Name: _____ Period: _____ Date: _____

Mid-Term Study Guide

1) If you ever have a question or a concern regarding safety, what should you do? Tell the teacher

2) What piece of protective equipment is crucial to safely completing many labs? Safety goggles

3) What are the seven steps of the scientific method?
   a. Define the problem (ask a question)
   b. Gather background information
   c. Form a hypothesis
   d. Design and carry out a controlled experiment
   e. Collect and organize data
   f. Form a conclusion
   g. Repeat the experiment or do a new experiment

4) Define variable- Something that is being changed. Independent variable is what we change in an experiment.

5) Explain how the control group and the experimental group differ?
The experimental group gets the independent variable the control group does not. This is need for comparison.

6) Why is it important to have only one variable in an experiment?
So you can see how that one ~~pees~~ variable is the only thing effecting the results of the experiment

7) When scientists organize their data, they make tables, charts, and graphs.

8) Name three ways that we can increase the validity ← reliable of results:
   a. Repeat the experiment
   b. Do the experiment for a longer period of time
   c. Increase sample size.

9) When graphing, the dependent variable is placed on the y – axis because this variable depends on the variable on the x – axis, which is known as the independent variable.

10) The scales (intervals) on each axis of a graph must be equal, ~~unless a~~ break ~~is inserted.~~ ← no breaks in science!

11) Give the graph an appropriate title that explains what the graph is showing (~~"The effect of "X" on "Y"~~)

12) What sentence is used to help remember the order of metric prefixes, which is important because we often have to convert measurements? Kim... Helped Dave Until Dave Could Multiply

13) To convert from millimeters to micrometers (microns), multiply by 1000 or just move the decimal 3 places to the right.

14) When measuring the volume of a liquid in a graduated cylinder, always measure from the bottom of the meniscus.

15) How many millimeters are there in one centimeter? 10

16) What is the technical name of our most frequently used microscope? Compound light microscope

17) What microscope part controls the amount of light coming up through the specimen. diaphragm

18) Why are cover slips needed? to protect the specimen

19) T or (F) The field of view is larger under high power

20) When viewing the letter "e" under the microscope, describe how the image is altered: upside down and backwards & magnified

21) What is the easiest way to increase the magnification of a specimen? switch to higher magnification

22) Give 2 reasons why we can't use the coarse adjustment when we are using the high power objective:

a. crack slide

b. Damage the objective (high) or specimen

23) The total magnification of the microscope is determined by multiplying the magnification of the eyepiece by the magnification of the objective lens (scanning, low, or high)

24) If three cells fit across a field of view that is 1500 microns in diameter, how big is each cells? 500 microns

25) What is an indicator? tests for the presence of something. ie. iodine tests for starch

26) Explain how centrifuging works: it spins materials and separates them by density

27) Define ultracentrifuge: _____

28) What is benedicts solution used to test for? simple sugars. glucose needs to be heated

29) How is this test performed **and** what color change indicates a positive result? add benedicts solution and heat, look for color change from blue to brick orange

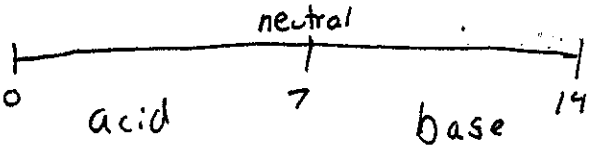
30) What does lugol's iodine test for? starch

When the test is positive, what color change is observed? amber to purple-black

31) Why do we stain specimens? to make cell organelles more visible

32) What are the numbers on the pH scale? 0-14

33) On the pH scale substances with a pH of 7 are said to be neutral, while those under 7 are acidic and those above 7 are basic.



34) What are the 8 life processes? The 3R GENTS

a. R espiration
b. R egulation
c. R eproduction
d. G rowth
e. E xcretion
f. N utrition
g. T ransport
h. S ynthesis

35) Define synthesis: putting something together from smaller things

36) What is the opposite of synthesis? Digestion / Hydrolysis

37) Although not a life process, what term is used to describe the sum of all the chemical processes that occur within a cell or organism? metabolism

38) What are the two types or respiration and how do they differ?

a. Aerobic - uses oxygen
b. Anaerobic - does not use oxygen

39) What is the purpose of respiration **and** in which organelle does aerobic respiration occur? Respiration provides energy (ATP) for the cell, takes place in the mitochondria

40) What is the difference between autotrophs and heterotrophs?

Autotroph - make their own food (plants)
Heterotroph - can't make their own food (animals + us)

41) During photosynthesis, plants use CO_2 to create their own food and they give off oxygen. During respiration, animals (+ plants) use oxygen and give off CO_2.

42) Name 2 substances excreted by cells: CO_2 and wastes.

43) Maintaining a constant internal environment is called homeostasis.

44) What are the 2 parts of transport? absorption & circulation

45) What two human body systems **regulate** all others? nervous & endocrine

46) What are the 2 types of reproduction and how do they differ? Asexual reproduction - 1 parent, daughter cells identical
Sexual reproduction - 2 parents; greater genetic variation

47) What are all living things made of? cells

48) According to the cell theory, where do all living cells come from? other cells (preexisting cells)

49) Why are viruses considered an exception to the cell theory? (Hint- What can't they do?) Viruses don't do all life processes ie. they don't reproduce on their own

50) What are 2 types of molecules that make up the cell membrane? lipids and proteins

51) Which organelle manufactures proteins? ribosomes

52) Which organelle controls the passage of materials into and out of the cell thereby maintaining homeostasis? cell membrane

53) Which organelle controls most cell activities and contains the hereditary material of the cell? nucleus

54) The watery material in which most cellular reactions occur and in which all organelles are suspended is called cytoplasm?

55) Which organelle is the "powerhouse" of the cell, or in other words, the site of aerobic respiration? mitochondria

56) Which organelle stores food & wastes? vacuole

57) Which organelle packages cell products? golgi body

58) Which organelle transports molecules within the cell?
endoplasmic reticulum

59) Name 3 differences between plant and animal cells;
a. cell wall (plant cell)
b. chloroplast (plant cell)
c. square shape (plant cell)

60) Define diffusion: movement of molecules from an area of high to low concentration, requires no energy

61) The diffusion of water is called osmosis

62) Name 2 simple molecules that can easily pass through the cell membrane: water & glucose (simple sugars) amino acids

63) Big molecules such as Starch cannot readily diffuse into cells

64) Organic compounds have which 2 elements? Carbon & Hydrogen

65) Indicate what each type of organic compound is broken into:
a. carbohydrates- Simple sugars
b. lipids- fatty acids
c. proteins- amino acids
d. nucleic acids- nucleotides

66) What are the 2 types of carbs? Sugars & starches

67) Fats, oils, & waxes are all lipids (fats)

68) What do enzymes do? speed up or regulate chemical reactions

69) Enzymes bond to very specific substrates, much like keys fit into and alter very specific locks.
*Very specific in shape!

70) Name 3 factors that influence the rate of enzyme action:
a. Temperature
b. pH level
c. Amount of enzyme/substrate

71) What term is used to describe the change in shape (breakdown) of enzymes at high temperatures? Denaturation

72) What is a theory? An explanation based on facts

73) What are the three parts of the cell theory?

- All living things are made of cells
- All
- All cells come from other cells (pre-existing cells)

74) Explain how the cell membrane can be selectively permeable:
Only certain molecules can pass through it. Usually based on size, polarity, charge, etc.

75) Fill in the functions for the digestive organs listed below:

Mouth	Mechanical + Chemical. Digestion begins here. Carbs begin to be digested by amylase
Esophagus	Peristalsis begins (muscular contractions) no digestion occurs here
Stomach	Both mechanical and chemical digestion Protein digestion occurs
Small Intestine	Most digestion occurs here Villi increase surface area for absorption
Large Intestine	No digestion occurs here. Water reabsorption + vitamin production

76) What is peristalsis? Muscular contractions that push food through the digestive tract

77) Describe the **causes** & **symptoms** of these digestive disorders:

- Diarrhea- Caused by bacteria. Not enough water is reabsorbed. Dehydration
- Constipation- Diet/Bacteria. To much water is reabsorbed so eliminating feces is difficult
- Ulcers- Bacteria. Causes open sores in the digestive tract. Excess acid production also enflames sores.
- Appendicitis- Infection/Inflammation of the appendix caused by bacteria or virus.

78)

Organic Compound	Where Digestion Starts	Where Digestion Ends
Carbohydrates	mouth	Small intestine
Proteins	stomach	Small intestine
Lipids	Small intestine	Small intestine

79) In what organ does digestion end and the absorption of nutrients occur? Small intestine

80) The level of what gas causes changes in our breathing rate? CO_2

81) List the correct pathway of air into the body: Mouth \ nose → Trachea → Bronchi → Bronchioles → Alveoli (in lungs)

Alveoli are important for gas exchange.

82) The movement of what muscle causes inhalation & exhalation during breathing? Diaphragm

83) In what 2 places are the gases oxygen and carbon dioxide exchanged? lungs & body cells

84) Describe the causes and symptoms of these diseases:

- Bronchitis- Inflammation of bronchi
- Stroke- Blood vessel in Brain is blocked, portions of the brain can die

* 85) The cell membrane has 3 proteins imbedded within it: channel, marker, & receptor proteins. Molecules such as hormones are able to bind to the receptors because they have the right shape

86) Fill in the chart below:

Organic Compound	Building Blocks
Carbohydrates	Simple sugars (glucose)
Lipids	glycerol + fatty acids
Proteins	amino acids
Nucleic Acids	nucleotides

87) List or describe several main ideas about the blood vessels:

- ✓ Arteries- Thick, muscular, carries blood away from the ♡
- ✓ Veins- Thinner, contain values, carries blood to ♡
- ✓ Capillaries- Tiny, thin, gas exchange of O_2 + CO_2 happens her

88) List or describe several main ideas about blood flow to & from heart:

- ❖ Right side deoxygenated blood from the body
- ❖ Right side goes to the lungs
- ❖ Left side oxygenated blood from the lungs
- ❖ Left side goes to the rest of the body.
- ❖ _____

89) What are the functions of the following blood parts?

- Red Blood Cells- Carry oxygen (hemoglobin)
- White Blood Cells- Fight infection
- Platelets- Clot Blood
- Plasma- Liquid part of blood, carries nutrients

90) List 3 structures that materials are able to diffuse into or out of:

Alveoli, Villi, & Capillaries

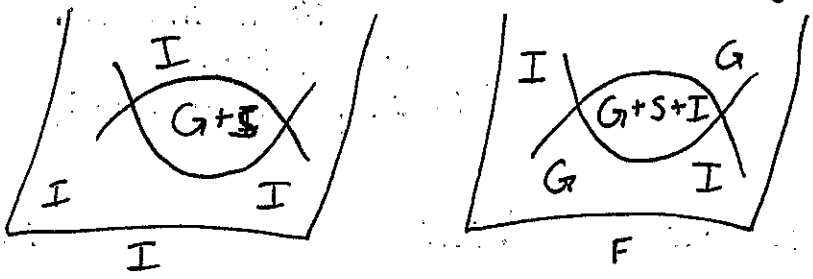
Midterm Review: Diffusion Through A Membrane

Concepts You Must Know

a) The dialysis bag represents the cell membrane
b) Diffusion moves material from high to low concentrations (No energy needed)
c) Only small molecules can fit through the membrane (starch cannot)
d) Benedict's solution tests for sugar... heat it and it turns brick red; iodine tests for starch (purple black)
e) The diffusion of water is called osmosis

Draw & Label Pictures

Starch was too big to diffuse



Procedures

a) Make cell: Glucose + Starch on inside, water + iodine on outside
b) After a few minutes a color change to purple black should be noted on the inside of the tubing
c) The water on the outside of the tube must be tested with benedict's solution to see if glucose has diffused out. Sample + Benedict's + heat = Positive result (Red/Orange)
d) Starch is too big to diffuse out
e) Make a wet mount slide of red onion in regular (tap) water. Observe & draw.
f) Use a dropper and paper towel to add salt water to the slide without removing the coverslip. Observe and draw. (Cell Shrinks)
g) Repeat the same procedure using distilled water, observe and draw. (Cell Membrane Swells)

Draw & Label Pictures