:

\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-

1. Using the amino acid sequence and Chart #2, write out the step-by-step recipe for making your rice krispy treat “protein”. Before actually making your “protein”, have the instructor check your recipe for accuracy. Once your “protein” is made, answer the questions on the analysis and conclusions sheet.

Analysis Questions:

1. Describe in detail what your protein looks like. Did it turn out as expected? Why or why not?
2. What effect would deleting the fifth nucleotide of your DNA sequence have upon your protein?
3. How would changing the eleventh nucleotide of your DNA sequence from a G to a T change your amino acid sequence? How would this mutation change what your protein looks like?
4. What would be the effect upon your protein if the 19th, 20th and 21st nucleotides of your DNA sequence were deleted? Would you consider this a necessarily bad mutation? Why or why not?
5. Compare your protein created by another group and answer the following:
6. How are the two proteins physically different?
7. Why, specifically, are the two proteins different?

Conclusion:

1. If you were given the physical description of a protein (i.e. color, shape, size) how might you determine the particular DNA code that coded for that protein?
2. Describe why it is important that DNA replication be accurate and that mutations be avoided.
3. You may now eat your protein!

**Gene #5** Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period: \_\_\_\_\_ Date: \_\_\_\_\_\_\_

**Protein Synthesis Lab:**

**Creating a Rice Krispy Treat “Protein”**

1. Transcribe the following DNA sequence into an mRNA sequence:

(Note: the sequence has been separated into each three-nucleotide codon set)

TAC-CAC-AAC-AGC-TAG-AGT-TTT-TGC- GTA-ACG-ACC-CCT-ATC

\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_

1. Write the tRNA anticodons that recognize the above mRNA sequence:

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

1. Using the mRNA sequence and Chart #1, write out the amino acid sequence for your gene:

\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-

1. Using the amino acid sequence and Chart #2, write out the step-by-step recipe for making your rice krispy treat “protein”. Before actually making your “protein”, have the instructor check your recipe for accuracy. Once your “protein” is made, answer the questions on the analysis and conclusions sheet.

Analysis Questions:

1. Describe in detail what your protein looks like. Did it turn out as expected? Why or why not?
2. What effect would deleting the fifth nucleotide of your DNA sequence have upon your protein?
3. How would changing the eleventh nucleotide of your DNA sequence from a G to a T change your amino acid sequence? How would this mutation change what your protein looks like?
4. What would be the effect upon your protein if the 19th, 20th and 21st nucleotides of your DNA sequence were deleted? Would you consider this a necessarily bad mutation? Why or why not?
5. Compare your protein created by another group and answer the following:
6. How are the two proteins physically different?
7. Why, specifically, are the two proteins different?

Conclusion:

1. If you were given the physical description of a protein (i.e. color, shape, size) how might you determine the particular DNA code that coded for that protein?
2. Describe why it is important that DNA replication be accurate and that mutations be avoided.
3. You may now eat your protein!

**Gene #6** Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period: \_\_\_\_\_ Date: \_\_\_\_\_\_\_

**Protein Synthesis Lab:**

**Creating a Rice Krispy Treat “Protein”**

1. Transcribe the following DNA sequence into an mRNA sequence:

(Note: the sequence has been separated into each three-nucleotide codon set)

TAC-CAC-AAC-AGC-TAG-AGT-TTT-TGC- ATA-ACG-ACC-GGG-ACT

\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_

1. Write the tRNA anticodons that recognize the above mRNA sequence:

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

1. Using the mRNA sequence and Chart #1, write out the amino acid sequence for your gene:

\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-

1. Using the amino acid sequence and Chart #2, write out the step-by-step recipe for making your rice krispy treat “protein”. Before actually making your “protein”, have the instructor check your recipe for accuracy. Once your “protein” is made, answer the questions on the analysis and conclusions sheet.

Analysis Questions:

1. Describe in detail what your protein looks like. Did it turn out as expected? Why or why not?
2. What effect would deleting the fifth nucleotide of your DNA sequence have upon your protein?
3. How would changing the eleventh nucleotide of your DNA sequence from a G to a T change your amino acid sequence? How would this mutation change what your protein looks like?
4. What would be the effect upon your protein if the 19th, 20th and 21st nucleotides of your DNA sequence were deleted? Would you consider this a necessarily bad mutation? Why or why not?
5. Compare your protein created by another group and answer the following:
6. How are the two proteins physically different?
7. Why, specifically, are the two proteins different?

Conclusion:

1. If you were given the physical description of a protein (i.e. color, shape, size) how might you determine the particular DNA code that coded for that protein?
2. Describe why it is important that DNA replication be accurate and that mutations be avoided.
3. You may now eat your protein!

**Gene #7** Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period: \_\_\_\_\_ Date: \_\_\_\_\_\_\_

**Protein Synthesis Lab:**

**Creating a Rice Krispy Treat “Protein”**

1. Transcribe the following DNA sequence into an mRNA sequence:

(Note: the sequence has been separated into each three-nucleotide codon set)

TAC-CAC-AAC-AGC-TAG-AGT-TCT-TGC- GTA-ACG-ACC-GGG-ATT

\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_

1. Write the tRNA anticodons that recognize the above mRNA sequence:

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

1. Using the mRNA sequence and Chart #1, write out the amino acid sequence for your gene:

\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-

1. Using the amino acid sequence and Chart #2, write out the step-by-step recipe for making your rice krispy treat “protein”. Before actually making your “protein”, have the instructor check your recipe for accuracy. Once your “protein” is made, answer the questions on the analysis and conclusions sheet.

Analysis Questions:

1. Describe in detail what your protein looks like. Did it turn out as expected? Why or why not?
2. What effect would deleting the fifth nucleotide of your DNA sequence have upon your protein?
3. How would changing the eleventh nucleotide of your DNA sequence from a G to a T change your amino acid sequence? How would this mutation change what your protein looks like?
4. What would be the effect upon your protein if the 19th, 20th and 21st nucleotides of your DNA sequence were deleted? Would you consider this a necessarily bad mutation? Why or why not?
5. Compare your protein created by another group and answer the following:
6. How are the two proteins physically different?
7. Why, specifically, are the two proteins different?

Conclusion:

1. If you were given the physical description of a protein (i.e. color, shape, size) how might you determine the particular DNA code that coded for that protein?
2. Describe why it is important that DNA replication be accurate and that mutations be avoided.
3. You may now eat your protein!

**Gene #8** Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Period: \_\_\_\_\_ Date: \_\_\_\_\_\_\_

**Protein Synthesis Lab:**

**Creating a Rice Krispy Treat “Protein”**

1. Transcribe the following DNA sequence into an mRNA sequence:

(Note: the sequence has been separated into each three-nucleotide codon set)

TAC-CAC-AAC-AGC-TAG-AGT-TCT-TGC- ATA-ACG-ACC-CCT-ATC

\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_-\_\_\_\_

1. Write the tRNA anticodons that recognize the above mRNA sequence:

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

1. Using the mRNA sequence and Chart #1, write out the amino acid sequence for your gene:

\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_-

1. Using the amino acid sequence and Chart #2, write out the step-by-step recipe for making your rice krispy treat “protein”. Before actually making your “protein”, have the instructor check your recipe for accuracy. Once your “protein” is made, answer the questions on the analysis and conclusions sheet.

Analysis Questions:

1. Describe in detail what your protein looks like. Did it turn out as expected? Why or why not?
2. What effect would deleting the fifth nucleotide of your DNA sequence have upon your protein?
3. How would changing the eleventh nucleotide of your DNA sequence from a G to a T change your amino acid sequence? How would this mutation change what your protein looks like?
4. What would be the effect upon your protein if the 19th, 20th and 21st nucleotides of your DNA sequence were deleted? Would you consider this a necessarily bad mutation? Why or why not?
5. Compare your protein created by another group and answer the following:
6. How are the two proteins physically different?
7. Why, specifically, are the two proteins different?

Conclusion:

1. If you were given the physical description of a protein (i.e. color, shape, size) how might you determine the particular DNA code that coded for that protein?
2. Describe why it is important that DNA replication be accurate and that mutations be avoided.
3. You may now eat your protein!