Please use these sheets to help you study and prepare for the tests.

1. Genes are on at specific location on a _____ and they code for a

_____ which is made up of amino acids

An_____ is an alternate form of a gene. Blonde, brown and black hair colors are all due to alternate forms of genes. We inherit or receive chromosomes from our parents.

2. People have 46 chromosomes in each cell of our body except the sperm and ova. From our

mother we receive _____ and from our father we receive _____ . We have 2 alleles for

most traits because _____ .
Gene alleles are often abbreviated with a letter from the alphabet. Different alleles are represented by an uppercase or lower case letters (i.e. **A** and **a** would be alleles of a gene)

A _____ individual is a person has 2 of the exact same allele. AA or aa

A _____individual is a person with 2 different alleles. Aa

3. Many traits actually rely on many genes and produce a predictable _____ curve. Examples of these traits would be height, weight, or intelligence. Since many genes may work together to create a phenotype, it might be more accurate to say that natural selection works on selecting the most fit phenotype in a population.

4. When considering evolution we say (circle one) populations individuals evolve because evolution is the change in the frequency or % of an allele in a population. A person can't change their genes and suddenly grow 6 inches taller but over time a population could evolve over generations and become on average taller due to natural selection.

5. A _____ includes all the genes in the population, while a _____ is the alleles of a person.

6. An adaptive trait improves _____

7. A _____ is the physical expression of an individual's genes.

8. A mutation is a change in a _____ . There are 3 types of

mutations:_____

9. New combinations of alleles occur due to (circle one) asexual sexual reproduction.

10. _____ is when allele frequencies are not changing and a population is not changing or evolving

The 5 conditions necessary to create "Genetic Equilibrium" are: _____

_____

_____

Since these conditions are hard to meet, most populations are evolving and changing.

11. A mathematical equation that allows us to determine if a population is at genetic equilibrium is called the _____ and consists of 2 equations:

$p + q = 1$; and **$p^2 + 2pq + q^2 = 1$**

The equation p + q = 1 tells us the frequency of 2 alleles in the _____ of a equilibrium population. So if one allele, q, is 0.6 in the population, then the frequency of the other allele, p, will be _____. If you know the frequency of alleles, you can figure out the proportions (or percentages) for the different genotypes in a population. The equation **$p^2 + 2pq + q^2 = 1$** that tells us the _____.

If q = 0.6, can you figure out the equation for the population?

_____

What would be the proportion of recessives? _____

12. If the population is in genetic equilibrium, then (circle one) there is there is not a change in the frequency of the alleles in a population.
If the population is changing due to natural selection then (circle one) it is it is not in equilibrium.

13. Natural Selection is _____

_____

Natural selection may occur in three ways that change in allele frequency, and they include:

1. _____ where the allele frequency is shifting the curve in one direction
2. _____ where the average phenotype is favored and extremes decline.
3. _____ where the 2 extremes of the bell curve are favored

Resistance to pesticides or antibiotics is an example of _____.

Birth weight has historically been a type of _____selection..

Finches with large or small beaks and no intermediates is a _____selection

Sexual Dimorphism means that_____

and arises due to _____.

Sexual selection commonly (circle one) increases decreases secondary sexual traits and therefore changes the frequency of those alleles in the population.

14. Polymorphism means_____

It occurs when two or more alleles are _____

A person would have sickle cell anemia if they are _____ for the trait or Hb^s Hb^s

A person would be resistant to malaria if they are _____ for the trait or Hb^s Hb^A
Since these people live longer and reproduce, this allele persists in the population.

15. A gene has 2 alleles, we call A and a. A heterozygote would be (circle one) AA Aa
and sometimes there is a "heterozygote advantage" for the individual. (ex. Sickle cell anemia).

16. _____ is the physical movement of alleles into a population.
This inflow of genes tends to keep different and distant groups similar.

17. Genetic Drift is _____

The population most likely to have genetic drift is (circle one) large small populations. It

reduces genetic variation in a population. If genetic drift continues, the population may have

fixation, which means all _____. If fixation

happened, then all members of the population would be _____zygous for that particular

allele, and the genotype would be be (circle one) AA Aa

18. A bottleneck is when _____
and it (circle one) reduces increases genetic variation in the population.

The Founder effect is _____

_____and it reduces genetic variation.

Inbreeding is_____
and it reduces genetic variation.

19. A biological species is_____

_____

20. _____ is the change of population due to isolation of its gene pool

and these changes are caused by_____

_____ Increased gene flow decreases _____.

21. _____ allows speciation to occur. Speciation is

_____

Reproductive Isolation Mechanisms include _____ and

_____

22. Prezygotic Isolation includes (prior to formation of zygote = sperm + ovum)

_____where the species are physically incompatible.

_____ where species have different reproductive timing.

_____where the species have different courtship cues.

_____ where species are in different habitats

_____ where either the sperm or the ovum are lethal.

Postzygotic Mechanisms (after zygote is formed) mating (circle one) does does not occur

Problems include_____

23. The most common mechanism of speciation is _____ which means there is a physical barrier between the populations and a lack of gene flow.

Examples include the founder effect where a few individuals colonize an island.

_____is when a single species gives rise to many new species to fill vacant niches in a habitat.

_____ is speciation that occurs in the same region
Example was cichlid or fish is a lake in W. Africa that are closely related but are now separate species. Also occurs with plants in the same region but can no longer cross pollinate

24. _____in plants create speciation by increasing the chromosome number. Now offspring can not breed with parents, they can only breed between themselves so they are a species.

_____ is speciation that occurs in a nearby region. Adjacent populations are distinct species. Offspring is a hybrid that many be sterile.

25. Macroevolution deals with _____-scale models of evolution. There are 2 models:

_____ which suggests that changes occur over long periods of time

_____ which suggests change occurs abruptly, followed by periods of no change.

26. If a single lineage fills many niches, it is _____

27. _____ is when 2 species have evolved together depend on each other to survive

28. _____ is the loss of a species and a loss of diversity.

29. Microevolutionary processes include. _____

30. An adaptive trait is_____