Chapter 14 Questions

1. **What is the “blending” hypothesis of inheritance?**
2. **What is the “particulate” hypothesis of inheritance?**
3. **Who is considered the father of genetics? (p 270 when done with review)**
4. **What is the difference between a character and trait?**
5. **What characterizes true-breeding varieties?**
6. **What is the crossing of two true-breeding varieties and what are the generations called?**
7. **What are the two types of alleles?**
8. **What is the law of segregation?**
9. **What diagram is used to predict the allele composition of offspring?**
10. **Define homozygote, homozygous, heterozygote, and heterozygous.**
11. **What is the scientific term for appearance and the term for genetic makeup?**
12. **What is breeding an organism of unknown genotype with recessive homozygote called?**
13. **What are monohybrids and a monohybrid cross?**
14. **What are dihybrids?**
15. **What does the law of independent assortment say?**
16. **What are the three types of allele dominance?**
17. **What determines the human MN blood group?**
18. **What is Tay-Sachs disease?**
19. **What is the condition of being born with extra fingers or toes?**
20. **How is human blood type determined?**
21. **What is pleiotropy?**
22. **What is epistasis?**
23. **What is polygenic inheritance?**
24. **What are quantitative characters?**
25. **What are multifactorial characters?**
26. **What is a family tree describing traits of parents and children across generations?**
27. **How is the fur color of labrador retrievers determined?**
28. **How are widow’s peaks inherited?**
29. **What is PTC and how is the ability to taste it inherited?**
30. **What are carriers?**
31. **What is albinism?**
32. **In what groups is Tay-Sach’s disease most common?**
33. **What is the term and symbol for matings between close relatives and what problems can they cause?**
34. **What is cystic fibrosis?**
35. **What is sickle-cell disease?**
36. **What occurs in carriers of sickle-cell disease?**
37. **What is achondroplasia?**

38. **What is Huntington's disease?**
39. **What does the Genetic Information Nondiscrimination Act do?**
40. **What is amniocentesis?**
41. **What is chorionic villus sampling (CVS)?**
42. **What is used to produce an image of the fetus?**
43. **What is ß-thalassemia?**
44. **What is phenylketonuria(PKU)?**
45. **IF TIME CHECK OUT PAGE 292!**

Chapter 14 Answers

1. Genetic material contributed by parents mixes (like blue and yellow mix to form green)
2. Gene idea of discrete heritable units that retain separate identities in offspring
3. Gregor mendel (monk) documented particulate mechanism for inheritance
4. Character is a heritable feature among individuals, trait is a variant of a character
5. Over many generations of self-pollination, produced only same variety of parent plant
6. Hybridization. True-breeding parents called P generation (parental generation), offspring called F_1 generation (first filial generation), offspring of offspring called F_2 generation
7. Dominant allele determines organism's appearance, recessive allele no noticeable effect
8. Two alleles for a heritable character segregate during gamete formation
9. Punnett square
10. Organism that has pair of identical alleles, ~, organism with two different alleles, ~
11. phenotype, genotype
12. testcross
13. Heterozygous for the particular character being followed in cross of two parents, cross of two of these offspring
14. INdividuals heterozygous for the two characters being followed in cross
15. Two or more genes assort independently, each pair of alleles segregates independently of any other pair during gamete formation, applies only to genes on nonhomologous chromosomes
16. Complete dominance (phenotypes of heterozygote and dominant homozygote are same), incomplete dominance (F_1 hybrids have phenotype between those of parent varieties), codominance (alleles affect phenotype in separate, indistinguishable ways)
17. Codominant alleles for 2 specific molecules located on the surface of red blood cells.
18. Inherited disorder where only children with two copies have disease, brain cells cannot metabolize certain lipids since enzyme is missing. Heterozygous children have intermediate activity of this enzyme.
19. Polydactyly, caused by dominant alleles but only one baby of 400 is born with it
20. I^A, I^B, i alleles. Blood type may be A, B, AB, or O (refer to two carbs, A and B, that may be found attached to specific cell-surface molecules on red blood cells).
21. Property of genes having multiple phenotypic effects, responsible for cystic fibrosis and sickle-cell disease
22. It is when one gene affects phenotype of another

23. When multiple genes independently affect a single trait
24. Characters that vary in gradations along a continuum
25. Characters that many factors (both genetic and environmental) influence phenotype
26. Pedigree
27. Black allele is dominant, brown is recessive. Separate gene decides whether pigment shows (dominant means it shows, recessive means it doesn't)
28. Widow's-peak allele is dominant
29. Phenylthiocarbamide, chemical, similar compounds found in broccoli, brussel sprouts, etc.Taste allele is dominant
30. Heterozygous individuals that show no symptoms but can pass a disorder to their children
31. Lack of pigmentation, results in susceptibility to skin cancer and vision problems
32. Ashkenazi Jews (Jews whose ancestors lived in central Europe) have disease in one of 3,600 births, 100 times more than that in non Jews
33. Consanguineous, indicated in pedigrees by double lines, more likely to produce offspring homozygous for recessive traits
34. The most common lethal genetic disease in the U.S. (1 in 2,500 people of European descent, much rarer in other groups). 4% of Europeans are carriers. Normal allele codes for membrane protein that functions in transport of chloride ions between cells and EC fluid. These proteins absent or defective in homozygous recessive children (results in abnormally high concentration of intracellular chloride, causes uptake of water due to osmosis, causing mucus that coats some cells to become thicker and stickier. Leads to poor absorption of nutrients from intestines, chronic bronchitis, and recurrent bacterial infections.
35. Most common inherited disorder among people of African descent (1 in 400 AAs). Caused by replacement of glutamic acid by valine in the 6th position of the beta subunit in hemoglobin of red blood cells; In homozygous inds, hemoglobin is abnormal. When O_2 content of blood is low, sickle-cell hemoglobin proteins aggregate into long fibers that deform red cells into sickle shape, which may then clump and clog blood vessels (physical weakness, pain, organ damage, stroke, and paralysis may result). Regular blood transfusions can prevent brain damage.
36. Carriers said to have sickle-cell trait since they have both normal and abnormal hemoglobins, usually healthy, may suffer symptoms if long periods of reduced blood oxygen. Carriers have less susceptibility to malaria (especially in children) since malaria spends part of life cycle in red blood cells, sickle-cell hemoglobin reduces parasite density
37. Form of dwarfism (1 in 25000 people), results from dominant alleles
38. Degenerative disease of nervous system, caused by lethal dominant allele that has no obvious phenotypic effect until individual is about 35 to 45 years old (1 in 10000 people in US), irreversible, fatal.
39. Passed in US in 2008, prohibits discrimination in treatment based on genetic test results
40. Test that can occur starting 15th week of pregnancy, physician inserts needle into uterus and extracts 10 mL of amniotic fluid (liquid that bathes fetus). Molecules in fluid can

indicate certain disorders. Fetal cells found in amniotic fluid can yield DNA that can be used to determine whether the fetus has Tay-Sach's disease

41. Physician inserts narrow tube through cervix into uterus and suctions tiny sample of tissue from placenta (organ that transmits materials between fetus and mother). Cells of the sampled portion (chorionic villi) are derived from fetus, have same genotype as fetus. Can be performed as early as 10th week of pregnancy.
42. Ultrasound technique where reflected sound waves are used to produce image of fetus
43. Harmful blood disorder (13 per 1000)
44. Recessively inherited disorder occurs in about 1 of 15,000 births in US, children cannot properly metabolize phenylalanine. Compound and by-product (phenylpyruvate) can accumulate to toxic levels in blood, causing mental retardation. If detected, special diet low in phenylalanine allows normal development (disallows artificial sweetener aspartame)