Who was Gregor Mendel?

**Gregor Mendel’s Laws**

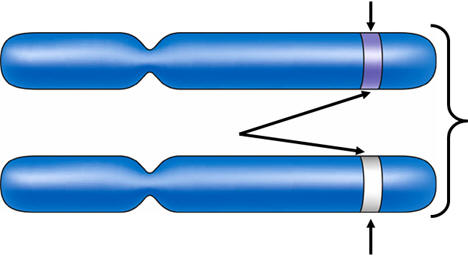
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| **Gene-Chromosome Theory** (not really Mendel’s) | **Law of Dominance** (complete dominance) | **Law of Segregation**  (of alleles) | **Law of Independent Assortment** |
| Hereditary information is transmitted from parents to offspring as **genes** found on chromosomes. These genes determine an individual’s traits. | In cases in which two or more forms (**alleles**) of a gene for a single **trait** exist, some forms of the gene may be **dominant** and cover up others that are **recessive**. | In most **sexually** reproducing organisms, each adult has **2**  copies of each **gene**: one from each parent. These genes are **segregated** from each other when gametes are formed. | The alleles for different genes usually segregate **independently** of one another. |

**Dominant Alleles vs. Recessive Alleles**

H

* The **dominant allele** always **Hides or masks** the recessive allele. It is the one that is **shown** and it is what we see

Hh



* + - **Dominant alleles** are represented with **capital** letters.

h

* The **recessive allele** is “weaker” and gets **covered** up by the dominant allele. It is not expressed unless an individual inherits **2** copies of the alleles.
  + - **Recessive alleles** are represented with **lowercase** letters .

**Gregor Mendel studied** pea **plants. The data below represents his findings**

Dominant Traits: tall stems, green pods, yellow seeds, round seeds

Recessive Traits: short stems, yellow pods, green seeds, wrinkled seeds

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| --- | --- | --- | --- | --- |
| **Trait** | **Height** | **Pod Color** | **Seed Color** | **Seed Shape** |
| Dominant | **T** | **G** | **Y** | **R** |
| Recessive | **t** | **g** | **y** | **r** |

|  |  |
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| **Genotype** | **Phenotype** |
| * The use of **letters** to represent the alleles for a trait is called an organism’s * Examples: TT = Tall plant, gg =yellow pod, Yy = yellow seeds | * The **expression** of those alleles (or traits) is called an organism’s * Examples: tall or short plant, green or yellow pod |
| **When alleles are brought together in** fertilization**, they are classified according to which allele matched with another.** | |
| **Homozygous** | **Heterozygous** |
| * When an organism has **2** of the **same** alleles (*either dominant or recessive*), they are said to be **true-breeding** or **homozygous**.   (homo = same)   * Examples: TT, GG, gg, yy, RR | * When an organism has 2 **different** alleles (*one dominant, and one recessive*), they are said to be **hybrid**, or **heterozygous**.   (hetero = different)   * Examples: Gg, Rr, Yy |

**Guided Practice**

1. For each genotype below, indicate whether it is heterozygous (He) or Homozygous (Ho).
   1. TT \_\_Ho\_\_\_\_\_ b. Bb \_He\_\_\_ c. Dd \_He\_\_\_\_ d. LL \_Ho\_\_\_\_ e. gg \_\_Ho\_\_\_\_\_
   2. Circle the genotypes above that would be considered **purebred**.
   3. Draw a square around the genotypes above that would be **hybrids**.
2. ***Determine the phenotype*** for each genotype using the information provided.
   1. Brown hair is dominant to blonde hair. e. Brown eyes are dominant to blue eyes.
      1. BB \_\_\_Brown\_\_\_\_\_\_\_\_\_\_\_\_\_ i. BB \_\_\_\_\_Brown\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
      2. Bb \_\_\_Brown\_\_\_\_\_\_\_\_\_\_\_\_\_ ii. Bb \_\_\_\_\_\_\_\_\_\_Brown\_\_\_\_\_
      3. bb \_\_\_Blonde\_\_\_\_\_\_\_\_\_\_\_\_ iii. bb \_\_\_\_Blue\_\_\_\_\_\_\_\_\_
   2. Which genotype is homozygous brown? \_BB\_\_
   3. Which genotype is homozygous blonde? \_bb\_
   4. Which genotype is heterozygous? \_Bb\_\_
3. For each phenotype, ***give the genotypes*** that are possible.
   1. Tall plants (T) are dominant to short plants (t). b. Purple (P) flowers are dominant to white flowers (p).
      1. Tall = \_\_TT,Tt\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ i. Purple = \_\_\_\_PP, Pp\_\_\_\_\_\_\_\_\_\_\_\_\_\_
      2. Short = \_\_\_\_tt \_\_\_\_\_\_\_ ii. White = \_\_\_\_\_pp\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_