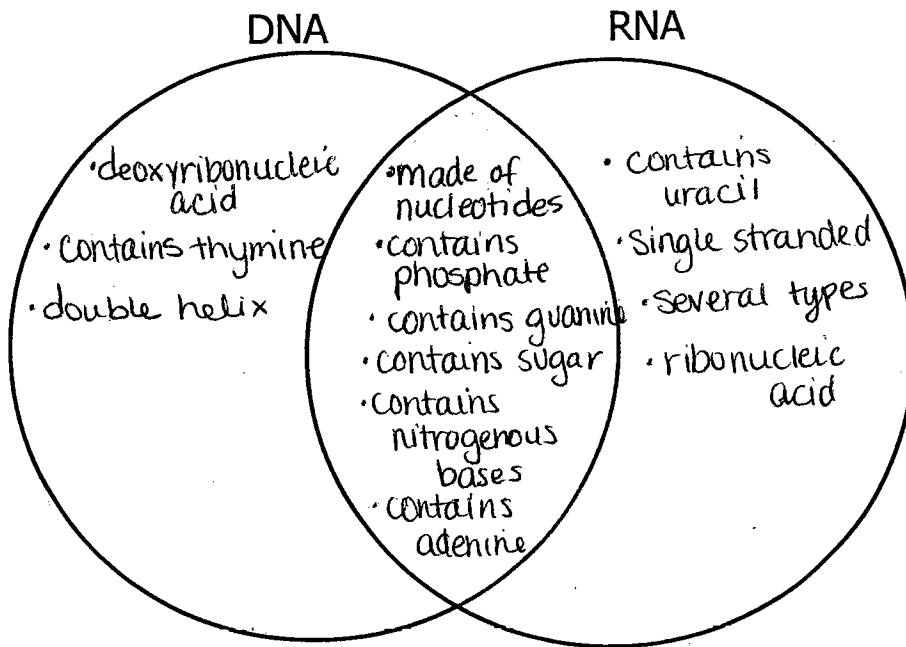


Name Key

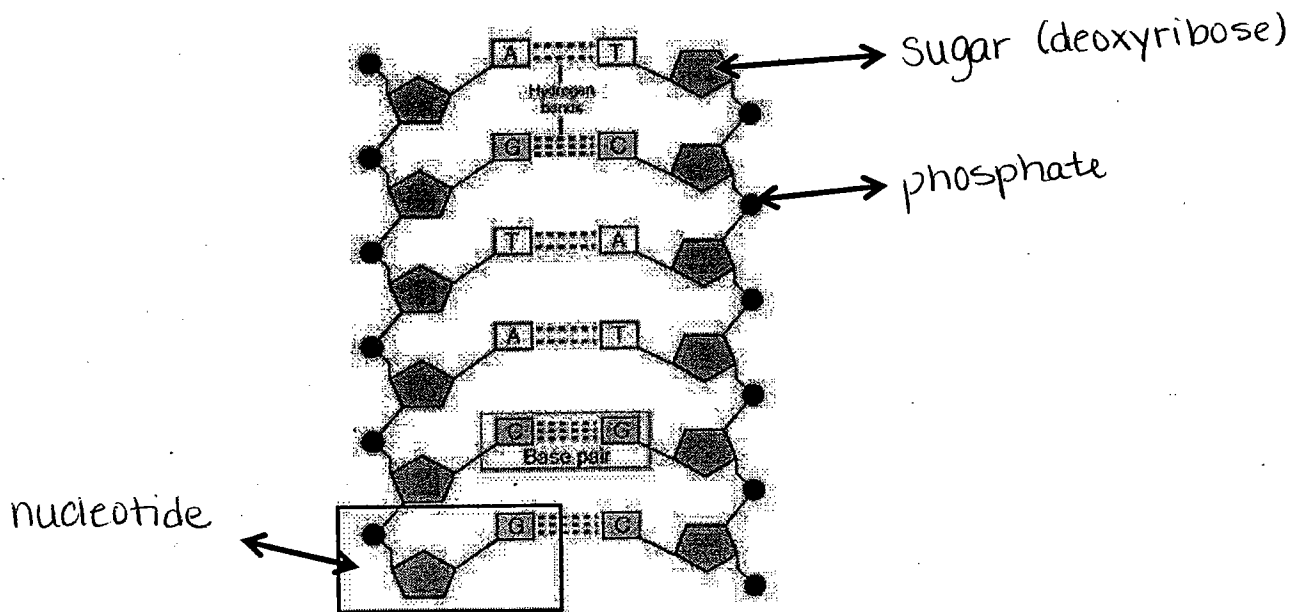
Final Exam Review Packet – Bio 2009

DNA & Mitosis:

1. Complete the Venn Diagram using the listed phrases about DNA and RNA:
- Made of nucleotides
 - Deoxyribonucleic acid
 - Contains phosphate
 - Contains uracil
 - Contains guanine
 - Contains thymine
 - Single strand
 - Contains a sugar
 - Double helix
 - Contains nitrogenous bases
 - Several types
 - Ribonucleic acid
 - Contains adenine



2. Label the following diagram of DNA:



3. What is the rule for complementary base pairing in DNA in the following DNA sequence?

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

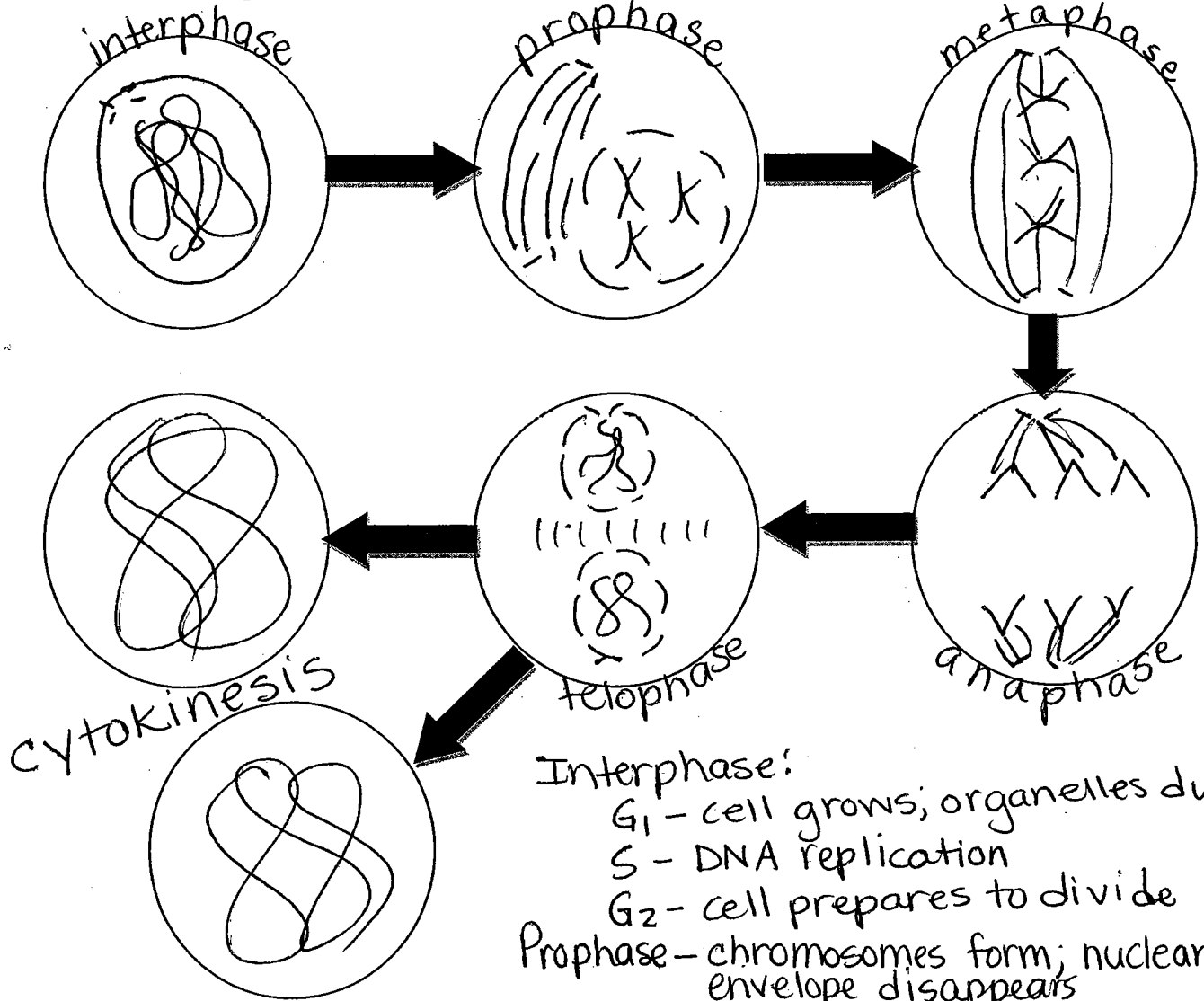
4. Describe the process of DNA replication by putting the following phrases in numerical order (1-5).

- 2 DNA polymerase (an enzyme) breaks the hydrogen bonds between bases
- 3 Replication bubbles are made
- 5 2 identical strands of DNA are produced
- 4 Complementary bases bond to each other
- 1 DNA strand unwinds at the origin of replication

5. What is the purpose of the cell cycle?

- grow
- repair
- reproduce

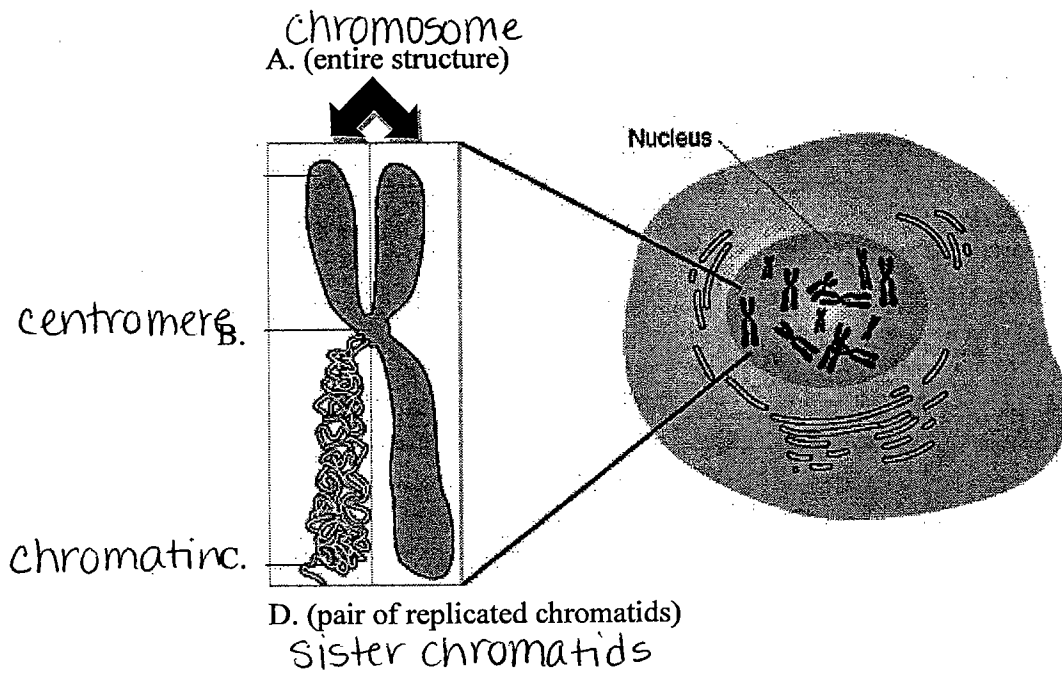
6. Draw the stages of the cell cycle in order and describe what is occurring in each stage.



Interphase:
 G₁ - cell grows; organelles duplicate
 S - DNA replication
 G₂ - cell prepares to divide
 Prophase - chromosomes form; nuclear envelope disappears
 Metaphase - chromosomes line up in middle
 Anaphase - chromosomes pull to poles
 Telophase - chromosomes uncoil; nuclear envelope reforms
 Cytokinesis - division of cytoplasm

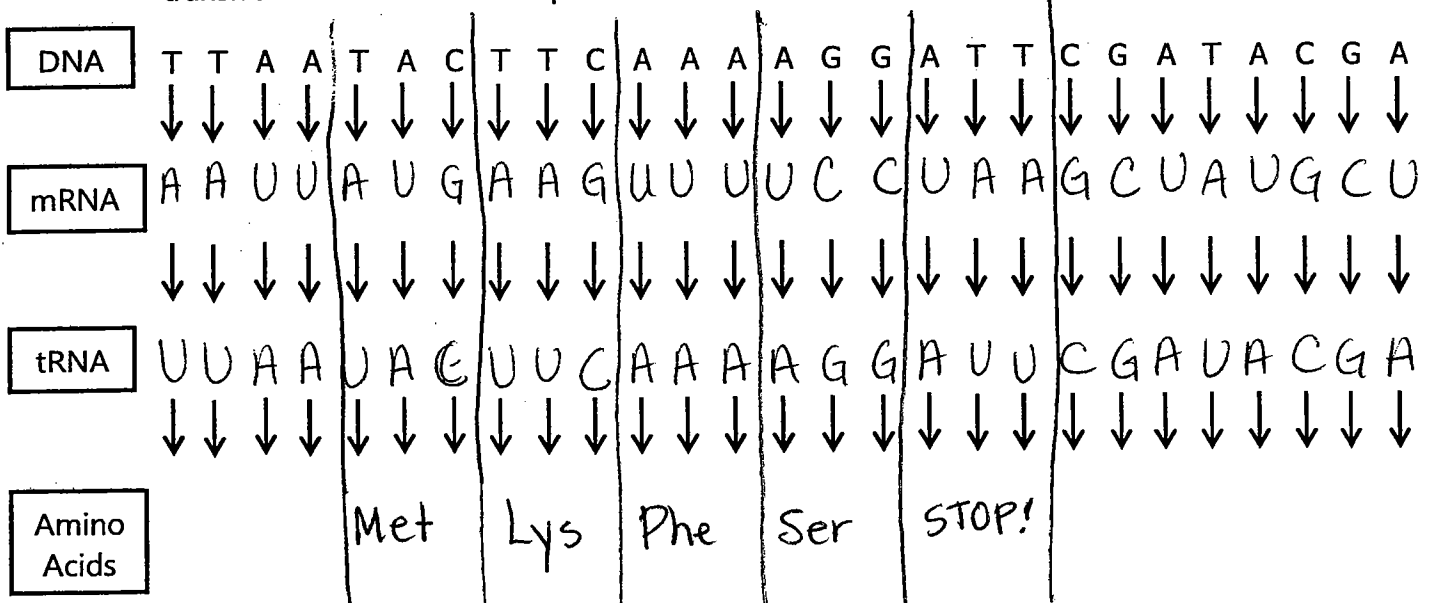
7. Use the following words to identify the parts of the picture:

- chromosome
- chromatin
- sister chromatids
- centromere



Proteins & Biotechnology:

8. Trace the information flow in protein synthesis from DNA to protein, labeling transcription & translation & where each step occurs. Use bases from a DNA strand

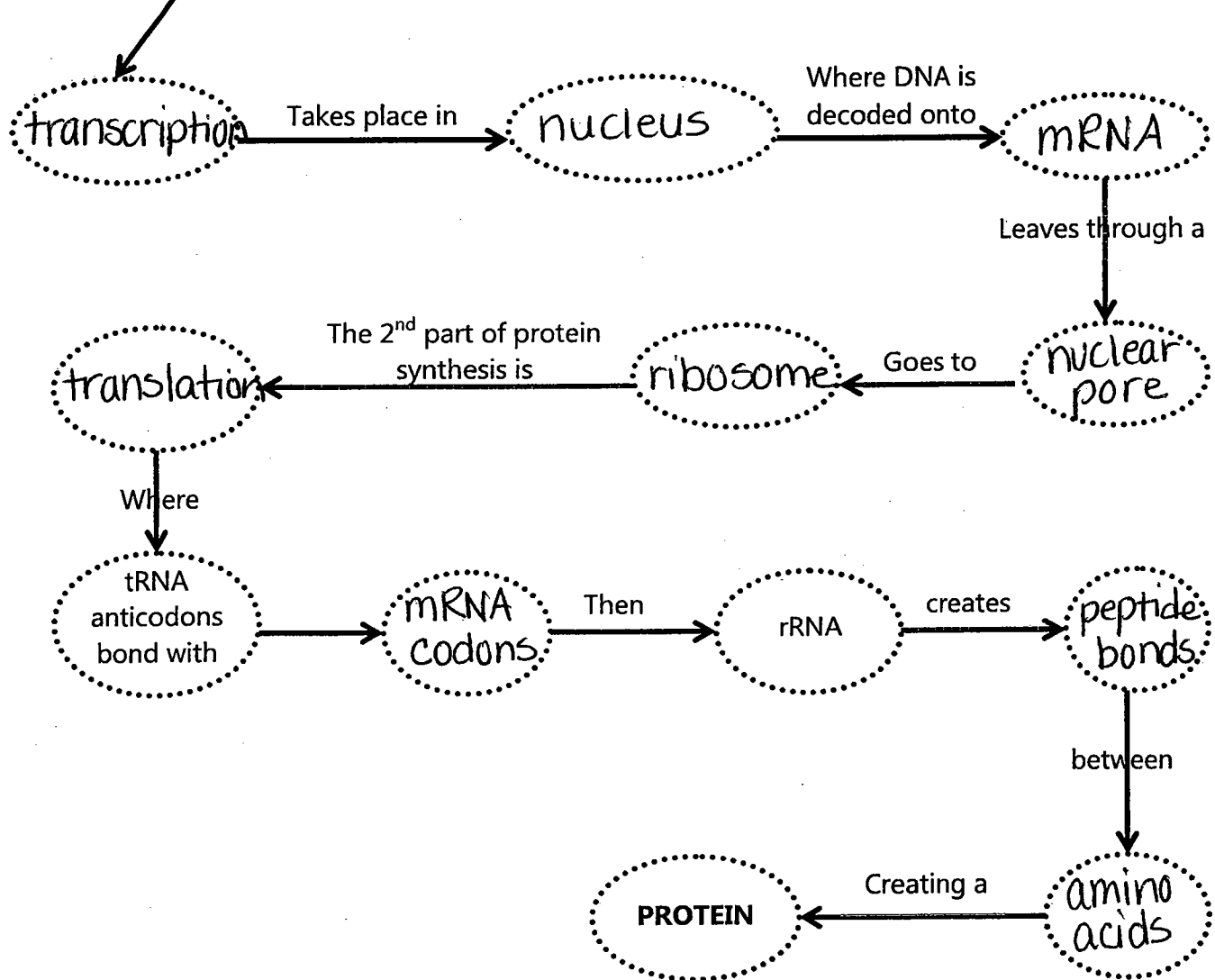


Remember that mRNA codes for the amino acids – the tRNA is only responsible for dropping it off!!

9. Protein Synthesis Flow Chart Directions: Fill in the flow chart below, using the following words:

Amino acids, mRNA, mRNA codon, nucleus, nuclear pore, peptide bonds, ribosome, translation, transcription.

The first part of protein synthesis is



10. Explain how the use of bacteria has contributed to the development of DNA technology.

- used to help make medications (i.e. - insulin)
- helps preserve foods

11. How do you clone an animal?

12. Match the following vocabulary words:

Genetically Modified Organisms F

Transgenic C

Genetic Marker D

DNA Fingerprint A

Codon B

Anticodon E

a. individual's unique banding pattern on a gel electrophoresis

b. three base "word" found on mRNA

c. organism that has acquired genetic material by artificial means

d. specific portion of DNA that varies among people

e. three base code found on tRNA

f. genetically modified organism whose source of new genetic material is a different species

13. Define recombinant DNA.

DNA that has been modified and contains segments of DNA from another source

Meiosis & Genetics:

14. Summarize the process of meiosis & the resulting cells. - egg + sperm cells ONLY

Meiosis is sexual and produces cells that are genetically different from each other & contain half the number of chromosomes

15. Compare mitosis and meiosis by completing the venn diagram using the following phrases:

✓ Produces haploid cells

✓ Occurs in plant and animal cells

✓ Produces 4 cells

✓ Homologous chromosomes line up together

✓ Has 2 separate divisions

✓ Occurs in sex cells

✓ In humans, produces cells with 23 chromosomes

✓ Produces exact copies

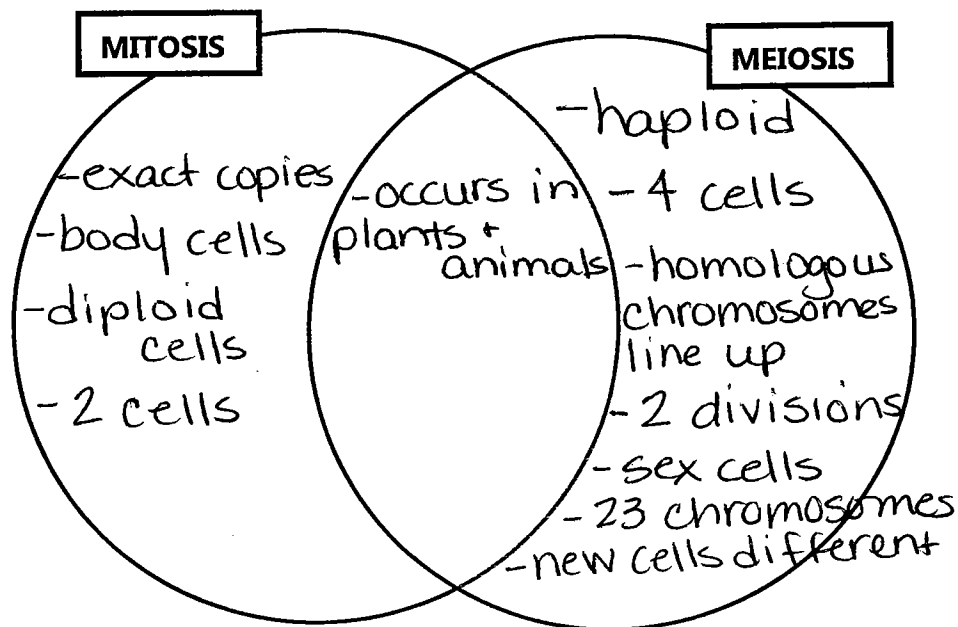
✓ Homologous chromosomes line up together

✓ New cells are different from each other

✓ Occurs in body cells

✓ Produces diploid cells

✓ Produces 2 cells



16. Match the following vocabulary words.

Genotype C

Phenotype B

Crossing over D

Genome A

complete set of an organisms genetic material

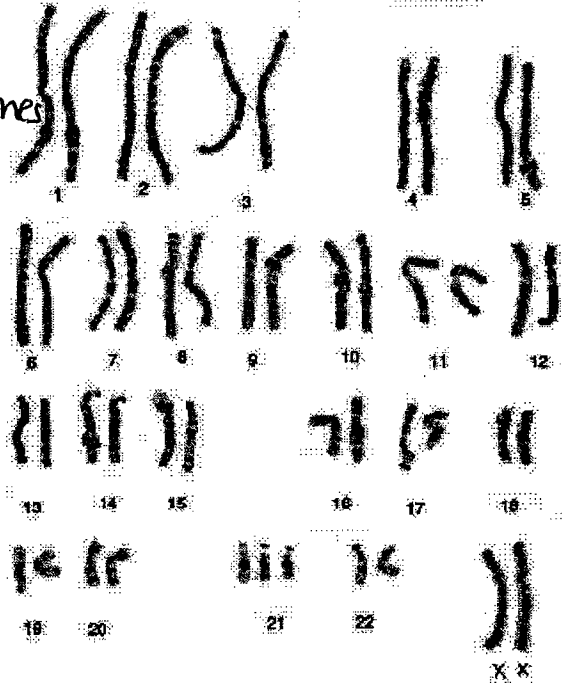
observable traits of an organism

genetic makeup of an organism

exchange of genetic material between homologous chromosomes during meiosis I

17. Describe what a karyotype is & how it is put together.

- visual picture of chromosomes in a cell
- put together by size, genes and centromere location



18.

a. What is the sex of this individual?
How do you know?

female - contains 2 X chromosomes

b. Is this a normal karyotype?
Why or why not?

Abnormal - contains 3 chromosome 21 instead of 2.
(Down Syndrome)

19. In pea plants, spherical seeds (A) are dominant to dented seeds (a). In a genetic cross of two plants that are heterozygous for the seed shape trait, what fraction of the offspring should have spherical seeds? 75%

	A	a
A	AA	Aa
a	Aa	aa

20. In pea plants, spherical seeds (A) are dominant to dented seeds (a). In a genetic cross of two plants one dented & one heterozygous for the seed shape trait, what fraction of the offspring should have spherical seeds? 50%

	A	a
a	Aa	aa
a	Aa	aa

21. In humans, the gene for brown eyes is dominant to that for blue eyes. A man with brown eyes whose mother had blue eyes marries a brown-eyed woman whose mother had blue eyes. What proportions of their children would be expected to have blue eyes? 25%

	B	b
B	BB	Bb
b	Bb	bb

22. In four-o'clock flowers, red flower color (A) is incompletely dominant over white (a). The heterozygous plants are pink flowered. In the following crosses, in which the phenotypes for the parents are given, what are the flower colors of offspring from each cross & what percentage would you expect for each color? Show your work

a. Pink x Pink

	A	a
A	AA	Aa
a	Aa	aa

25% red
50% pink
25% white

b. Pink x White

	A	a
A	Aa	aa
a	Aa	aa

50% pink
50% white

23. In fruit flies, red eye color is dominant over white eye color. The trait is sex-linked. A white-eyed male is crossed with a red-eye homozygous female. What are the possible offspring genotypes & phenotypes & their percentages?

	X^A	X^A	
X^a	$X^A X^a$	$X^A X^a$	100% red eyes
Y	$X^A Y$	$X^A Y$	

24. Colorblindness is a sex-linked recessive trait. A man with colorblindness marries a woman who is a carrier. What percentage of their daughters will be colorblind? 50%
 What percentage of their sons will be colorblind? 50%

	X^A	X^a	
X^a	$X^A X^a$	$X^a X^a$	
Y	$X^A Y$	$X^a Y$	

25. What are the possible blood types of children in the following families?
 a. Type A homozygous mother & Type AB father.

	A	A	
A	AA	AA	50% type A 50% type AB
B	AB	AB	

b. Type B homozygous mother & Type B heterozygous father

	B	B	
B	BB	Bb	100% type B
O	BO	BO	

c. Type O mother & Type B heterozygous father

	B	O	
O	BO	OO	50% type B
O	BO	OO	50% type O

d. Type O mother & Type O father

	O	O	
O	OO	OO	100% type O
O	OO	OO	

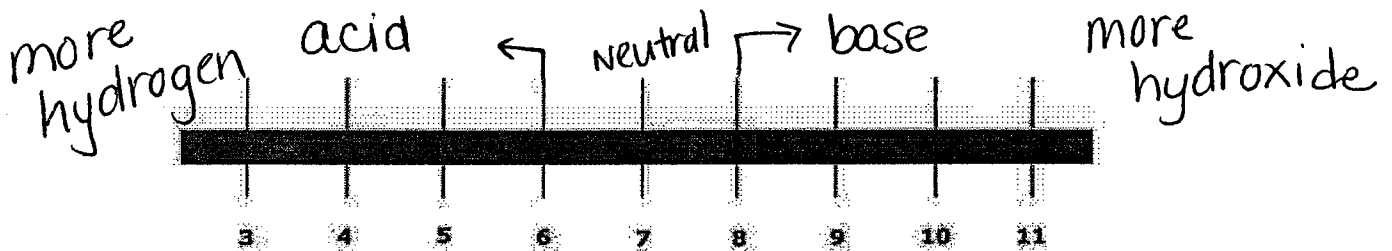
26. Explain why type O is the universal donor & type AB is the universal recipient.

type O can donate to any blood type

type AB can receive from any blood type

Digestive System:

27. Indicate on the chart where the words acid, base and neutral should be placed and show where there is more hydrogen and more hydroxide ions.



28. Describe factors that influence protein shape.

temperature & pH

29. Explain how enzymes work & how they affect activation energy.

Enzymes are biological catalysts (speed up chemical reactions). They lower the activation energy which allows the reaction to speed up.

30. Define homeostasis & explain its importance. List three ways your body maintains homeostasis.

Homeostasis is the ability to maintain stable internal conditions.

Examples - temperature, breathing, pH

31. Label the parts of the digestive system below & explain what the function is of each part

A - esophagus - connects mouth to stomach

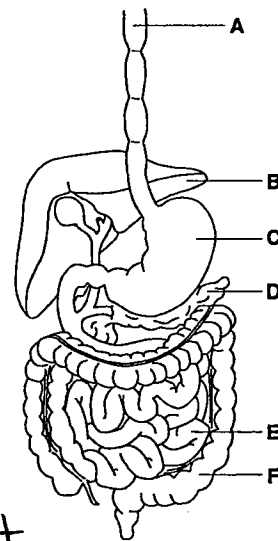
B - liver - secretes bile into the small intestine

C - stomach - churns food; digests proteins

D - pancreas - secretes lipase

E - small intestine - absorbs nutrients + breaks down fat

F - large intestine - absorbs water



32. List all of the parts (in order) of the human digestive system through which food **actually** passes & explain what happens at each part.

1. mouth - food is churned; carbs begin digestion
2. esophagus - passageway for food from mouth to stomach
3. stomach - churns food; proteins begin digestion
4. small intestine - nutrients absorbed; fats begin digestion
5. large intestine - absorbs water
6. rectum - storage area for waste
7. anus - releases waste

33. Explain how food is mechanically broken down during digestion. How is this different from chemical digestion? In what organs does mechanical digestion take place? Chemical digestion?

Mechanical Digestion - breaks food into smaller pieces; mouth + stomach

Chemical Digestion - chemically changes food; mouth, stomach, small intestine

34. What is peristalsis?

muscular contractions that push food through a tube (esophagus + intestines)

