

Review for Test:

**Hand back quiz folders...look at previous quizzes (10 minutes)
(Put in grade for study guide)**

**Review Dances: Gene, DNA, Chromosome, Protein
Cell cycle Dance (G1, S, G2...)
Cancer Gene Dance
Mitosis vs. Meiosis vs. Fertilization Dance**

Answer questions about the Study Guide

Kahoot

Name: _____

Period: _____

Study Guide for Cell Cycle, DNA and Protein Synthesis Test- Due Monday April 29

Label each part of the cell cycle picture on the right with the name of the phase:

A: G1

B: S

C: G2

D: (F-I) Mitosis

E: (A, B, and C): Interphase

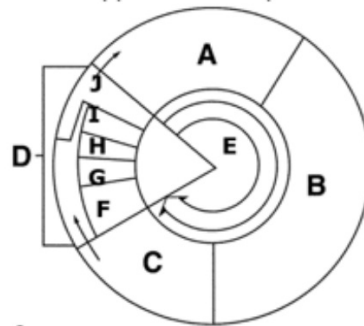
F: Prophase

G: Metaphase

H: Anaphase

I: Telophase

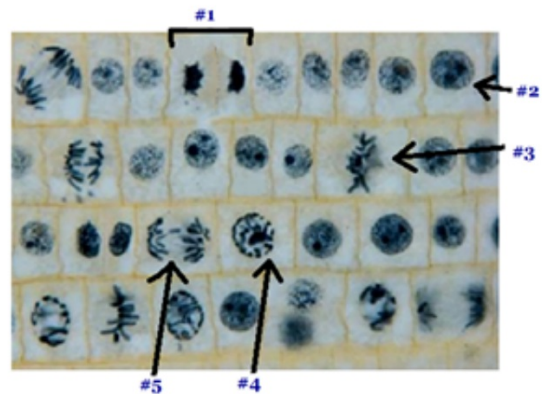
J: Cytokinesis



J: _____

Identify the phases in the picture to the right:

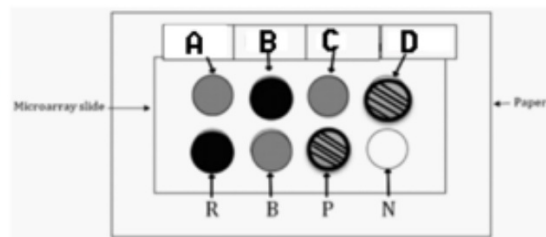
- 1: Telophase
- 2: Interphase
- 3: Metaphase
- 4: Prophase
- 5: Anaphase



1. What occurs in the cell during interphase? Is the DNA coiled or uncoiled? The cell grows, the DNA replicates itself. DNA is uncoiled.
2. What is the purpose of mitosis? Division of the nucleus
3. What molecules act as checkpoints? CDK and cyclin
4. What molecules are made to express a trait? Protein
5. What happens when an oncogene is active in a cell? The cell rapidly divides
6. What is the function of a tumor suppressor gene in a healthy cell? To stop cell division when it is not needed.

7. What is the function of DNA repair genes? To check the DNA during replication
8. What does a microarray measure? Gene Activity- amount of mRNA made
9. If genes are ONLY active in cancer cells they will appear what color on a microarray? Red
10. If genes are ONLY active in healthy cells they will appear what color on a microarray? Blue
11. If gene are active in both types of cells they will appear what color on a microarray? Purple

12. A, B, C and D are unknown genes. R, B, P and N are the controls. Which gene is active in a cancer cell? B and D

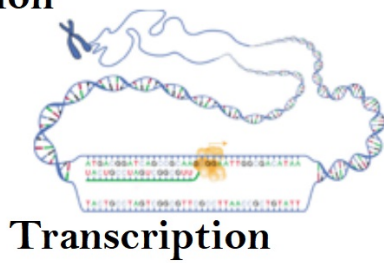


13. Which gene or genes are found in healthy cells?
A, C and D

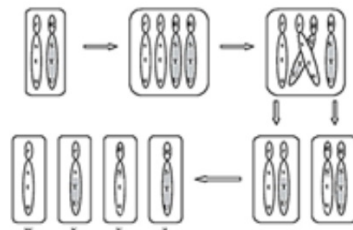
14. Do all cells in the body have the same chromosomes, DNA, and genes? YES!!!
15. Do all cells express all of the genes? No...only express genes (make proteins) for genes that help that cell function
16. What type of molecule is made as a result of a gene being "expressed"? Protein
17. What happens to the ability of a cell to perform its functions if there is a mutation in the DNA and the gene cannot be expressed? The cell cannot perform its function if the gene is not expressed correctly.

18. What happens in the cell if an activator is added to a gene? — ~~It causes the cell to do transcription and translation (protein synthesis)~~
19. Identify each of the pictures below:

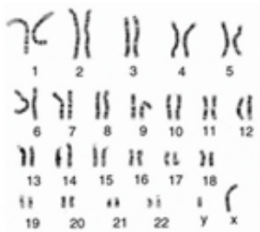
DNA Replication



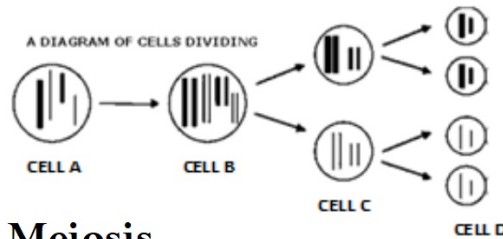
Transcription



Meiosis (shows crossing over)

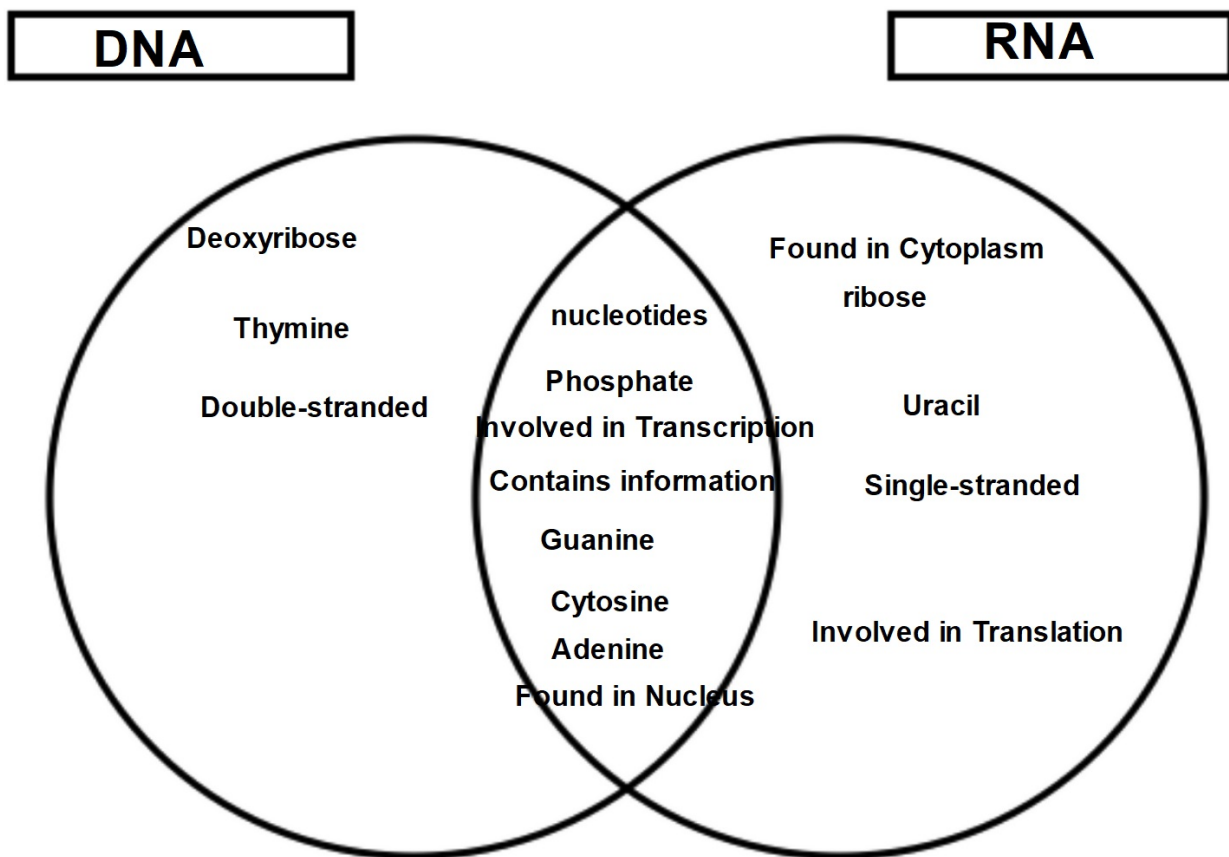


Karyotype- shows homologous chromosomes



Meiosis

Get out your homework- Comparing DNA to RNA Reading



2. A DNA molecule contains 100 base pairs of nucleotides. 40 of the nucleotides are paired with Adenine. How many of the nucleotides are paired with guanine?

$$60 \quad 100 - 40 \text{ A/T} = 60 \text{ G/C}$$

3. a. What is the purpose of DNA Replication? To make an exact copy of DNA for cell division
b. When does it occur? S phase of interphase
4. A. What is the purpose of protein synthesis? To make proteins (which do the work
B. When does it occur? Interphase of the cell
5. What are the 2 parts of protein synthesis? Transcription and Translation
6. What is transcription? making mRNA from DNA in the nucleus
7. What is translation? making an amino acid chain (protein) from mRNA

8. Fill in the blanks with the appropriate information:

DNA: 5' A T C C T A G G G T A A G G G C 3'
 Complementary DNA: 3' T A G G A T C C A T T C C C G 5'
 mRNA: 5' A U C | C U A | G G U | A A G | G G C 3'
 Amino acid chain: IsO- Leu - Gly - Lys - Gly

DNA: 5' C G G C A T C A C A G C A G G G 3'
 Complementary DNA: 3' _____ 5'
 mRNA: 5' _____ 3'
 Amino acid chain: _____

First Base	Second Base						Third Base		
	U		C		A			G	
U	UUU	Phenylalanine (Phe)	UCU	Serine (Ser)	UAU	Tyrosine (Tyr)	UGU	Cysteine (Cys)	U
	UUC		UCC		UAC		UGC		C
	UUA	Leucine (Leu)	UCA		UAA	Stop	UGA	Tryptophan (Trp)	A
UUG	UCG		UAG	UGG	G				
C	CUU	Leucine (Leu)	CCU	Proline (Pro)	CAU	Histine (His)	CGU	Arginine (Arg)	U
	CUC		CCC		CAC		CGC		C
	CUA		CCA		CAA	CGA	Glutamine (Gln)		CGG
CUG	CCG	CAG	CGG	G					
A	AUU	Isoleucine (Iso)	ACU	Threonine (Thr)	AAU	Asparagine (Asn)	AGU	Serine (Ser)	U
	AUC		ACC		AAC		AGC		C
	AUA	ACA	AAA		Lysine (Lys)	AGA	Arginine (Arg)	A	
AUG	Methionine (Met)	ACG	AAG	AGG		G			
G	GUU	Valine (Val)	GCU	Alanine (Ala)	GAU	Aspartic Acid (Asp)	GGU	Glycine (Gly)	U
	GUC		GCC		GAC		GGC		C
	GUA		GCA		GAA	Glutamic Acid (Glu)	GGG		GGG
GUG	GCG	GAG	G						

9. What is a random change in DNA called? Mutation

10. If the DNA in a gene is changed, what molecule will most likely be altered? Protein

11. In one type of mutated gene, AAA replaced the normal ATA in the DNA code. What amino acid substitution has taken place in the mutated hemoglobin?

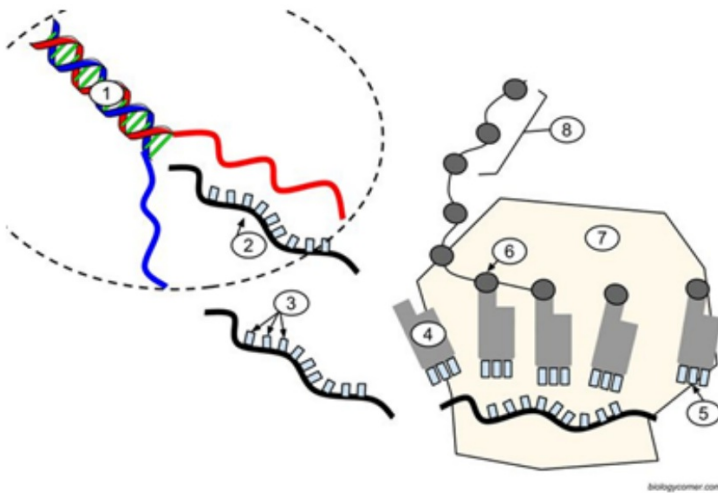
- a. ~~Arg~~ has replaced Tyr
- b. Lys has replaced ~~Arg~~
- c. Phe has replaced Tyr
- d. Lys has replaced Asp

Change it to mRNA first

UUU replaced UAU

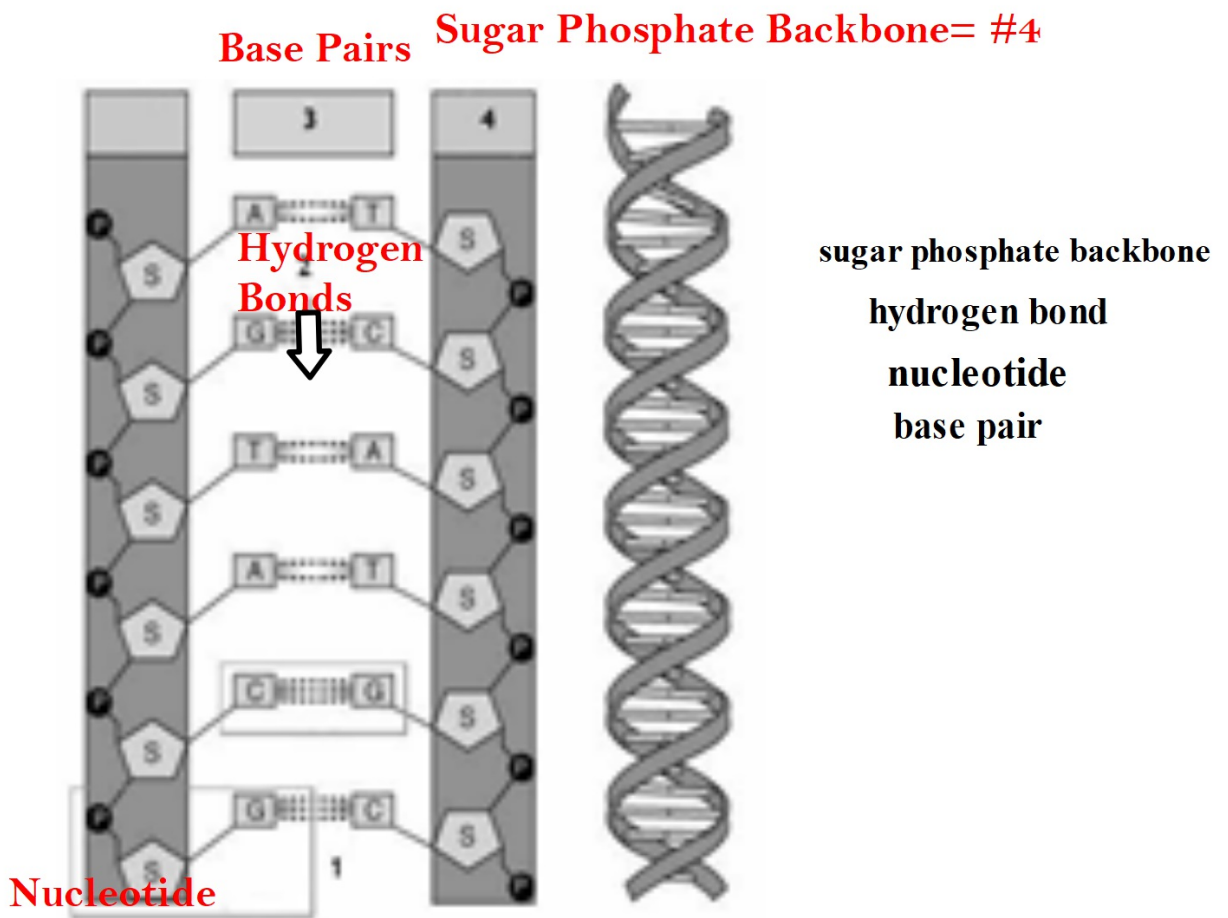
12. Match the following words to the appropriate numbers:

Word bank: Ribosome, DNA, Amino acid chain, Amino Acid, anticodon, codon, mRNA, tRNA



1. DNA
2. mRNA
3. Codon
4. tRNA
5. anticodon
6. amino acid
7. ribosome
8. amino acid chain

Label the following on this diagram: DNA, hydrogen bond, sugar phosphate backbone, nucleotide, base pair



Meiosis:

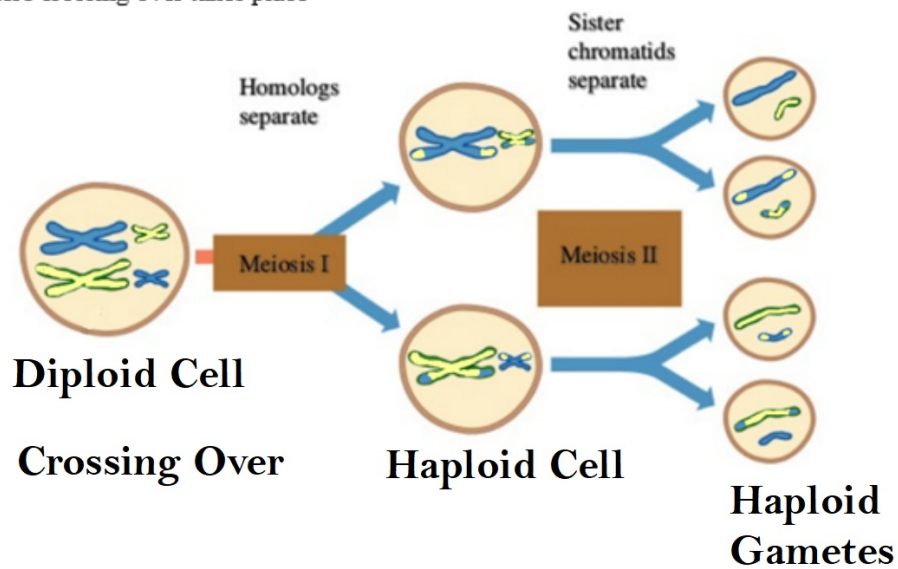
1. What is Meiosis? What is the final result? Makes 4 unique haploid gametes
2. Define "Diploid". Cells with 2 copies of each chromosome 2n
3. Define "Haploid". Cells with only 1 copy of each chromosome n
4. What kind(s) of cells are diploid in the human body? Everything in your body except sperm or egg
5. What kind(s) of cells are haploid in the human body? sperm or egg
6. How many times does the cell divide in meiosis? 2

7. What is crossing over? What is the result? What process is it a part of?

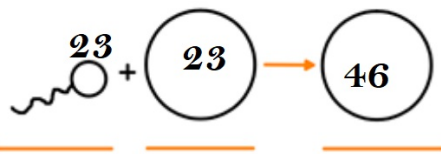
When homologous chromosomes wrap around each other and switch DNA. It happens during meiosis 1...Prophase 1

8. The following diagram shows Meiosis. On this diagram, label:

- i. all cells as haploid or diploid
- ii. Gametes
- iii. Where crossing over takes place



9. What is fertilization? What is the end result of fertilization? Label cells as haploid or diploid, and label zygote, male gamete, female gamete. Write in chromosome number for humans.



Haploid
gamete

Haploid
gamete

Diploid
Zygote

10. If an organism's skin cells have 40 chromosomes, how many chromosomes are in its:
- a. Sperm cells: 20
 - b. Gamete: 20
 - c. Egg cells: 20
 - d. Zygote: 40
 - e. Brain cells: 40

Mitosis vs Meiosis

11. How is the purpose of meiosis different from the purpose of mitosis?

12. Mitosis, meiosis or both:

- | | |
|---|--|
| i. Creates skin cells: <u>Mitosis</u> | Includes two cell divisions: <u>Meiosis</u> |
| ii. Creates sperm cells: <u>Meiosis</u> | Creates variation in offspring: <u>Meiosis</u> |
| iii. Creates cancer cells: <u>Mitosis</u> | Type of cell division: <u>Both</u> |
| iv. Creates gametes: <u>Meiosis</u> | |

**The purpose of meiosis is to create haploid cells for reproduction.
The purpose of mitosis is to create identical diploid body cells.**

kahoot review

