Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Protein Synthesis and Biotech Study Guide**

**DNA, RNA, Protein Synthesis**

1. Explain the difference between chromatin, chromatids, and chromosome
2. Please state the monomer that makes up DNA and RNA. Draw a picture of each.
3. Please fill in the chart

|  |  |  |
| --- | --- | --- |
|  | Ribonucleic Acid (RNA) | Deoxyribonucleic Acid (DNA) |
| Job in protein synthesis: |  |  |
| Nitrogen bases: |  |  |
| Shape: |  |  |
| Sugar in molecule: |  |  |
| Location in the cell: |  |  |

1. DNA cannot leave the nucleus because: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. What type of bonds hold together guanine and cytosine?
3. Replication happens where?
4. Transcription happens where?
5. Translation happens where?
6. Please fill in the chart

|  |  |  |  |
| --- | --- | --- | --- |
|  | Replication | Transcription | Translation |
| Location |  |  |  |
| Purpose |  |  |  |

1. Please describe the difference between mRNA, tRNA, and rRNA. Draw a picture of each.
2. Amino Acids carried by the tRNA attach to form long \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ chains. These amino acids are held together by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ bonds. Sometimes we call these poly\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. Please list the events that take place during the synthesis(making) of a protein.
4. Proteins are made on what organelle?
5. Which amino acid is the Start codon?
6. How many nitrogen bases make up a codon?
7. How many nitrogen bases make up an anti-codon?
8. Codons are located on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
9. Anti-Codons are located on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
10. Translation is based off of the codon or anti-codon?
11. Practice:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | GTA | CTC | AAG | GTC | TAG |
| Replication |  |  |  |  |  |
| Transcription |  |  |  |  |  |
| Anti-Codons |  |  |  |  |  |
| Translation |  |  |  |  |  |

1. Please state the two gene mutations and explain each.
2. Please state the 4 types of chromosome mutations and explain each.
3. Please state the two ways a cell can turn on or off a gene.

**Biotechnology**

1. What is the purpose of the Human Genome Project?
2. What type of screening can pregnant woman go through in order to find any genetic diseases?
3. What is the linkage map?
4. What type of gel is used in gel electrophoresis?
5. Protein is run through a gel electrophoresis unit to make a DNA \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
   1. This is unique for every person except for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
   2. Gel Electrophoresis is used to find what?
   3. What type of scientists use DNA fingerprints?
6. Protein has a negative or positive charge?
7. Do the larger pieces of DNA stay closer to the wells or move further in the gel when zapped with an electrical charge?
8. What do we remove from the donor egg when cloning and why?
9. When cloning, do we use a somatic cell or a gamete cell? Why?
10. What are restriction enzymes? What do we use them for?
11. What is a transgenic organisms?
12. What does transformation mean in genetic engineering?
13. What shape is a plasmid?
14. What type of cell do we use to insert new DNA into an organism?
15. What are the two things that can be determined by a karyotype?
16. How many chromosomes are in a normal human karyotype?
17. Please explain nondisjunction.
18. Which pair of chromosomes on a karyotype determine the sex of the baby?
    1. Males: X\_\_\_\_\_\_
    2. Females: X\_\_\_\_\_\_\_
19. What is Turner’s Syndrome?
20. What is Klinefelters Syndrome?