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 ____________

F₁:
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 ____________

F₁:
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 ____________

F₁:

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 ____________

F₁:

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.

<table>
<thead>
<tr>
<th>P: ____________ x ____________</th>
<th>![Punnett Square]</th>
</tr>
</thead>
</table>

F1:

Genotypic ratio: ________________________________

Phenotypic ratio: ________________________________

What percentage of the offspring may carry the pied allele? ____________

Cross these 2 cockatiels (F₁) to show how their chicks came to look the way they did.

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F1:

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? ________________________________
___________________________________________________________________________________________