Name_____ Date_____

Biology 2nd Semester Final Exam Review Guide

Mendel & Genetic Inheritance

Vocabulary: Define the following terms as they apply to Mendel and Genetic Inheritance.

(1) Homozygous:

(2) Heterozygous:

(3) Genotype:

(4) Phenotype:

(5) Allele:

(6) Incomplete Dominance:

(7) Multiple Alleles:

(8) Sex-Linked Inheritance:

(9) Polygenic Inheritance:

(10) Co-Dominance:

(11) True-Breeding:

(12) Pedigree:

(13) Punnent Square:

Free Response:
(14) Describe Mendel's Law of Independent Assortment and give an example of how it was modeled in the Reebop Lab.

(15) Describe Mendel's Law of Segregation and give an example of how it was modeled in the Reebop Lab

(16) Why were the pea plants Mendel used good for doing experiments regarding the laws of inhertiance?

(17) Describe the four blood types and how blood type is inherited.

(18) Round seeds (R) are dominant over wrinkled seeds (r). Cross a homozygous round female with a homozygous male pea plant.

_____ X _____

female genotype | male genotype

Phenotypic ratio _____

(19) Round seeds (R) are dominant over wrinkled seeds (r). Cross a male heterozygous pea plant with a female heterozygous pea plant.

_____ X _____

female genotype | male genotype

Phenotypic ratio _____

(20) Determine all the possible blood types of children born from parents who are blood type A and blood type O.

_____ X _____

female genotype | male genotype

Phenotypic ratio _____

_____ X _____

female genotype | male genotype

Phenotypic ratio _____

DNA Structure

Free Response:

(21) What is the monomer subunit of nucleic acid polymer?

(22) What are the three components of a nucleotide?

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(23) Draw and label a nucleotide.

(24) What are the four types of nitrogen bases?

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(25) What type of 5-Carbon sugar does DNA contain?

(26) What does DNA stand for? What part of the molecule gives DNA its name?

(27) What is complementary base paring?

(28) What is the overall shape of a DNA molecule?

(29) Who discovered the structure of DNA?

DNA Replication

Vocabulary: Define the following terms as they apply to DNA Replication.

(30) Helicase:

(31) DNA polymerase:

Free Response:

(32) Describe in detail the process of replication. Be sure to include the enzymes involved.

Meiosis

Vocabulary: Define the following terms as they apply to Meiosis.

(33) Diploid:

(34) Haploid:

(35) Sister Chromatid:

(36) Homologous Chromosome:

(37) Tetrad:

(38) Crossing Over:

(39) Independent Assortment:

Free Response:
(40) What is meiosis?

(41) In which stage does independent assortment occur?

(42) In which stage does crossing over occur?

(43) Describe the similarities and differences between metaphase I and metaphase II.

(44) Describe the similarities and differences between anaphase I and anaphase II.

(45) Describe the similarities and differences between anaphase of mitosis and anaphase I of meiosis.

(46) If the diploid number of an organism is 50, how many chromosomes will than organism pass to the next generation?

(47) For each of the stages of meiosis, draw a picture and describe what happens. In Metaphase I, label: a duplicated chromosome, a tetrad, a sister chromatid, and a set of homologous chromosomes

Interphase:

Prophase I:

Prophase II:

Metaphase I:

Metaphase II:

Anaphase I:

Anaphase II:

Telophase I:

Telophase II:

Protein Synthesis

Vocabulary: Define the following terms as they apply to Protein Synthesis.

(48) Transcription:

(49) Translation:

(50) tRNA:

(51) mRNA:

(52) rRNA:

(53) Ribosome:

(54) Codon:

(55) Anticodon:

Free Response:

(56) Describe three differences between DNA and RNA

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(57) What are the complementary base pairing rules used when transcribing RNA from DNA?

(58) What are the complementary base pairing rules used between codons and anticodons?

(59) How many binding sites does a ribosome have?

(60) What mRNA sequence would be transcribed from the following DNA sequence:
AAATACGCCATGCCTATT

(61) What are the anticodons for the codons on the mRNA sequence created in #60?

2nd base in codon

1st base in codon	U	C	A	G	3rd base in codon
U	Phe	Ser	Tyr	Cys	U
	Phe	Ser	Tyr	Cys	C
	Leu	Ser	STOP	STOP	A
	Leu	Ser	STOP	Trp	G
C	Leu	Pro	His	Arg	U
	Leu	Pro	His	Arg	C
	Leu	Pro	Gln	Arg	A
	Leu	Pro	Gln	Arg	G
A	Ile	Thr	Asn	Ser	U
	Ile	Thr	Asn	Ser	C
	Ile	Thr	Lys	Arg	A
	Met	Thr	Lys	Arg	G
G	Val	Ala	Asp	Gly	U
	Val	Ala	Asp	Gly	C
	Val	Ala	Glu	Gly	A
	Val	Ala	Glu	Gly	G

(62) What is the amino acid sequence that is coded for by the DNA sequence in #60?

Evolution

Vocabulary: Define the following terms as they apply to Evolution.

(63) Genetic Variability:

(64) Natural Selection:

(65) Reproductive Fitness:

(66) Vestigial Structure:

(67) Homologous Structure:

(68) Stabilizing Selection:

(69) Disruptive Selection:

(70) Directional Selection:

(71) Scientific Theory:

(72) Scientific Law:

(73) Scientific Hypothesis:

(74) Gene Flow:

(75) Genetic Drift:

(76) Founder Effect:

(77) Genetic Bottleneck:

(78) Speciation:

Free Response:
(79) Identify the four evidences of evolution.

(80) What are the mechanisms that change allelic frequency from generation? Which did we see in the Mutagen Valley lab for mouth type? Which did we see in the Mutagen Valley lab for color?

(81) Identify and explain the five sources of genetic variation in a population. Which of these sources did we see in the Mutagen Valley lab?

(82) Why is genetic variability in a population an important in the process of evolution through natural selection?

(83) What is the role of isolation in speciation?

(84) Describe the differences stabilizing, directional, and disruptive selection.

Ecology

Vocabulary: Define the following terms as they apply to Ecology.

(85) Ecology:

(86) Population:

(87) Species:

(88) Habitat:

(89) Community:

(90) Biotic Factor:

(91) Abiotic Factor:

(92) Niche:

(93) Ecosystem:

(94) Succession:

(95) Producer:

(96) Consumer:

(97) Decomposer:

(98) Trophic Level:

(99) Herbivores:

(100) Carnivores:

(101) Omnivores:

(102) Detritivores:

(103) Food Web:

(104) Energy Pyramid:

(105) Transpiration:

(106) Nitrogen Fixation:

(107) Symbiosis:

(108) Predation:

(109) Parasitism:

(110) Commensalism:

(111) Mutualism:

(112) Convection Cells:

(113) Global Warming:

(114) Greenhouse Effect:

(115) Ozone Depletion:

(116) 10% Rule:

(117) Carrying Capacity:

Free Response:
(118) What are the similarities and differences between primary and secondary succession?

(119) What are the similarities and differences between detritivores and decomposers?

(120) Explain why there are rarely more than four trophic levels found in an ecosystem. Use an energy pyramid to aid in the explanation.

(121) Describe different places in which water can be found on earth.

Describe some ways in which water moves out of the air.

Describe some ways in which water moves into the air.

(122) Describe different places in which carbon can be found on earth.

Describe some ways in which carbon moves out of the air.

Describe some ways in which carbon moves into the air.

(123) Describe different places in which nitrogen can be found on earth.

Describe some ways in which nitrogen moves out of the air.

Describe some ways in which nitrogen moves into the air.

Can atmospheric nitrogen (N_2) be used by plants and animals to build biomolecules?

What is the importance of nitrogen fixation to organisms such as plants and animals?

Where do animals get the nitrogen they need for building biomolecules?

(124) Identify, explain, and give an example of each of the three types of symbiotic relationships.

(125) Describe the difference between a habitat and a niche.

(126) Describe the difference between a fundamental and a realized niche.

(127) Describe the factors that were contributing to ozone depletion and some of the consequences of a hole in the ozone layer.

(128) Describe some of the consequences of global warming.

Biotechnology

Vocabulary: Define the following terms as they apply to Biotechnology.

(129) Gene splicing:

(130) Palindrome:

(131) Plasmid:

(132) Recombinant DNA:

(133) Restriction enzyme:

(134) Sticky ends:

(135) DNA fingerprinting:

(136) Transgenic organism:

(137) Vector:

(138) DNA ligase:

(139) Agarose:

(140) Gel Electrophoresis:

(141) Clone:

(142) Gene Therapy:

(143) Genetic Engineering:

(144) Polymerase Chain Reaction PCR:

(145) Stem Cells:

(146) pluripotent:

(147) multipotent:

(148) totipotent:

Free Response:
(149) List and describe the 5 steps of building a recombinant DNA molecule.
Step 1:

Step 2:

Step 3:

Step 4:

Step 5:

(150) What is the result of using plasmids to insert human genes into bacteria? Why can bacteria read and use the human DNA to build proteins?

(151) Explain how gel electrophoresis separates molecules. Be sure to include relevant information concerning size, charge, and speed of migration of particles. Also indicate the role of the agarose and buffer in the process.

Body Systems

Vocabulary: Define the following terms as they apply to Body Systems.

(152) Artery:

(153) Vein:

(154) Capillary:

(155) Systole:

(156) Diastole:

(157) Sphygmomanometer:

(158) Brachial Artery:

(159) Heart Rate:

(160) Blood Pressure:

(161) Amalase:

(162) Pepsin:

(163) Bile:

(164) Lipase:

(165) Nuclease:

(166) Pancreatic Amylase:

(167) Physical Digestion:

(168) Chemical Digestion:

(169) Peristalsis:

Free Response:
(170) Explain the significance of heart rate elevation during and after physical activity.

(171) Identify the differences between the structure and function of arteries, veins, and capillaries.

(172) Trace the sequence of blood flow through the heart, lungs, and body.

(173) Identify the shape and resulting effect (sound with a stethoscope) of the brachial artery when taking the blood pressure of a person with 120/80 blood pressure when the cuff is inflated to the following pressures – 160 mmHg, 120 mmHg, 100 mmHg, 80 mmHg, and 60 mmHg.

(174) Identify the contribution to digestion made by the following major organs of digestion.
Mouth:

Esophagus:

Stomach:

Pancreas:

Duodenum:

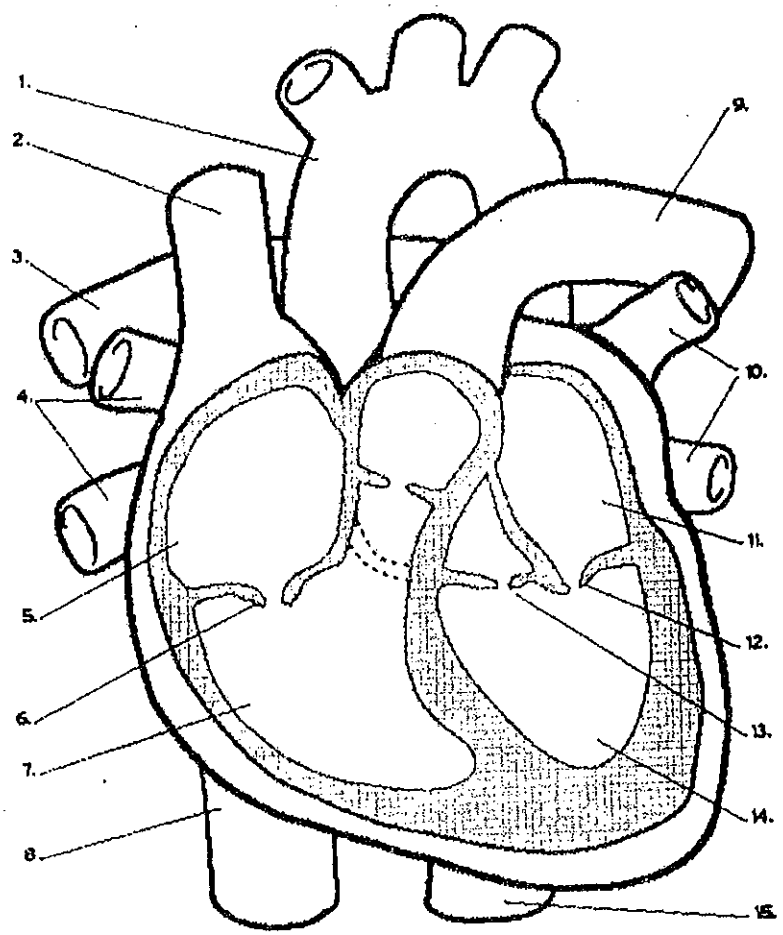
Liver:

Gallbladder:

Small Intestine:

Large Intestine:

(175) Identify all of the chambers, blood vessels, and valves in a four chambered heart. (Right Ventricle, Left Ventricle, Right Atrium, Left Atrium, Pulmonary Artery, Pulmonary Vein, Vena Cava, Aorta, Tricuspid Valve, Bicuspid Valve, Pulmonary Semilunar Valve, Aortic Semilunar Valve)



(176) Identify the contribution to digestion made by the following major organs of digestion. (Mouth, Esophagus, Stomach, Pancreas, Duodenum, Liver, Gallbladder, Small Intestine, Large Intestine)