

Name _____

Homeroom _____

Genetics and Heredity Outline

What is Genetics?

- Traits are _____.
 - Same hair color, eye color, or skin color.
- Genetics is the science of _____.
- Heredity is the study of the way _____ are passed on from _____ to _____.

Variation

- The _____ an organism inherits is determined during the life process of _____.
- More _____ (differences) are found in _____ reproduction than by _____ reproduction.
- In sexual reproduction, the offspring _____ its parents but is also _____ from them.

Species and Chromosome Number

- The _____ number (species chromosome number) is the same from _____ to generation within an _____ or species.
- Every _____ will have a different _____ number.
 - Human = _____
 - Dog = _____
 - Pea = _____
 - Crayfish = _____
 - Cat = _____
 - Fruit fly = _____

Chromosome Arrangement

- In a cell, _____ are arranged in _____.
- A photograph or chart of _____ arranged in pairs is called a _____.

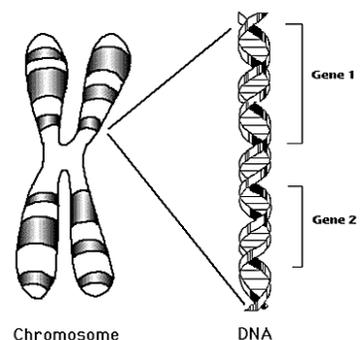
Gregor Mendel

- Today's knowledge about _____ is a result of genetic studies started by _____ in the middle 1800's.
- Because of his work, he is called the "father of _____."
- Mendel did not know about _____, but thought that certain " _____ " were responsible for _____ passed from parents to offspring.



The Gene-Chromosome Theory

- This theory states that _____ (found in the _____ of the cell) are made of small units called _____.
- Genes carry _____ information and are found at specific locations along _____.



Alleles

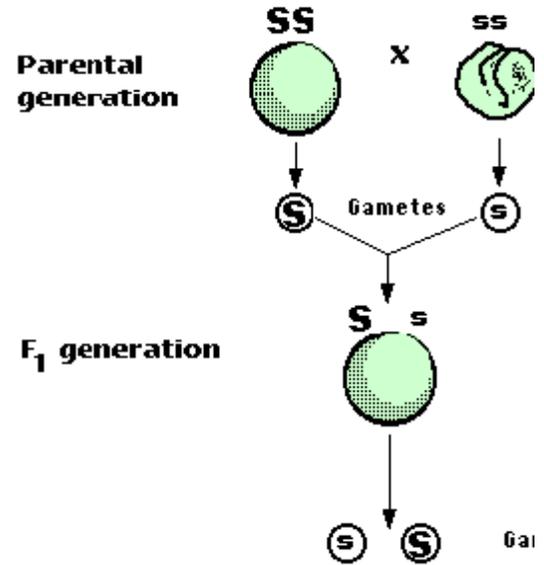
- _____ are pairs of _____ that carry the _____ traits and are found at the _____ locations on pairs of _____.
- Each chromosome may contain several hundred _____.

Inheritance of Traits

- During _____, the male and female parents each contribute genetic information (_____) to the _____ (fertilized egg).
 - One-half of its genetic information is from its _____ parent and the other _____ from its _____ parent.
- _____ traits are carried in _____.

Mendel's Experiments

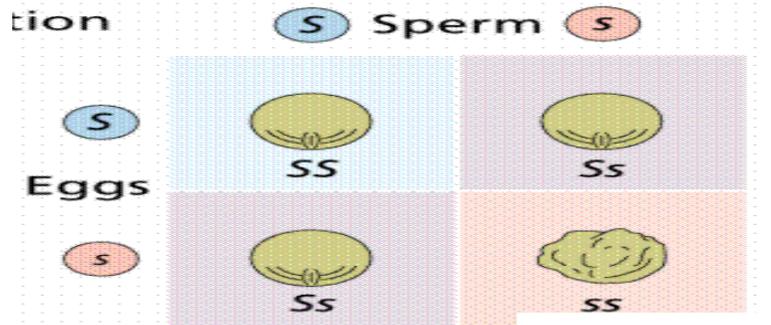
- Gregor _____ conducted _____ experiments using common garden pea plants.
- Mendel _____ (mated) large numbers of plants.
- Mendel concluded that there were _____ that always appeared (were expressed) when they were present in an organism.
- The purebred plants are called the _____ (P) generation.
- The _____ of a cross between two parent (P) generation plants are called the **first filial (F1) generation**.
- The trait that always appears when it is present is called the _____ trait.
- The trait that is hidden by the dominant trait is called the _____ trait.



Genetic Terms

- _____ Trait - Both _____ for that _____ are the _____.
- A pea plant with two genes for tallness.
- _____ Trait - Both _____ for that trait are _____ the same.
- A pea plant with one gene for tallness and one for shortness.
- _____ - The _____ makeup of an organism.
- _____ - The external _____ of an organism.
- For example, an organism that looks tall can have a genotype that is pure tall or hybrid tall. This is because whenever the dominant trait is present, the organism expresses (shows) the dominant trait.

Punnett Squares



Try This Punnett Square

In roses, red is dominant over white.

1. What letter represents the red gene?
2. What letter represents the white gene?
3. Cross two heterozygous red roses. Describe the phenotype of the offspring.

	R	r
R	RR	Rr
r	Rr	rr

A Dihybrid Cross

■ In mice, black is dominant over tan and short tails are dominant over long.

■ Write the genotype for a heterozygous black, short-tailed mouse.

- B = black**
- b = tan**
- S = short tails**
- s = long tails**

■

What are the possible gametes for this mouse?

Each gamete must have one "B" and one "S"

$$\boxed{BbSs \times BbSs}$$

	BS	Bs	bS	bs
BS				

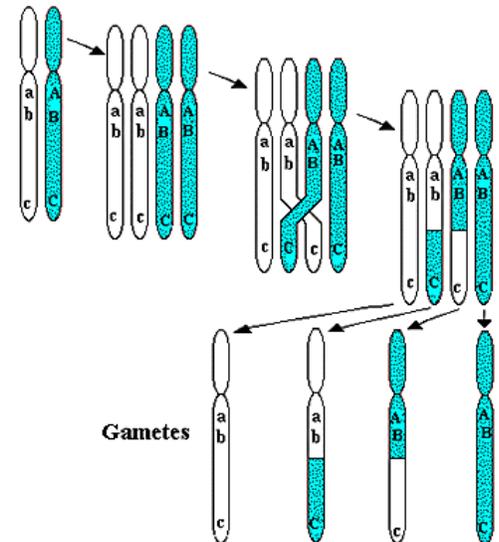
■ Describe the phenotype of the offspring.

Gene Linkage

- Today, we now know that _____ are not all inherited independently of each other.
- Scientists have found that _____ that are located on the same _____ tend to be inherited _____.
- Traits located on the same chromosome are said to show _____.

Crossing-Over

- Although linked genes are generally inherited _____, they can become separated by _____, which may occur during a stage of _____.
- During this stage, the four chromatids sometimes _____ around each other.
- As they separate, the chromatids may _____, exchange segments, and _____.



Crossing-over and recombination during meiosis

Incomplete Dominance

- Incomplete dominance or _____ inheritance occurs when the offspring shows traits that are a _____ or _____ of the two parents.

Inheritance of Sex

- Your _____ (male or female) was determined when your mother's _____ was fertilized by your father's _____.
- Humans have one pair of chromosomes, called the _____ chromosomes.
- Sex chromosomes are represented as _____ and _____.
- Egg cells have only _____ chromosomes while sperm carry either an _____ or a _____ chromosome.
- At _____, _____ X chromosomes produce a _____ (_____).
- An X chromosome and a Y chromosome produce a _____ (_____).
- In most organisms, it is the _____ that determines the sex of the offspring.

Sex-Linked Inheritance

- The Y chromosome is _____ than the X chromosome.
- Several of the genes found on the X chromosome are not found on the Y chromosome.
- The genes on the X chromosome that have no matching genes on the Y chromosome are called _____.
- Sex-linked genes are usually _____.
- Two human _____ associated with sex-linked genes are hemophilia (blood does not clot properly) and color blindness.
- Both of these disorders are more common in _____ than in females.
 - This is because the sex-linked recessive gene on the male's X chromosome is the only gene the male has for the sex-linked trait.
- A female will not have hemophilia, color blindness or any other sex-linked condition, as long as she has _____ normal gene for the trait.
 - Females who have one recessive gene for a sex-linked trait are called "_____ " for that trait.
 - That means they do not have the disorder, but they _____ the recessive gene.
 - Children of _____ can inherit the sex-linked gene

Sex-Linked Inheritance

