****Genetics #1: Meiosis and Mendel

*For additional support and information, read and reference*

*Chapter 12 in your Biology “Bee” Book.*

* **Section 1 – Chromosomes and Meiosis**
	+ Somatic Cells vs Germ cells
		- * Somatic =
			* Germ =

Female =

Male =

* + - Chromosome =
			* Each species has a characteristic number.
			* Humans =
			* Each pair = Homologous pair – b/c
				+ One comes from the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and one from the\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
				+ Code for the same type of traits
			* Autosomes vs Sex Chromosomes
				+ Autosomes =
				+ Sex Chromosomes =

X and Y

X and Y are not \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

When pairing

XX =

XY =

The Female can only donate and \_\_\_\_\_\_\_\_\_\_\_

The Male can donate an X or and \_\_\_\_\_\_\_\_\_\_\_

* + - Sexual Reproduction
			* + They fuse and become one cell =
		- Diploid vs Haploid
			* Body cells =
				+ One from the mother and one from the father
				+ Diploid cells are represented by 2n.

Diploid 2n…

* + - * Gametes =
				+ Contains only
				+ Represented by : (n)

In humans = 22 autosomes + 1 sex chromosome

n = 23

**Section 1 Review Questions:**

* **Identify:**

Which cell type makes up the brain? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* **Summarize:**

Are homologous chromosomes identical to each other? Explain

* **Apply:**

Why is it important that gametes are haploid cells?

**Section 2:**

* + **Meiosis: Nuclear division**
		- 1 Diploid “Germ Cell” …..
		- Has two major parts:
			* Each of these contains 4 steps:
			* That means from start to finish there are 8 total steps.
				+ Read and Study the Image on page 174 and 175
		- **Homologous Chromosomes:**
			* Very similar in size and appearance.
			* Carries the same genes on each.
	+ One will have mom’s info.
	+ The other will have dad’s info.

* + - **Chromatid:**
			* Each half of a duplicated chromosome is called a = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
			* Sister Chromatids =
				+ Not divided until \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- **Gametogenesis :**
			* **Sperm**

Draw and Label

* + - * **Egg**
				+ **Polar Bodies**

**Section 2 Review Questions:**

* **Contrast:**

What is the major difference between metaphase I and metaphase II?

* **Infer:**

Explain why Mendel’s choice of either-or characteristics aided his research?

**Section 3:**

* **Traits:**
	+ Examples:
* **Genetics:**
	+ Father of Genetics: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- He worked with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ because they reproduce quickly and he could \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
		- Each plant contains both \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_reproductive organs.
		- This means that in nature, the peas would typically self-pollinate. (plant mates with itself).
		- Over time when organisms self-pollinate they can develop a\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
		- Purebred =
		- **Mendel’s Three Key Choices:**
* **Cross =**
* Mendel demonstrated that traits are inherited as\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
	+ They are **not** blended or diluted.
* **Law of Segregation:**
	+ Organisms **inherit** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ copies of each gene, one from each parent.
	+ Organisms **donate** only \_\_\_\_\_\_\_\_\_\_ copy of each gene in their gametes. Thus the two copies of each gene **segregate, or separate**, during gamete formation.

**Section 4 - Traits, Genes and Alleles**

* **Gene:**
	+ Each gene has a specific position or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on a pair of homologous chromosomes.



* + **Allele:**
		- Your cells have two alleles for each gene because……
			* **Dominant:**
				+ If you inherit this allele it will show up.
				+ Example:
			* **Recessive:**
				+ Example
			* If the alleles are different we call them:
				+ (Hetero) = different
				+ Example :
			* If the alleles for the trait are the same we call them:
			* However, there are two ways that alleles can be homozygous:
	+ **Genome:**
	+ **Genotype:**
	+ **Phenotype:**
		- If it is a trait that can be seen, then the phenotype is what you see!

**Section 5– Traits and Probability**

* **Punnett Square:**
	+ Remember that is a cross is defined as: Mating of two organisms.
	+ Visual Vocab: Draw and Label the Punnett Square that is on page 183.
	+ **Monohybrid Crosses:**
		- Sample Problem: Let’s Cross a Purebred Tall Plant with Purebred Short plant. To help you out on this problem, think back to what the term “Purebred” tells us.

 

* + - * + How many of the offspring will be Homozygous dominant? \_\_\_\_\_\_\_\_\_\_\_
				+ What is the phenotype of all of the offspring? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Use the following information and set up and work out the Punnett Square.
	+ In Mendel’s Pea plants
		- Purple flowers are dominant. (F)
		- White flowers are recessive. (f)
		- What would the outcome be if you crossed to plants that were both heterozygous for flower color?



* Testcross:
* Dihybrid Crosses:
	+ Example Worksheets = **Use the practice Dihybrid Cross worksheets to help you better understand this concept.**
* Law of Independent Assortment:
* Probability