BIOLOGY

@ NEW SMYRNA BEACH HIGH SCHOOL

Accept our connectedness to events. It is not unknown forces that cause our problems. We are the cause and the cure. We create our own reality and we can change it.

STANDARD 8:

The Blueprint of Life

1. DNA Structure & Replication

2011-2012

New Smyrna Beach High School

Working together with parents, school personnel and community members, New Smyrna Beach High School students will graduate with the knowledge, skills and values to be positive contributors to society.

STANDARD 8, The Blueprint of Life

Required Content = "Ticket to Test"

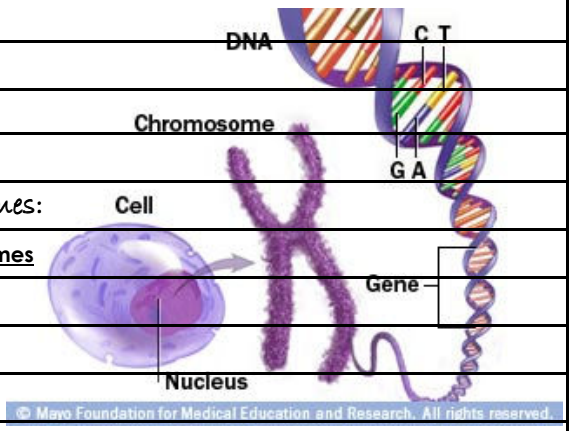
Key Term	Information/Description/Definition
1. DNA	
2. Chromosome	
3. Protein	
4. Nucleotide	
5. RNA **A) mRNA** **B) rRNA** **C) tRNA**	
6. Replication	
7. Transcription	
8. Translation	
9. Mutation	

Standard 8: The Blueprint of Life

TOPIC: DNA Structure

Date:_____

Possible Test Questions or Topic	Notes:
1. The purpose of Part 1 of this unit is to describe CHROMOSOMES, GENES, DNA and their functions.	Define the following terms: 1 A. Chromosome -
	We have 23 pairs of Xsomes: 22 pair are called **Autosomes** 1 pair are **Sex Xsomes**
	1 B. Gene -
	1 C. DNA -
2. Do eukaryotic cells have DNA?	2.
Do prokaryotic cells have DNA?	
Do viruses have DNA?	
3. Watson & Crick came up with a model of the DNA molecule. How did they describe it?	3.
4. Each strand of DNA is made up of linked molecules/subunits. What are these called? What are the other 2 parts that make up the subunit shown at the right?	4. 1. 2. 3. Nitrogen base
	If you take a bunch of these nucleotides & put them together like on the next page... you get a DNA molecule!!!

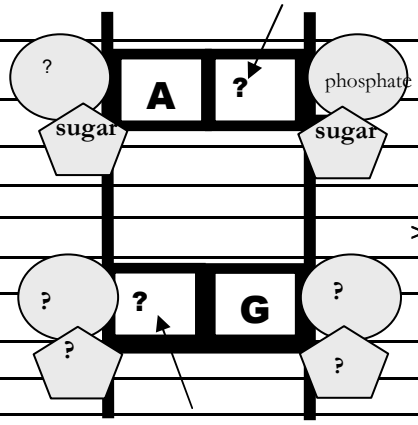


Notes, cont.

TOPIC: DNA Structure

Date:_____

Possible Test Questions or Topic	***Notes:***
5. The diagram to the right is of a DNA	5.
molecule showing 4 nucleotides. Using the	
'Base Pairing Rules', fill in the missing nitrogen	
bases & missing 'sides' of the 'ladder'.	
The sequence of nucleotides, meaning	
the A with the T, and/or the C with the G…	
determines what we will be <u>or</u> what a fish	
will look like <u>or</u> what a flower look like, etc.	
6. Draw another DNA Molecule—use your own	
shapes! Show me you understand!	
7. What kind of bond holds the two sides	7.
of the DNA ladder together?	
8. Following the Base-Pairing Rules' write in the	8A) **A A A—T T T—C C C—G G G**
matching complimentary half of DNA	T T T
	B) **A C G - G C A - T A A - GTA**
	C) **T T C - G A A - G G G - A T T**
	How the nitrogen bases in the nucleotides pair up (their SEQUENCE) helps determine the characteristics/traits
	that every living thing exhibits!



> The **sides** of the DNA 'ladder' are made up of _____ & _____

> The **rungs** (steps) are made up of four different _____ BASES and they always pair up in this way:

Adenine —> **T**hymine

Cytosine —> **G**uanine

Notes, cont.

TOPIC: DNA vs RNA

Date:_____

Possible Test Questions or Topic	***Notes:***
9. What is RNA?	9.
10. Compare RNA to DNA	

	DNA	**RNA**
A. Letters stand for?	**DeoxyriboNucleic Acid**	
B. How many strands?		
C. Name of sugar?	**Deoxyribose**	**Ribose**
D. 4 base pairs?	A – T	A – ?
	C – G	C - G

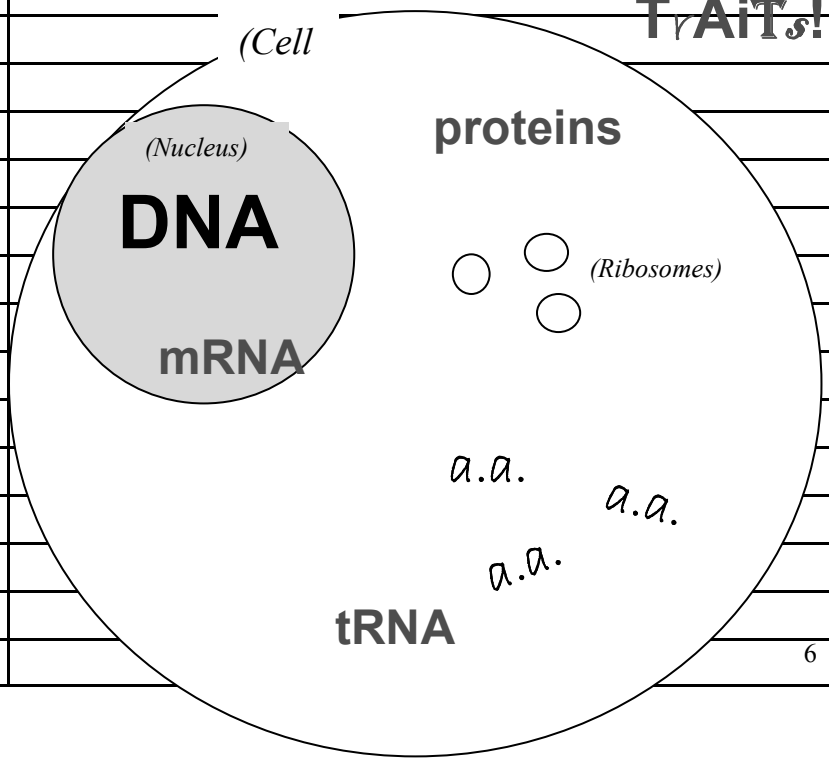
11. So here's the deal with DNA and RNA...	DNA is too big to fit through the pores of the nuclear membrane. So DNA
	temporality unzips in order to make an RNA strand . As you will see on the
FACT: DNA starts the signal to make proteins	next page that RNA sends to message out of the nucleus to the ribosomes to
FACT: RNA delivers the signal	tell them to make proteins (proteins make us what we are)!
	So you need to know HOW to 'make an RNA strand'. Don't forget ONE base is
	Different! Complete the following:
	11A) **A A A—T T T—C C C—G G G**
	↓↓↓
	U U U—A A A—
	B) **A C G - G C A - T A A - GTA**
	↓↓↓
	C) **T T C - G A A - G G G - A T T**
	The function of DNA is to 'tell the cell' to make proteins. Proteins are used in the
	Cell to control chemical reactions. Examples: proteins give you eyes their
	color; digest your food. Make up your hormones, tell cells when to divide, help
	cells communicate with each other. So THE QUESTION IS.... How to you
	get from this double stranded DNA in the nucleus OUT to the RIBOSOMES
	to make PROTEINS and how is RNA involved????

Notes, cont.

TOPIC: DNA Replication

Date:_____

Possible Test Questions or Topic	***Notes:***
12. What is Transcription?	12.
A. **m**RNA = **m**essenger RNA	A.
B. **r**RNA = **r**ibosomal RNA	B.
C. **t**RNA = **t**ransfer RNA	C.
13. What is Translation?	13.
14. Draw arrows to understand:	#1 Draw an arrow from DNA to mRNA
	#2 Draw an arrow from mRNA to the cytoplasm to the ribosomes
	#3 Draw an arrow from tRNA to the amino acids then to the ribosomes
	#4 Draw an arrow from the ribosomes to proteins
	#5 Draw an arrow from proteins to the word traits
DNA Starts the signal to	
make proteins	
The RNA delivers the	
message to the	
amino acids & the ribosomes	
so the proteins can be put together	
So you look like you do or so plants	
look like they do…. So every living	
thing looks like they do… all because	
of how the PROTEINS are arranged!	

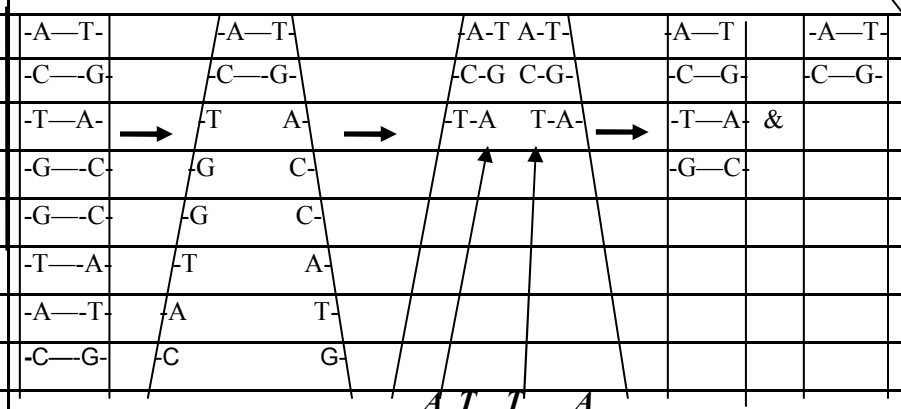


Notes, cont.

TOPIC: DNA Replication

Date:_____

Possible Test Questions or Topic	Notes:
15. What is replication?	15.
16. During what phase of mitosis does DNA replicate?	16.
17. WHY does the DNA have to replicate?	17.
18. Replication takes place in the NUCLEUS!!! Describe what is taking place in each of the 4 steps:	



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

STEP 1:

STEP 2:

STEP 3:

How Does DNA Determine

the Traits of an Organism

In this simulation, you will examine the DNA sequence of a fictitious organism: the Snork. Snorks were discovered on the planet Dee Enae in a distant solar system. Snorks only have one chromosome with 6 genes on it. Your job is to analyze the genes of its DNA and determine what traits the organism has. Part of the chromosome sequence from a Snork is listed below in the table. Each gene has only 3 amino acids. Determine the sequence of amino acids for your specimen. Using the tables on the next page, write the complimentary mRNA, tRNA, the amino acid (A.A.) sequence it codes for and the related trait in the chart below.

Remember when you go from DNA to DNA —> A-T, G—C
DNA to RNA —> A-U, G—C
RNA to RNA —> A-U, G—C

DNA gene sequence	**A C C-G G T-T A T - A G C-C G A-G G G - T T T-A A C-A A A - G G A-C G C-C G A - GG G-A G G-A A A - A T C-A T C-C T A**					
mRNA – interprets DNA's message	**UGG –CCA - AUA**					
tRNA – each triplet codes for a specific amino acid	**ACC –GGU - UAU**					
A.A. – each amino acid triplet sequence codes for a certain trait	**20 - 12 - 13**					
Trait	hairy					

∞

Use this information to help you decipher the DNA sequence:

tRNA triplet	Amino Acid Number
ACC	20
AGC	16
CGA	2
AAC	4
CGC	3
GGG	5
AGG	7
AAA	8
UUU	9
GGU	12
UAU	13
CCC	1
AUC	6
CUA	10
GGA	11

Amino Acid Sequence	Trait
20-11-13	hairless
20-12-13	hairy
20-21-21	plump
13-14-15	skinny
16-2 - 5	4 legged
16-4 - 5	2 legged
12-7-8	round head
5-7-8	block head
9-8 - 8	no tail
9-4 - 8	tail
11-3-2	slanted eyes
11-3-3	wide round eyes
6-6-10	male
6-6-14	female

Draw what the Snork looks like!

Additional notes, drawings, scribbles, doodles, etc. that will help you learn the material –>

THIS, my friends, is your "Ticket to Test"! This is not a joke. This is real! Make a "Ticket to Test"