**Genetics Study Guide**

1. Who is the father of genetics?
2. What did he study?

***Match*** *the term from column A to its definition in column B.*

1. Alleles
2. Homozygous
3. Heterozygous
4. Dominant
5. Recessive
6. Genotype
7. Phenotype

\_\_\_\_\_\_\_ Different versions of the same gene.
\_\_\_\_\_\_\_ Individuals having two copies of different alleles.
\_\_\_\_\_\_\_ An organisms genetic make-up.
\_\_\_\_\_\_\_ An organisms physical appearance.
\_\_\_\_\_\_\_ The allele that is represented with a capital letter.
\_\_\_\_\_\_\_ The allele that is represented with a lower case letter.

***Simple Punnett Practice*** *- Construct Punnett squares for the following crosses and report the predicted percentages for the offspring*.

1. A mother with attached earlobes (Ee) X A father with free earlobes (ee)

|  |  |
| --- | --- |
|  |  |
|  |  |

EE ‑\_\_\_\_\_\_\_% Attached earlobes –\_\_\_\_\_\_%

Ee‑\_\_\_\_\_\_\_\_%

ee -\_\_\_\_\_\_\_\_% Free earlobes - \_\_\_\_\_%

1. A pea plant with wrinkled seeds (rr) X A pea plant homozygous for round seeds

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| --- | --- |
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|  |  |

RR‑\_\_\_\_\_% Round seeds - \_\_\_\_\_%
Rr-\_\_\_\_\_% wrinkled seeds - \_\_\_\_\_%
rr - \_\_\_\_ %

***Genetic Disorders:***

*Fill in the blank below with D if it is a dominant disorder and R if it is a recessive disorder.*

Hemophilia \_\_\_\_\_

Red-Green Colorblindness \_\_\_\_\_

Cystic Fibrosis \_\_\_\_\_

Huntington’s \_\_\_\_\_

Sickle Cell Anemia \_\_\_\_\_

PKU \_\_\_\_\_

***Explain each of the following disorders:***1. Huntington’s Disorder- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Cystic Fibrosis - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. PKU- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Hemophilia - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***Incomplete Dominance vs. Codominance***

5. A mating between a black goose and a white goose produces blue-gray offspring. (This is an example of what inheritance? \_\_\_\_\_\_\_\_\_\_

6. Fill in the phenotypes below for the geese in problem #**5**.

B B = black
B’B’=\_\_\_\_\_\_\_\_\_\_\_\_
B B'=\_\_\_\_\_\_\_\_\_\_\_\_

7. Cross a black goose and a blue-gray goose. What percentage of offspring would be black?

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| --- | --- |
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Answer:\_\_\_\_\_\_\_\_\_\_%

8. A reddish/brown-haired cow when crossed with a white-haired cow produces offspring that have reddish/brown hairs AND white hairs (This color is called roan). This is an example of what inheritance? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9. Fill in the missing genotype and phenotype below for problem **#8**.

RR = Reddish/Brown
\_\_\_ = Roan
WW = \_\_\_\_\_\_\_\_\_\_\_

1. Cross a red cow and a white cow.

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|  |  |

Roan: \_\_\_\_\_\_\_\_\_\_% %

1. What are some examples of polygenic inheritance?

***Karyotypes***

1. Why would you use a karyotype?
2. There are \_\_\_\_\_\_\_\_\_ chromosomes in a human somatic cell.
3. A male has \_\_\_\_\_\_\_\_\_ chromosomes for the 23rd pair and a female has \_\_\_\_\_\_\_\_\_ chromosomes for the 23rd pair.
4. A person with Down syndrome has \_\_\_\_\_ total chromosomes. They have an extra chromosome in the \_\_\_\_\_\_\_\_\_\_\_ chromosome pair.
5. What is nondisjunction? What disorder(s) can it cause?

***Multiple Allele Inheritance***

1. What makes a trait a multiple allele inheritance?
2. What role do antigens play in blood type?\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Antibodies? \_\_\_\_\_\_\_\_\_\_\_\_\_
3. Blood type \_\_\_\_ is considered a universal donor because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Blood Type \_\_\_\_\_\_\_ is considered a universal recipient because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. If type A antigens come in contact with anti A antibodies, the blood will \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, also called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
6. A woman with blood type O mates with a man who has AB. What is the possible phenotype(s) of the offspring? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (show your work)

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 ***Sex-Linked Traits***

1. Chromosomes 1-22 are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. A Hemophiliac male is crossed with a normal female.
What is the chance they will have a affected child? \_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
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1. A normal male is crossed with a female carrier for hemophilia.
What is the chance they will have a child with hemophilia? \_\_\_\_\_\_\_\_\_\_\_\_

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| --- | --- |
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26. Can a hemophiliac father pass hemophilia on to his son? Explain why or why not.

*The pedigree below is for* ***cystic fibrosis****.*



27. List the genotypes for the following individuals:

I-1:\_\_\_\_\_\_\_\_\_\_\_ II-6: \_\_\_\_\_\_\_\_\_\_

II-5:\_\_\_\_\_\_\_\_\_\_\_

***Mitosis vs. Meiosis***

|  |  |  |
| --- | --- | --- |
|  | **Mitosis** | **Meiosis** |
| How many cells at end? | 2 |  |
| Chromosome number at end? (diploid or haploid) |  |  |
| Number of cell divisions? | 1 |  |
| Identical or different from parent cell? |  |  |
| Produce what type of cells? |  | Gametes |
| Human chromosome number? | 46 |  |