

**Mendelian Genetics – Notes Guide**

Name: \_\_\_\_\_

Genotypes, Phenotypes, and Mutations

Who was Gregor Mendel?

Gregor Mendel: \_\_\_\_\_

Worked with \_\_\_\_\_

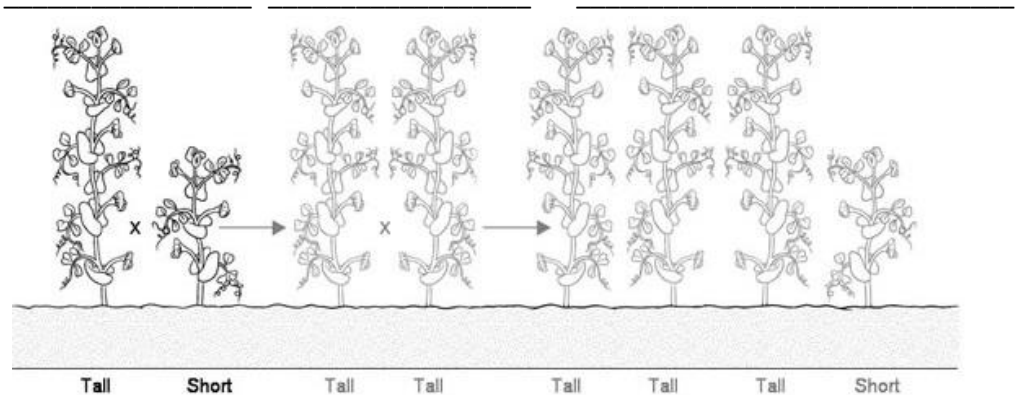
Mendel studied phenotypes: \_\_\_\_\_

such as: \_\_\_\_\_ peas x \_\_\_\_\_ peas  
\_\_\_\_\_ pods x \_\_\_\_\_ pods  
\_\_\_\_\_ plants x \_\_\_\_\_ plants

An example...

Label the plants: \_\_\_\_\_

Some terminology...



**Genotype:** The genetic make-up of an individual, usually representing \_\_\_\_\_ and \_\_\_\_\_ alleles by using capital and lowercase letters.

**Phenotype:** The \_\_\_\_\_ that are a result of the organism’s genetic make-up

**Allele:** one \_\_\_\_\_ of a gene

**Dominant:** An allele that \_\_\_\_\_ when \_\_\_\_\_

**Recessive:** An allele that shows if \_\_\_\_\_ is present for that gene

Important terminology

**Homozygous:** both alleles are the \_\_\_\_\_ for the same gene (TT or tt)

**Heterozygous:** 2 \_\_\_\_\_ alleles for the same gene (Tt)

**Autosomal:** Alleles located on the \_\_\_\_\_ (non-sex chromosomes)

**Sex-linked:** Alleles located on one of the \_\_\_\_\_

Mammals: \_\_\_\_\_ have XX, \_\_\_\_\_ have XY

Birds: \_\_\_\_\_ of mammals (Males \_\_\_\_\_, Females \_\_\_\_\_)



Phenotypes (draw arrows to the individual phenotypes:

**Head color**

**Breast color**

**Body color**



Breast color – \_\_\_\_\_

Head color – \_\_\_\_\_

Body color – \_\_\_\_\_ and/or  
\_\_\_\_\_

Breast color – Dominant: \_\_\_\_\_ Recessive: \_\_\_\_\_

Head color – Dominant: \_\_\_\_\_ Recessive: \_\_\_\_\_

Body color – Dominant: \_\_\_\_\_ Recessive: \_\_\_\_\_

**Punnett Practice!**

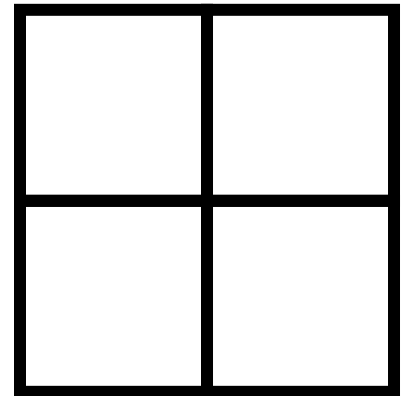
Cross a red head male who had a black head parent with a black head female.

P: \_\_\_\_\_ x \_\_\_\_\_

F<sub>1</sub>:

Genotypic ratio: \_\_\_\_\_

Phenotypic ratio: \_\_\_\_\_



**Blue and Gold Macaw**

Blue and gold macaws inhabit the forests of \_\_\_\_\_

A mutation randomly appeared that eliminated the \_\_\_\_\_ coloration

The result is a mutation called “\_\_\_\_\_ macaw”

**Macaw Mutation**

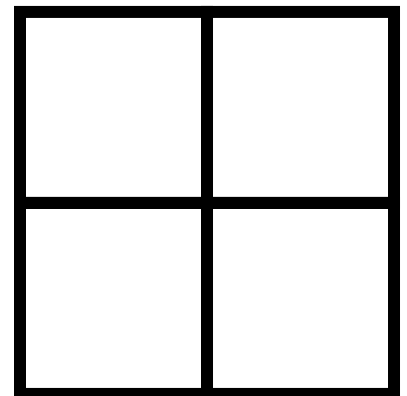
Cross a heterozygous female with a golden male.

P: \_\_\_\_\_ x \_\_\_\_\_

F<sub>1</sub>:

Genotypic ratio: \_\_\_\_\_

Phenotypic ratio: \_\_\_\_\_



Other examples

\_\_\_\_\_ (*Forpus* spp.) are the smallest parrot in the world

The wild type is the \_\_\_\_\_ color pictured which is dominant

\_\_\_\_\_ mutations have also been bred for such as yellow, blue, and white

**Parrotlet Punnett Practice!**

Cross a heterozygous male with a heterozygous female.

P: \_\_\_\_\_ x \_\_\_\_\_

F<sub>1</sub>:

Genotypic ratio: \_\_\_\_\_

Phenotypic ratio: \_\_\_\_\_


What is the chance that green offspring carry the blue gene? \_\_\_\_\_

**Traits are not passed alone**

In many cases, it is a \_\_\_\_\_ of genes that result in a new phenotype.

In Pacific parrotlets, the \_\_\_\_\_ mutation is actually the presence of both the \_\_\_\_\_ and the \_\_\_\_\_ mutation together.

This means the pigment \_\_\_\_\_ that would result in each color are mutated and do not function as they normally would.

Because individuals receive an allele for each gene from each parent, \_\_\_\_\_ genes would involve \_\_\_\_\_ alleles.

Two traits: Dihybrid cross

When a parrotlet shows both blue and yellow in its phenotype, a " \_\_\_\_\_ " phenotype is the result.

Cross a wild type green male who is heterozygous for blue and yellow with a female of the same genotype.

Cross a heterozygous male with a heterozygous female.

P: \_\_\_\_\_ x \_\_\_\_\_

F<sub>1</sub>:

Genotypic ratio: \_\_\_\_\_

Phenotypic ratio: \_\_\_\_\_




**What happens over generations?**

Follow the story on the presentation and use the Punnett squares below to help answer the genetics questions.

Cross these 2 cockatiels (P) to show how their chicks came to look the way they did.

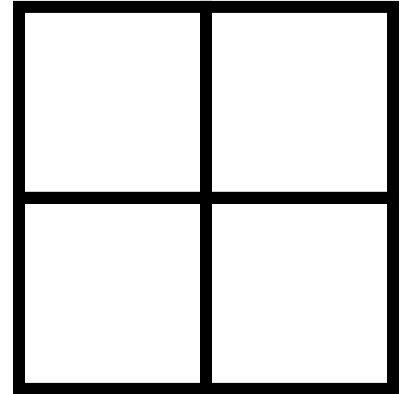
P: \_\_\_\_\_ x \_\_\_\_\_

F<sub>1</sub>:

Genotypic ratio: \_\_\_\_\_

Phenotypic ratio: \_\_\_\_\_

What percentage of the offspring may carry the pied allele? \_\_\_\_\_



Cross these 2 cockatiels (F<sub>1</sub>) to show how their chicks came to look the way they did.

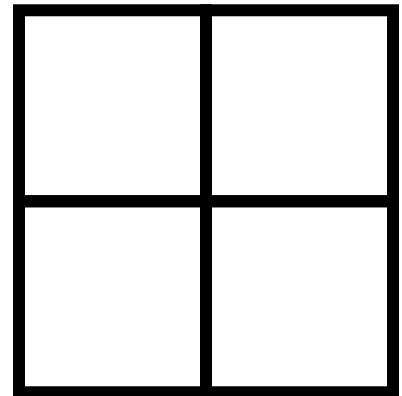
P: \_\_\_\_\_ x \_\_\_\_\_

F<sub>1</sub>:

Genotypic ratio: \_\_\_\_\_

Phenotypic ratio: \_\_\_\_\_

What percentage of the offspring may carry the pied allele? \_\_\_\_\_



Some questions to consider:

What did this pattern of inheritance over the generations tell you about the pied allele? \_\_\_\_\_

\_\_\_\_\_

If two pied cockatiels were paired, what would the offspring look like? \_\_\_\_\_

\_\_\_\_\_

