

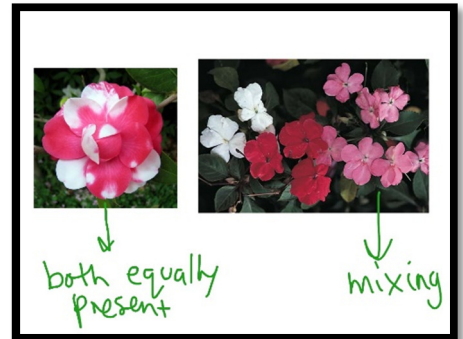
Notes: Exceptions to Mendel's Genetics

7.2

- Mendel's works only focused on either or traits.
- Not all genes show simple patterns of _____ and _____ alleles
- Genetics is more _____ in most organisms

5 Exceptions to Mendel's Genetics

- 1.
- 2.
- 3.
- 4.
- 5.



1. Incomplete Dominance (Mixing)

- One allele is not completely _____ over another
 - The heterozygous phenotype is somewhere in _____ the two homozygous
- _____
- Examples: four-o'clock flowers, betta fish

RR = _____

WW = _____

RW = _____

Practice Problem of Incomplete Dominance

A. Black Andalusian chickens have (BB) genes for feather color. White Andalusian chickens have (bb) genes for feather color. Blue Andalusian chickens have (Bb) genes for feather color. Determine the genes of offspring between one black and one white Andalusian chicken

Parent Alleles _____ x _____

Genotypes

Phenotypes

B. The flowers of snapdragons are dominant in red (RR), recessive in white (rr) and (Rr) for pink. A pure red snapdragon is crossed with a pink snapdragon. Parent Alleles _____ X _____

Genotypes

Phenotypes

2. Codominance (Two traits equally present)

- _____ alleles are _____ and contribute to the phenotype
- Example: roan cattle, appaloosa horses, _____ (AB)

Practice Problems for Codominance

A. A. In cattle, white color is determined by the gene W, red color by the gene R, the heterozygote is roan colored. Cross a roan cow with a white cow. Parent Alleles _____ x _____

Genotypes

Phenotypes

3. Multiple Alleles

- Genes that have more than _____ alleles
- No _____ can have more than _____ alleles, but more than two alleles can exist in a _____
- Examples: human blood type
- What is blood-typing?
 - Determining what _____ you are.
 - Depends on the presence or absence of specific proteins on your _____ cells.
- Governed by _____
 - _____ exist for blood types (_____)
- 4 Human blood types:
 - **A**- _____ or _____
 - **B**- _____ or _____
 - **AB**- _____
 - **O**- _____ (_____ allele)
- A and B are both dominant alleles; this another example of _____

Practice Problem for Blood Typing

A. Cross one person that is homozygous for Type A with a person that is heterozygous for Type B. Parent Alleles _____ x _____

Genotypes

Phenotypes

- Is it possible for two Type AB parents to have a type O child? _____
- Is it possible for two Type B parents to have a Type O child? _____
- Is it possible for two type O parents to have a Type A child? _____

4. Polygenic Traits

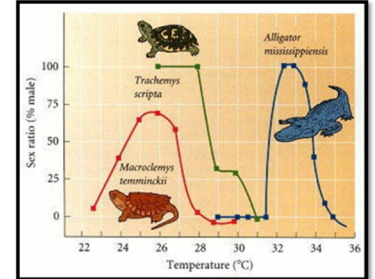
- Poly = _____
- genic = _____
- Traits are controlled by _____ or _____ genes
- Examples: eye color - ___different _____
human skin color - ___different _____

Epistatic Genes

- An _____ gene can _____ with other genes.
- Example: _____

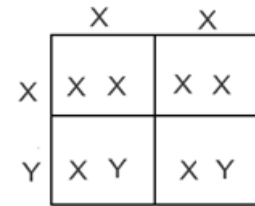
Environmental Influence

- Phenotype is a combination of _____ and _____
- Examples:
sea turtles → _____ or _____
height → amount of _____
hair color → effects of _____



5. Sex-linked Traits

- Sex-linked traits are traits that are passed through _____ located on the _____ and _____ chromosomes (_____).
- (usually the _____)
- Some classic examples are _____ and _____
- Female sex chromosomes = _____
- Male sex chromosomes = _____



Thomas Morgan

- In 1910, discovered traits linked to _____.
- Studied fruit flies
- Morgan's discoveries led to the concept of _____.
- Females are _____ of sex-linked traits if they have the _____ genotype.
 - _____ = normal carrier
- Female parents who are carriers can pass _____ traits to children, but _____ are usually the ones who _____ the trait.
- Males _____ be _____ because they only have one _____.
- _____ = normal _____ = colorblind
- More _____ than _____ show a sex-linked trait.

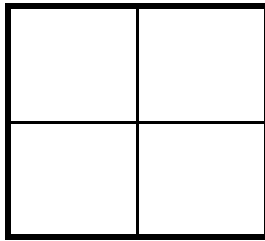
Practice Problems of Sex-linked Traits

- Working out a sex-linked trait
 - Include _____ and _____ to represent female and male
 - The allele for a trait is always shown as a _____ letter on the _____

Females	Males
$X^H X^H$ = normal	$X^H Y$ = normal
$X^H X^h$ = normal (carrier)	$X^h Y$ = hemophilia
$X^h X^h$ = hemophilia	

Morgan's Experiment

1st Cross: Red-eyed female ($X^R X^R$) x white-eyed male ($X^r Y$)

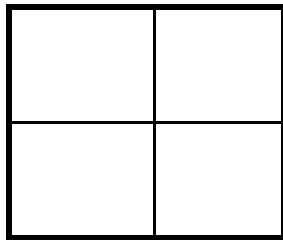


Genotypes

Phenotypes

2nd Cross: used offspring from first cross

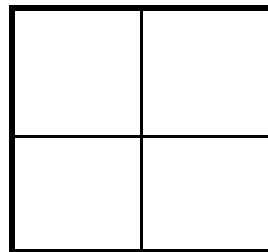
$X^R X^r$ x $X^R Y$



Genotypes

Phenotypes

A. In humans, hemophilia is a sex linked trait. Females can be normal, carriers, or have the disease. Males will either have the disease or not (but they won't ever be carriers). Not (H) having hemophilia is dominant over having (h) hemophilia. Show the cross of a man who has hemophilia with a woman who is a carrier. Parent Alleles _____ x _____

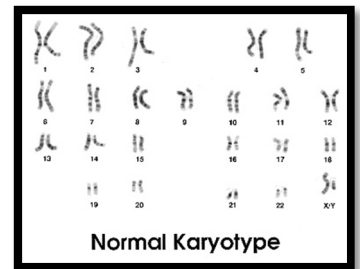


Genotypes

Phenotypes

Karyotypes

- A karyotype is a picture of all the _____ in a cell.
- Karyotypes can show _____ in chromosomes.
 - _____ or loss of chromosome
 - extra chromosomes or _____ of part of a chromosome



Pedigrees

- A pedigree chart is used to trace the _____ and _____ throughout a family.
- Boxes = _____
- Circles = _____
- Shaded shape = person shows the _____
- White shape = person _____ show trait
- Half-shaded = person is a _____

