1. Define each word, then write your OWN definition of the word.
   1. Heredity – The passing of traits from parents to offspring
   2. DNA – The instructions or code that lives in the nucleus of a cell
   3. Genes – A section of a chromosome that codes for a particular trait
   4. Alleles – The options or choices for the genes. Different forms (options) of a single gene.
   5. Chromosomes – A tightly coiled, organized structure of DNA
2. Fill out the following diagram with the words: Chromosomes, DNA, Alleles, Genes, Alleles (alleles is used twice).

The largest structure should label the largest circle

1. In 2-5 sentences, put the pieces together and explain the complete relationship between DNA, Genes, Alleles, and Chromosomes.

Chromosomes are made of segments of genes, which have options known as alleles. Genes are made of DNA which contains the code for our inherited traits.

1. How do they relate? Explain how each of the two terms below relate to each other in a sentence.
   1. DNA and Chromosomes (example: DNA and chromosomes relate to each other because chromosomes are made of DNA).
   2. DNA and Genes DNA makes up genes.
   3. Genes and Alleles The options or choices for the genes are called alleles.
   4. Genes and Chromosomes Genes are segments or pieces of a chromosome.
2. Develop an analogy to explain the relationship between DNA, Genes, Alleles, and Chromosomes.

If the Nucleus is a library, the Chromosomes would be the shelves. The Genes would be the books and the Alleles would be the genre of book. The DNA would be the words.

1. Fill in the chart below with any examples (just like p7 in Notes)

|  |  |  |
| --- | --- | --- |
| **Gene** | **My allele** | **Someone else’s allele** |
| Eye Color | Ms. Bland - brown | Ms. Green – blue |
| Hair Color | Ms. Bland - brown | Ms. Francis – blond |

1. What does dominant mean? Controlling- this gene will always show if the organism has at least one dominant allele. What does recessive mean? This gene will only show if there is no dominant allele present

What are all the possible genotypes for corn color?

YY, Yy, yy

What are the possible phenotypes for corn color?

Yellow or white

# Corn Color

Yellow corn is **dominant** over white corn.

Y – represents having yellow corn

y – represents having white corn

1. One rabbit has a genotype of Bb for fur color, and another rabbit has a genotype of Bb for fur color. B = brown fur and b=white fur. Draw a punnett square for this cross.

B b

B

b

B

b

|  |  |
| --- | --- |
| BB | Bb |
| Bb | bb |

1. For the mating above (rabbits), what are the possible genotypes (include probability)?

BB (25%), Bb (50%), bb(25%) OR

1. For the mating above , what are the possible phenotypes (include probability)?

Brown (75%) or white (25%) OR Brown (3:4) or white (1:4) OR 3 Brown: 1 white

1. Why are there three possible genotypes, but only two possible phenotypes for any genes (other than polygenic traits)? There are three possible genotypes because the possibilities are BB, Bb, or bb. However, there are only 2 possible phenotypes because both BB and Bb result in an organism that has a physical trait of brown fur.
2. What is the purpose or goal of meiosis? To produce cells with ½ the amount of required DNA for the purpose of sexual reproduction
3. What kind of cells does meiosis result in? Sex cells (or reproductive cells)
4. How many cells are produced by meiosis? 4
5. After meiosis, how much DNA do the resulting cells have in comparison to the original cell? ½ the required amount (for example, in humans, the resulting cells will have 23 chromosomes)
6. If a cell has 14 chromosomes, how many will the daughter cells have after meiosis? 7
7. What type of reproduction is meiosis for (sexual or asexual)? sexual
8. What kind of cell that is made by meiosis. Egg, pollen, sperm
9. What are 2 things that mitosis and meiosis have in common? 1) They both go through the phases IPMATC. They both increase the DNA in interphase, pair up in prophase, line up in the middle in metaphase, pull apart in anaphase, etc. 2) They both result in more cells
10. What are 2 ways in which mitosis and meiosis differ? 1) Mitosis makes 2 cells, meiosis makes 4 2)Mitosis makes an exact copy of the cell, meiosis makes cells with ½ the DNA 3)Mitosis is asexual reproduction, meiosis is for sexual reproduction 4) Mitosis is for growth and repair of body cells, meiosis is for producing reproductive cells