

DNA Test Study Guide

DNA History: Fill in the blanks below, and then find the answers in the word search provided. Last names only!

- The scientist who determined that the amount of adenine = thymine and guanine = cytosine was CHARGAFF.
- The scientist who took x-ray photos of DNA was FRANKLIN.
- The AMERICAN scientist who helped build the first model of DNA in order to become famous was WATSON.
- The British scientist who helped build the first model of DNA and won the Nobel Prize in 1962 was CRICK.

DNA Review: Crossword Puzzle!

Use the clues below to complete the crossword puzzle given.

Across

- Where both DNA replication and transcription take place within the cell.
- Repeating subunit of DNA and RNA.
Name of sugar found in RNA.
- Base that is complimentary to adenine during Transcription.
- Base that is complimentary to thymine during DNA Replication.
- First part of Gene Expression when DNA is copied to mRNA.
- Second part of Gene Expression when mRNA is used to make a protein.
- Base that is complimentary to cytosine.

Down

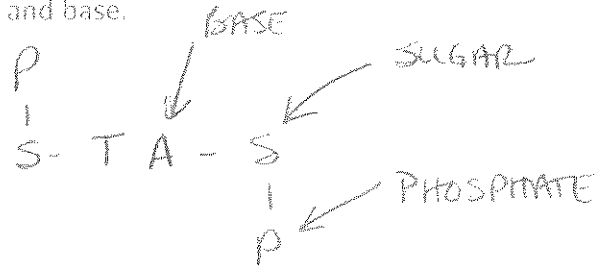
- Process of using information on DNA to make proteins.
- Where translation takes place within the cell.
- The process of making identical copies of DNA.
- Name of sugar found in DNA.

The crossword puzzle grid contains the following words:

- Across 1:** NUCLEUS
- Across 2:** NUCLEOTIDE
- Across 3:** URACIL
- Across 4:** TRANSCRIPTION
- Across 5:** TRANSLATION
- Down 1:** RIBOSE
- Down 2:** ADENINE
- Down 3:** GUANINE
- Down 4:** DEOXYRIBOSE

DNA Structure:

1. Draw a nucleotide with thymine as the base AND draw the complimentary nucleotide on the other side. THEN label the phosphate, sugar, and base.



2. Use the DNA strand given to determine its complimentary strand of DNA.

T A C G C C A A A G C A
• A T G C G G T T T C G T

DNA Replication:

1. Use the unzipped DNA strand below to simulate DNA Replication by determining what "free floating" nucleotides are needed.

T A C G C C A A T G C A
A T G C G G T T A C G T

T A C G C C A A T G C A
A T G C G G T T A C G T

2. Circle the words that best complete the sentences below.

DNA Replication is the process of making genetically (different/identical) strands of DNA.

3. Put the steps of replication in order.

2 Nucleotides go into the middle of the exposed strand and match with their complimentary nucleotides with the help of DNA Polymerase.

1 DNA Helicase unzips and unwinds the DNA strand.

3 Two identical pieces of DNA are created so that every cell of the body contains an exact set.

4. Why does a cell need to make identical copies of DNA? *SO THE CELL CAN COPY - FOR GROWTH, REPAIR, AND REPRODUCTION*

Gene Expression

Fill in the blanks below with the correct term.

1. The overall goal of gene expression is to take the information found on DNA and create a PROTEIN.
2. The first part of gene expression is called TRANSCRIPTION when the information on DNA is copied to mRNA. This part takes place in the NUCLEUS.
3. The second part of gene expression is called TRANSLATION when the mRNA is translated into AMINO ACIDS which will bond together to make a protein. The amino acids are transferred to the ribosome by the tRNA molecules. Translation takes place at the RIBOSOME.
4. Use the DNA sequence below and your genetic code to transcribe and translate the gene into a protein.

T A C G C C A A T A T (T)

mRNA: AUG CGG UUA UAA

amino acids: METH - ARG - LEUC - STOP

5. Use the DNA sequence below and your genetic code to transcribe and translate the gene into a protein.

T A C G C C A A T A T (A) ← POINT MUTATION

mRNA: AUG CGG UUA UAU

amino acids: METH - ARG - LEUC - TYROS.

6. What type of mutation occurred in the second DNA sequence when comparing it to the first?

POINT MUTATION

7. How did that affect the protein that was made? THE PROTEIN DOES NOT STOP. IT CONTINUES TO TYROSINE.

8. Look at the first DNA sequence from above. Write a mutated DNA sequence that would NOT change the protein?

T A C G C G A A T A T T

↳ STOP GOES TO CGC → ARGININE

Use the figures below to answer the questions on the following page.

FIGURE 1

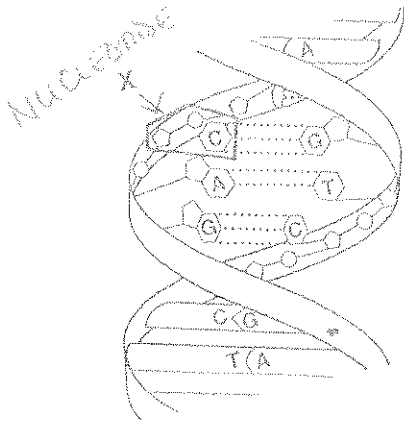


FIGURE 2

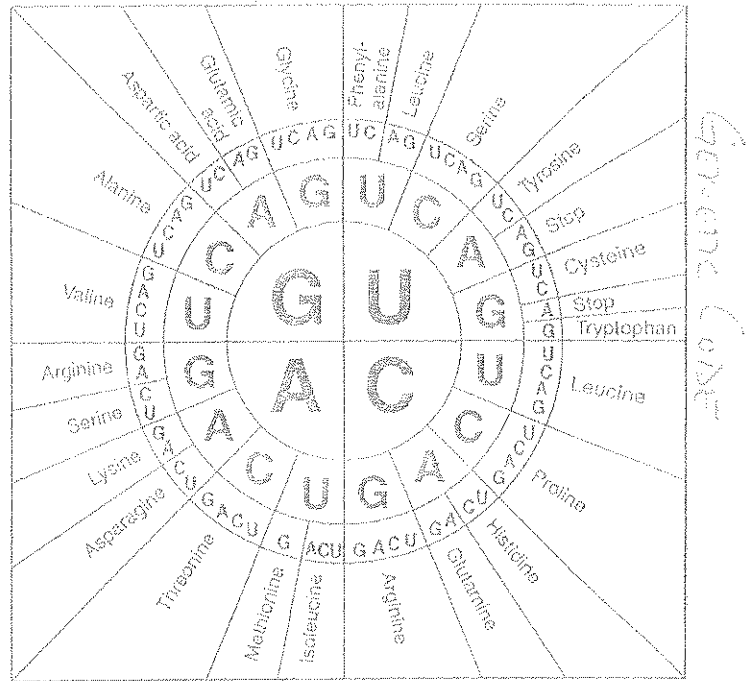


FIGURE 3

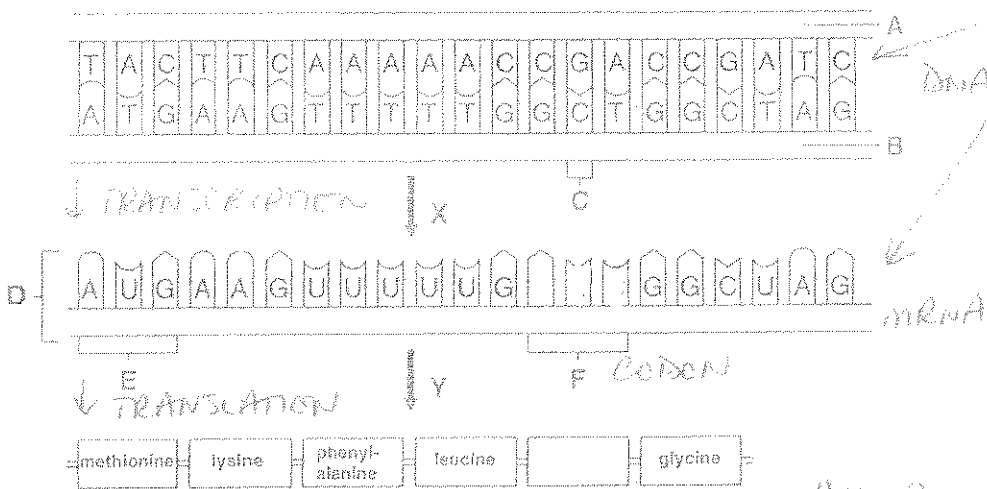


FIGURE 4

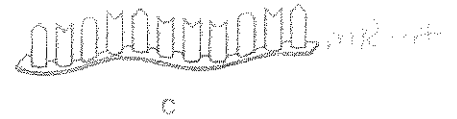


FIGURE 5

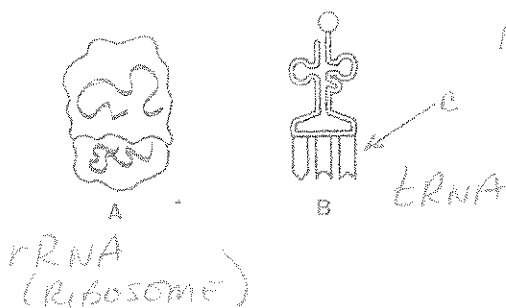
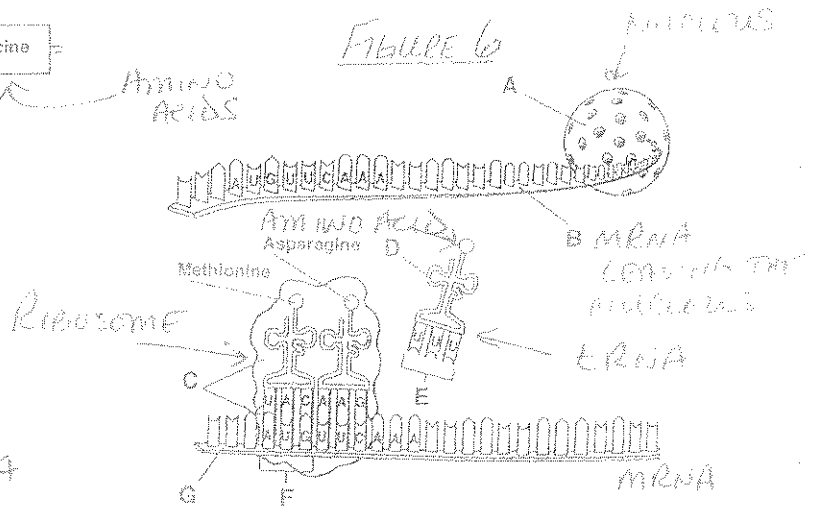


FIGURE 6



Use the figures on the previous page to answer the following questions.

Figure 1

1. What molecule is shown in this figure? **DNA**
2. What subunit of this molecule is represented by "X"?
NUCLEOTIDE
3. What is the name given to the shape of this molecule?
DOUBLE HELIX

Figure 1 & 2 Word Bank	
Glycine ✓	Genetic Code ✓
Nucleotide ✓	DNA ✓
Translation ✓	Double Helix ✓

Figure 2

1. What is the name given to this tool? **GENETIC CODE**
2. During which part of Gene Expression is this tool used? **TRANSLATION**
3. Use the tool to determine the amino acid needed if the DNA Template reads GGA. **GLYCINE**

Figure 3

1. Which side of the DNA strand is being used as the template? **SIDE A**
2. What is the name of the molecule labeled "D"? **mRNA**
3. Which Gene Expression process is represented by the "X" arrow?
TRANSCRIPTION (DNA → mRNA)
4. At is the missing codon labeled "F"?
GCU
5. What Gene Expression process is represented by the "Y" arrow?
TRANSLATION (mRNA → AMINO ACID)
6. Determine the missing amino acid.
ALANINE

Figure 3 Word Bank	
Side A ✓	Alanine ✓
Transcription ✓	mRNA ✓
GCU ✓	Translation ✓

Figure 4

1. What molecule is represented in this figure? **mRNA**
2. Where in the cell is this molecule made?
NUCLEUS

Figure 4 & 5 Word Bank	
rRNA ✓	tRNA ✓
nucleus ✓	mRNA ✓

Figure 5

1. What molecule is labeled "A"? **rRNA (RIBOSOME)**
2. What molecule is labeled "B"? **tRNA**

Figure 6

1. What cell part is labeled "A"? **NUCLEUS**
2. What molecule is labeled "B" and "G"? (It's the same molecule)
mRNA
3. What molecule is labeled "D"? **tRNA**
4. What cell part is labeled "C"? **RIBOSOME (rRNA)**
5. What Gene Expression process is being shown in this figure?
TRANSLATION

Figure 6 Word Bank	
Ribosome (rRNA) ✓	mRNA ✓
Nucleus ✓	tRNA ✓
Translation ✓	