Name _____ Block ____ Date _____

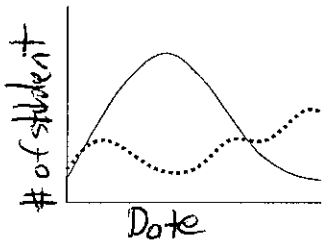
Biology Midterm Exam Review

Scientific Method (Packet 1)

Parts of an Experiment

1. E	Dependent Variable	A. Variable that is changed in the set-up
2. D	Constant/Standardized Variables	B. Group that serves as a standard of comparison
3. B	Control Group	C. Just ONE aspect is changed in this group
4. C	Experimental Group	D. Variables that are kept the same in each setup
5. A	Independent Variable	E. Variable that is measured

6. Use the info from the table to LABEL the missing parts of the graph. Be sure to include all parts of the graph!!!



Number of Students with the Flu at MCHS		
Date	05-06	06-07
Oct 1-15	2	4
Oct 16-31	26	25
Nov 1-15	39	10
Nov 16-30	61	3
Dec 1-15	55	12
Dec 16-31	41	19
Jan 1-15	27	28
Jan 16-31	14	29
Feb 1-15	3	42

- **What is the independent variable?** Date
- **What is the dependent variable?** # of students w/ flu

7. The following are necessary components for a good experiment:
   - The first step in any experiment is to make an observation
   - In order to know what is causing the changes in an experiment, the experimental design should contain 1 (#) independent variable(s).
   - The purpose of having a control group in an experiment is for comparision
   - After an experiment has concluded, the experiment should be verified to make sure the results are not just a coincidence (shows that the results are valid).

8. **Use the following description of the experiment to complete the questions below:**
John and Sally wanted to conduct an experiment with bread mold. They took 8 slices of white bread that Sally's mom had made and put each on the counter. Sally then placed 25 drops of water on each piece, trying to spread it evenly. John placed each slice in a plastic bag, sealed them and put the bags in various locations around the kitchen.
   - Two bags were placed in a box **in the freezer**
   - Two bags were placed in a box **in the refrigerator**
   - Two bags were placed in a box **on top of the refrigerator**
   - Two bags were placed were in a box **in front of the window.**

They left the bags alone for the first two days, and then checked the bread on days 3 - 8, looking for the amount of surface area covered by bread mold and the appearance (color, texture) of the mold.

A. Independent variable? Location of bread bag
B. What is(are) the dependent variable(s) in this experiment bread mold
C. List at least 2 variables that should be standardized: # of water drops, same bread, bags same time bread checked

Chemistry/Biochemistry (Packet 2):

9. Use the words in the word bank to complete the following table:

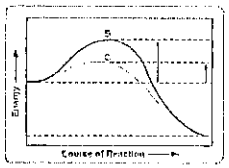
• Amino acid	• Lipid	• DNA & RNA
• Carbohydrate	• Monosaccharide	• Polypeptide
• Fats	• Nucleic Acid	• Polysaccharide
• Fatty acids	• Nucleolide	• Protein
• Glycerol	• Oils	• Waxes

Organic Compound	Name for monomer(s) or subunits	Name for polymer or subunits	Function(s)
Lipid	fatty acids + glycerol	fats, oils, waxes	• Forms majority of cell membrane • Long-term energy storage • Insulation & waterproofing • Chemical signals
Carbs	monosaccharide glucose	polysaccharide	• Short-term energy storage (basis of food chain) • Provides structure & support
Protein	amino acid	polypeptide	• Form muscle, hair & skin. • Helps with transport in/out of a cell. • Speeds up reactions using less energy (enzyme)
Nucelic Acid	nucleotide	DNA & RNA	• Stores genetic information • Contains instructions for making proteins.

Fill in the blank with the word from the Biochemistry unit that best matches each statement:

10. organic — Term for compounds that contain carbon (and hydrogen).
11. monomers — Compounds that join together to form polymers
12. Protein — An enzyme is what type of organic compound?
13. Carbs — Sugars and starches are this type of organic compound.
14. hydrolysis — Chemical process in which **larger compounds are broken down into** their monomers using water to break the bonds.
15. dehydration — **Building larger compounds by joining many building blocks together** (releases water)
16. active site — Part of the enzyme that holds/grabs the substrate.
17. glucose — Monomer sugar that is the building block of carbs.
18. starch — How plants store excess sugar.
19. cellulose — Carbohydrate found in the cell wall of plants.
20. Hemoglobin — Protein that covers the red blood cells and helps carry oxygen.

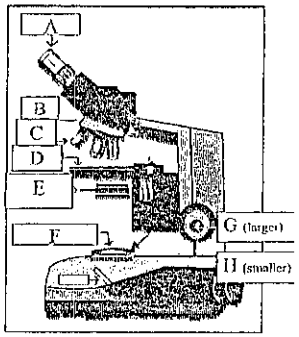
Use the graph on the right to answer questions 21-23.



21. Which reaction (B or C) needs more energy to get the reaction to begin? B — activation
22. The energy needed to start a reaction is called ~~activation~~ energy
23. In the graph, line B represents a reaction progressing without (with/without) an enzyme; however line C represents a reaction with (with/without) an enzyme. Explain why. Line B requires less energy b/c the enzyme is present

50. Identify the parts labeled on the microscope to the right:

A. Ocular lens / eyepiece
B. Nosepiece
C. Objective lens
D. Stage
E. Diaphram
F. Light Source
G. Course adjustment knob
H. Fine adjustment knob



51. List the eight characteristics that are shared by all living things: (Packet 1)

DNA
Made of cells

52. Put the terms in order from least to most complex: organ, cell, organism, organelle, organ system, tissue (Packet 2) Cell, tissue, organ, organ system, organism

53. Which of the above terms is the ***basic unit of life***? Cell

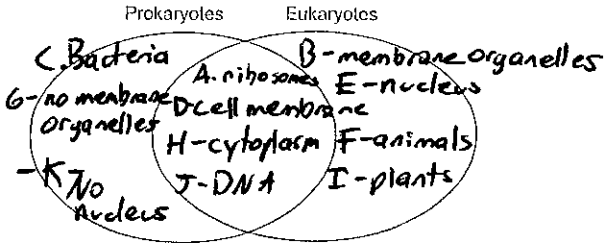
54. List the three components of the cell theory.

- All living things are made of cells
- Cells are the basic unit of life
- All cells come from preexisting cells

55. Organisms must maintain homeostasis by keeping the internal environment constant. They must control chemical traffic into & out of the cell through the cell membrane and the minimize change in body by using buffers.

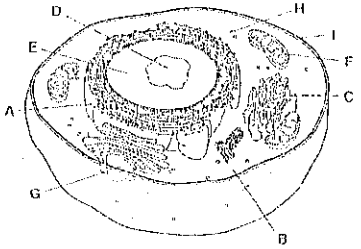
56. Fill in the Venn diagram with the **letters** of the characteristics of a prokaryotic cell and a eukaryotic cell.

A. Ribosomes
B. membrane bound organelles
C. bacteria
D. cell membrane
E. nucleus
F. animals
G. no membrane bound organelles
H. cytoplasm
I. plants
J. DNA
K. No nucleus



57. The endosymbiotic theory suggests that the origin of eukaryotic cells comes from the merging of several prokaryotic cells in a mutually beneficial relationship.

58. Identify organelles found in the cell seen below:

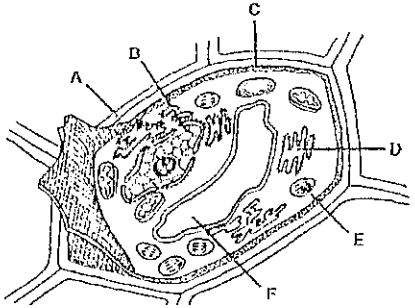


A – Rough Endoplasmic reticulum
B – Centrioles
E – Nucleus
F – Mitochondria
G – Golgi apparatus
H – Ribosomes
I – Cell membrane

59. What type of cell is pictured in Question 61? Animal Explain why you came to this conclusion.

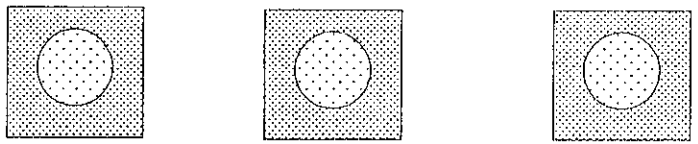
B/c of it shape (round), it has small vacoules, + no cell wall or chloroplast

60. Identify organelles found in the cell seen below:



A – Cell wall
B – Nucleus
C – cell membrane
D – Rough ER
E – Chloroplast
F – vacolue

81. Draw an arrow on each diagram to indicate the movement of molecules for the process described below. **Be sure to label your arrows with *what is moving*.**



OSMOSIS DIFFUSION PUMP

82. Unlike passive transport, _____ is required for active transport in the form of _____.

83. Distinguish between the terms endocytosis and exocytosis. Endocytosis takes large objects into the cell. Exocytosis releases stuff from the cell.

Cell Energy (Packet 4)

84. The process in which ATP is produced ***without*** oxygen is called anaerobic ***respiration*** or fermentation. In this process 2 (#) ATP can be produced from 1 molecule of glucose.

85. The process in which ATP is produced ***with*** oxygen is called aerobic ***respiration***; In this process 36 (#) ATP can be produced from 1 molecule of glucose.

86. Which part of the ATP molecule stores the energy? the phosphates

87. How is that energy released so the cell can do work? break the phosphatebond.

88. When ATP releases energy what new molecule(s) is/are formed? _____

89. Identify the process utilized by the cells below to produce ATP. Then list the byproducts that they produce in the ***absence of oxygen***.

- **Yeast** utilize a process called alcoholic fermentation. They use **sugar** and **water** to produce CO_2 H_2O & ~~ATP~~ ethanol & 2 ATP
- **Muscle cells** utilize a process called lactic acid fermentation. They use **sugar** & **water** to produce CO_2 lacticacid & 2 ATP

90. Fill in the chart	Photosynthesis	Cellular Respiration (aerobic)
An example of an organism that utilizes this process:	plant	animal / plant
Organelle in eukaryotes where process takes place	chloroplast	mitochondria
Reactants (what's needed to start the process)	$H_2O + CO_2$ (sunlight)	$C_6H_{12}O_6 + O_2$
Products (what the process makes)	$C_6H_{12}O_6 + O_2$	$H_2O + CO_2 + ATP$

91. A runner is competing in a 10 km track meet and just before completing the race, the runner is nearly out of breath and the energy needed to finish the race. Which cell structure is *most* affected by this lack of energy?
   A. Nucleus
   B. Ribosome
   C. Mitochondrion
   D. Plasma membrane

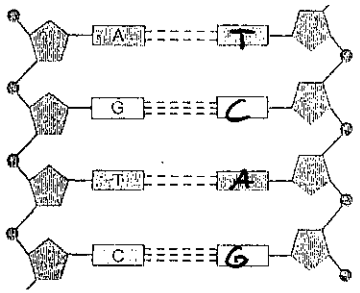
92. How does the process of photosynthesis in plants provide energy for animals?
   A. The water and carbon dioxide used in photosynthesis are converted into glucose and oxygen for animals.
   B. The glucose and ATP used in photosynthesis are converted into water and carbon dioxide for animals.
   C. The glucose and carbon dioxide used in photosynthesis are converted into proteins for animals.
   D. The oxygen and glucose produced through photosynthesis are converted into lipids for animals.

DNA & Protein Synthesis (Packet 5)

93. DNA and RNA are made from many amino acids joined together (what are their monomers?).

94. The shape of each DNA molecule is called a double helix

95. Name the 3 parts that make up all nucleotides:
   a. phosphate
   b. sugar
   c. Nitrogen base



96. Fill in the complementary DNA strand on the picture to the right. Also circle one nucleotide.

97. Being able to determine one side of DNA from another side is known as the base pairing Rule.

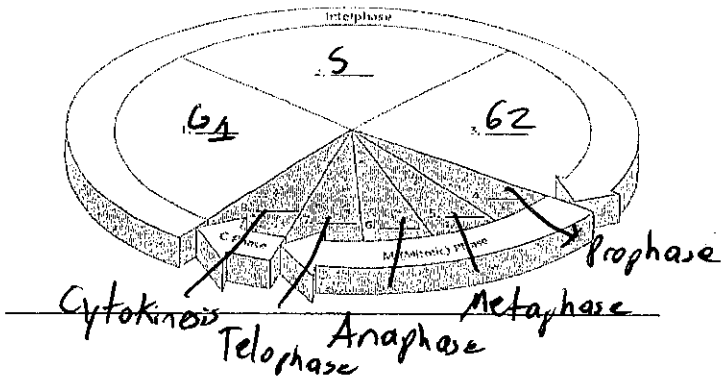
118. What amino acids would be coded for by the following DNA?

DNA	TAC GCT AAG ACT
mRNA	AUGCGAUUC UGA
Amino Acids	Leu - Arg - Phen - Stop

A	Lysine	Arginine	Isoleucine	Threonine	A
	Lysine	Arginine	Methionine	Threonine	G
	Asparagine	Serine	Isoleucine	Threonine	U
	Asparagine	Serine	Isoleucine	Threonine	C
G	Glutamic acid	Glycine	Valine	Alanine	A
	Glutamic acid	Glycine	Valine	Alanine	G
	Aspartic acid	Glycine	Valine	Alanine	U
	Aspartic acid	Glycine	Valine	Alanine	C
U	Stop codon	Stop codon	Leucine	Serine	A
	Stop codon	Tryptophan	Leucine	Serine	G
	Tyrosine	Cysteine	Phenylalanine	Serine	U
	Tyrosine	Cysteine	Phenylalanine	Serine	C
C	Glutamine	Arginine	Leucine	Proline	A
	Glutamine	Arginine	Leucine	Proline	G
	Histidine	Arginine	Leucine	Proline	U
	Histidine	Arginine	Leucine	Proline	C
	A	G	U	C	

Cell Reproduction (Packet 6)

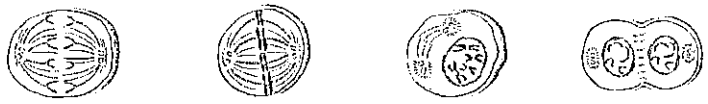
119. Label the steps of the cell cycle below:



120. What two main things happen during interphase?

growth & replication

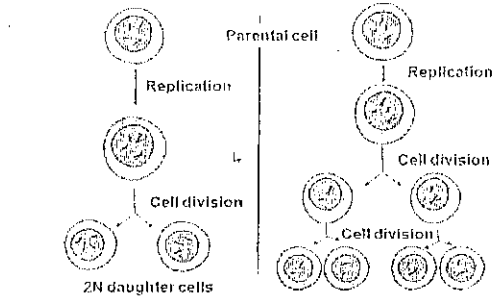
121. Match the appropriate picture with the phase. Note – one phase is not present. Leave the line next to that phase blank.



____ Interphase C Prophase B Metaphase A Anaphase D Telophase

122. Label each picture as either meiosis or mitosis

Mitosis Meiosis



123. Comparison of Mitosis and Meiosis

Description	MITOSIS	MEIOSIS
Involved in Sexual or Asexual Reproduction?	asexual	sexual
At the end of the process, how does the daughter cell compare to the parent?	identical	different
Creates Diploid or Haploid cells?	diploid	haploid
Does the process increases genetic variation?	no	yes
How many cells are produced at the end?	2	4
Describe a human cell that would be produced by each process (include information about the chromosome number)	body-somatic Cheorth	sex – gametes (sperm & egg)