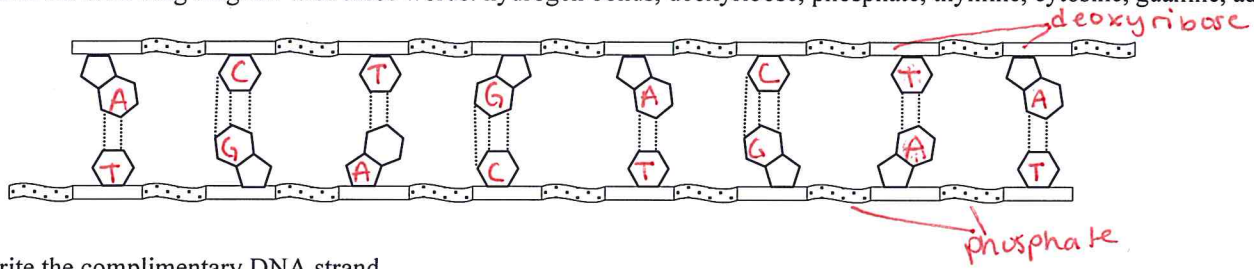


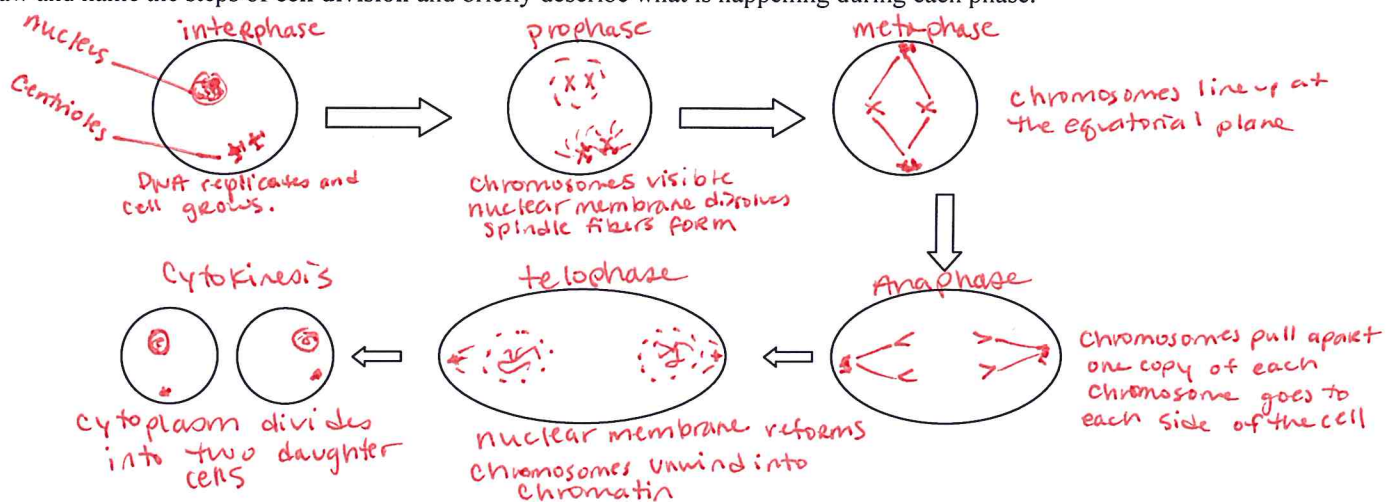
1. What does DNA stand for? deoxyribonucleic acid
2. What is the 3D structure of DNA? a double helix
3. Who is credited for the discovery of DNA? Watson and Crick. Which scientist did not get a Nobel prize but contributed to the discovery of DNA through x-ray crystallography? Franklin
4. DNA is composed of repeating subunits (monomers) what are those units called? nucleotides And what three parts make up these monomers? sugar, phosphate and nitrogen base
5. What are three ways that DNA differs from RNA?
RNA is single stranded while DNA is double stranded, DNA uses Thymine where RNA uses Uracil, DNA is very large and RNA is relatively small in length, RNA uses ribose sugar and DNA uses deoxyribose sugar.
6. What is the main difference between a purine and a pyrimidine? Which of the two nitrogen bases are purines and which two are pyrimidines?
purines have a double ring structure and pyrimidines have a single ring. Cytosine and Thymine are pyrimidines and guanine and adenine are purines.
7. Label the following diagram with these words: hydrogen bonds, deoxyribose, phosphate, thymine, cytosine, guanine, adenine



8. Write the complimentary DNA strand.

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

9. Describe the process of DNA replication (what enzymes are used and what is the final product?)
DNA helicase unzips the DNA by breaking hydrogen bonds. DNA polymerase places the correct DNA nucleotide on each strand (one continuously, the other in looped sections) The final product is two identical strands of DNA.
10. How does the cell prevent errors in replication?
DNA polymerase checks for errors and fixes mistakes.
11. Describe how DNA becomes chromosomes. (hint: use histones, chromatin, centromere in your explanation)
DNA winds around histones which wrap up into chromatin. Then chromatin winds up into chromosomes. The two sister chromatids are attached at the centromere.
12. What is a karyotype?
An image of all the chromosomes in a diploid cell.
13. What is the difference between diploid and haploid?
Diploid is the somatic # of chromosomes (2n) and haploid is half (sex cells, n)
14. What occurs during each part of interphase?
G₁ is cell growth, S is DNA replication and G₂ is more growth and preparation for cell division
15. Draw and name the steps of cell division and briefly describe what is happening during each phase.



16. How do plant cells differ from animal cells during cytokinesis?

plant cells must also form a cell plate between daughter cells which will become the cell wall.

17. Differentiate between DNA replication, mitosis and cell division.

DNA replication copies the DNA during S of Interphase. mitosis is the division of the nucleus into the two cells and cell division is the division of the cytoplasm into the two cells.

18. Describe the process of protein synthesis (use: transcription, translation, DNA, mRNA, tRNA, amino acid, ribosome and protein)

during transcription DNA is read by RNA synthase to create an mRNA strand. Then the mRNA leaves the nucleus and attaches to a ribosome. The ribosome reads mRNA codons (3 letters) and tRNA brings the correct amino acid by matching its anticodon to the mRNA codons. The amino acids form peptide bonds and a working protein is finally formed. When the stop codon is reached the process is complete.

Translation now begins.

19. Given the following DNA sequence, find the mRNA, tRNA and amino acid sequence.

DNA : T A C T T C T C G G T A A A T A T A T C T A T A T C

mRNA : AUG AAG AAG CCA UUU UUA UAU AUG AUA UAG

tRNA w/anticodon
UAC UUC UGG GUA AAA VAU AVC VAU AVC

Amino Acids met lys ser his phe iso stop = brainzyme

20. What would happen to the amino acid sequence if the letter with a * was changed to a G? What type of mutation is this?

This is a point mutation (substitution) and the amino acid would change from phe to leu creating a non functioning protein. NO frame shift.

MRNA CODONS FOR AMINO ACIDS

1st Letter	2nd Letter				3rd Letter
	U	C	A	G	
U	phenylalanine	serine	tyrosine	cysteine	U
	phenylalanine	serine	tyrosine	cysteine	C
	leucine	serine	STOP	STOP	A
	leucine	serine	STOP	tryptophan	G
C	leucine	proline	histidine	arginine	U
	leucine	proline	histidine	arginine	C
	leucine	proline	glutamine	arginine	A
	leucine	proline	glutamine	arginine	G
A	isoleucine	threonine	asparagine	serine	U
	isoleucine	threonine	asparagine	serine	C
	isoleucine	threonine	lysine	arginine	A
	methionine (START)	threonine	lysine	arginine	G
G	valine	alanine	aspartate	glycine	U
	valine	alanine	aspartate	glycine	C
	valine	alanine	glutamate	glycine	A
	valine	alanine	glutamate	glycine	G

"PROTEIN" NAME TABLE

NAME	SEQUENCE					
dentsin	met	leu	lys	val	pro	ser
introsin	met	leu	lys	val	pro	phe
enterozyme	met	leu	lys	phe	thr	tryp
jawzyme	met	leu	lys	phe	pro	tryp
glossossé	met	gly	ala	pro	his	arg
candysin	met	gly	ala	thr	his	arg
asterase	met	gly	cys	pro	lys	cys
hippoase	met	gly	cys	pro	glu	cys
fractase	met	lys	ser	his	phe	lys
brainzyme	met	lys	ser	his	phe	iso