23-24 Biology Study Guide

Lab Safety:

1. List 3 important lab safety rules.

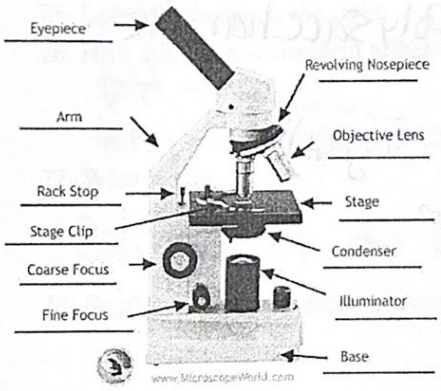
Examples
Hair back
No horseplay
No food or drink
Read directions

Answers can vary

2. *Look over the lab safety symbols and be prepared to identify them.*

Microscope:

3. *Know how to label a microscope.*



4. Which adjustment knob can only be used with the high power objective lens?

Fine

5. How do you properly carry a microscope?

arm + base

Characteristics of Life:

6. What are the 8 characteristics of life that we discussed?

Order
Heredity / DNA
Reproduction
Growth + development
Response to environment
Evolutionary adaptation
Energy Processing
Regulation

7. *Be able to determine the characteristic of life being described in a scenario.*

Macromolecules:

8. What are the four macromolecules?

Lipids
Proteins
Carbohydrates
Nucleic Acids

9. What does it mean that all macromolecules are organic?

They all contain Carbon

10. What is the reaction that connects monomers?

dehydration synthesis

11. What is the reaction that breaks down polymers?

hydrolysis

12. What are the main three types of carbohydrates?

monosaccharide
disaccharide
polysaccharide

13. What is glucose?

Monosaccharide (one sugar)

14. Which polysaccharide is found in cell walls of plants?

Cellulose

15. What is the unifying characteristic of lipids?

all hydrophobic

16. What are the main types of lipids?

triglycerides
Phospholipids
steroids

17. What is the difference between saturated and unsaturated fats?

Saturated (solid) - hydrocarbon chains connected by single bonds

Unsaturated (liquid) - fatty acids have one or more double bond

18. Where can you find phospholipids?

Cell membrane

19. What is the monomer of a protein called?

Amino Acids

20. What are the two types of nucleic acids?

DNA / RNA

21. What are the three parts of a nucleotide?

Phosphate Sugar
nitrogenous base

22. What is the difference between DNA and RNA?

DNA - 2 Strands
deoxyribose
T

RNA - single strand
ribose
U

Enzymes:

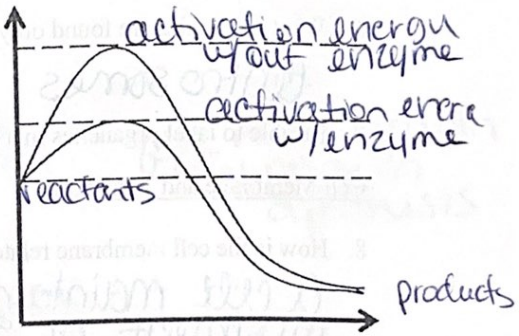
23. What type of macromolecule is an enzyme?

Protein

24. What do enzymes do?

Catalyze / speed up reaction

25. Label the image to the right.



26. How can the environment affect enzymes?

pH
temperature
Substrate concentration
can optimize or denature

27. What is denatured?

Causes it to change shape (enzyme)

28. *Be able to interpret enzyme graphs.*

Cells

Cell Theory and Organelles:

1. What are the three tenets of the Cell Theory?
   * all things made of cells
   * Cells come from pre-existing cells
   * Basic unit of life
2. What are organelles are found in prokaryotic cells?
   DNA ribosomes cell wall
   cytoplasm cell membrane
3. What are the four things prokaryotic and eukaryotic cells have in common?
   DNA ribosomes
   cytoplasm cell membrane
4. Know the functions of all the organelles we discussed.
5. What organelles are found only in plant cells?
   Cell wall chloroplasts large central vacuole
6. What organelles are found only in animal cells?
   Centrosomes & lysosomes
7. Be able to label organelles in a cell.

Cell Membrane and Transport:

8. How is the cell membrane related to homeostasis?
   A cell maintains homeostasis by controlling the movement of substances across the cell membran
9. What are the parts of the cell membrane?
   phospholipids carbohydrates
   proteins cholesterols
10. What are the two main types of transport?
    passive & active
11. What types of molecules can easily pass through the membrane?
    small non-polar
    hydrophobic non-charged molecules
12. What are the types of passive transport?
    simple diffusion
    facilitated diffusion osmosis
13. Does passive transport move up or down the concentration gradient?
    down high ↓ low
14. What are the types of active transport?
    protein pumps
    bulk transport (endocytosis & exocytosis)

(liquid) bond

15. Does active transport move up or down the concentration gradient?

up low → high

16. What type of transport requires the use of energy?

active

17. What type of solution is an isotonic solution? How does it affect the cell?

solute concentration on outside of cell is the same as the inside of cell (cell will stay the same)

18. What type of solution is a hypertonic solution? How does it affect the cell?

solute on the outside is higher than on the inside of cell (cell will shrink & die)

19. What type of solution is a hypotonic solution? How does it affect the cell?

solute on the outside is lower than on the inside of cell (cell will swell & burst)

20. Be able to identify the types of transport and types of solutions based off scenarios or pictures.

The Cell Cycle:

21. What are the parts of Interphase and what occurs in each step?

G1 - growth + protein synthesis

S - DNA replication

G2 - more growth & protein synthesis

22. What are the functions of the cell cycle?

growth + repair

reproduction → binary fission

23. What is the name of asexual reproduction in bacteria?

binary fission

24. What is mitosis?

cell cycle where replicated chromosomes are separated into 2 new daughter cells that are identical

25. What are the stages of mitosis in order?

Prophase, metaphase, Anaphase, telophase

26. Know what happens in each stage of mitosis.

27. What is the difference between cytokinesis in plants and animals?

in animals cytoplasm pinches

in plants a cell plate is formed

28. How is mitosis related to genetic continuity (continuity means "the same.")?

mitosis creates 2 daughter cells that are identical to parent cells. Same genes so genetic continuity

29. Be able to identify the stage of mitosis based off of a picture or description.

30. Be able to predict what would happen if certain stages of mitosis did not occur properly. (like cancer, genetic discontinuity, cell death)

Cell Regulation and Cancer:

31. Throughout the cell's cycle, there are built in Checkpoints that are designed to be a check and balance system for the cell. What do these checkpoints look for? proper growth + replication

32. Growth factors are proteins that stimulate cell division.

33. Programmed cell death is known as Apoptosis

34. What is cancer?
Uncontrolled cell division

35. Cancer cells form disorganized clumps called tumors

Carcinogen → substances that are known to lead to cancer

Stem Cells:

36. What is a stem cell?
a cell that lacks specialized function

37. What is cell differentiation?
a cell that has become specialized + has a specific function

38. What are some real-world applications of stem cells?
grow new cells
correct parts
research genetic defects etc.

DNA Replication and Protein Synthesis

39. What does DNA stand for?
deoxyribonucleic acid

40. Where is DNA located?
nucleus

41. What are the 3 parts of a nucleotide?
phosphate, nucleotide, sugar

42. What are the complementary base pairing rules for DNA?
A – T C – G

43. What are the complementary base pairing rules for RNA?
A – U C – G

44. When does DNA replication happen?

S-phase of interphase

45. Where does DNA replication happen?

nucleus

46. Which enzyme "unzips" DNA during replication?

helicase

47. What happens during DNA replication? (DNA is copied)

a complimentary strand is created

48. Which enzyme adds nucleotides and proofreads DNA?

DNA polymerase

49. Which enzyme connects pieces of the lagging strand?

ligase

50. What is the complementary DNA strand to the DNA sequence: TAG?

ATC

51. What does the central dogma of biology state?

DNA → RNA → Protein

52. Which process copies a gene into mRNA?

transcription

53. What are the 2 parts of protein synthesis?

transcription + translation

54. Where does transcription occur?

nucleus

55. Where does translation occur?

cytoplasm + ribosomes

56. Which process creates and amino acid from the mRNA?

translation

57. What are the 3 types of RNA?

tRNA mRNA rRNA

58. What do you call a triplet of 3 nucleotides that correspond to an amino acid?

Codon

59. How would mRNA transcribe the DNA sequence: GAT?

CUA

60. What is the corresponding amino acid for the codon GCU?

Alanine

61. What is the corresponding amino acid for the codon GUA?

Valine

62. What is the corresponding amino acid for the codon GGC?

Glycine

63. Where are codons found?

mRNA

64. Where are anticodons found?

tRNA

65. True or false: anticodons are read on the codon chart to find amino acids.

66. What brings amino acids to the ribosome?

tRNA

67. The process by which cells make proteins.

Protein Synthesis

~~68. The building blocks of nucleic acids. proteins~~

~~Amino acids / nucleic Acids~~

69. What kind of sugar is found in RNA?

ribose

70. What kind of sugar is found in DNA?

deoxyribose

71. The step of protein synthesis in which RNA is changed into an amino acid.

translation

72. The building block of proteins.

Amino acid / nucleic Acids

73. The step of protein synthesis in which DNA is changed into RNA.

transcription

74. A group of 3 bases that code for an amino acid.

Codon

75. The base that adenine pairs with in a DNA molecule.

T

76. The nitrogenous base that is found only in RNA.

U

77. How many amino acids are there?

20

78. What is the primary function of DNA in cells?

Instructions to make proteins