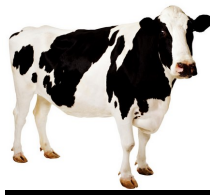


# 6F Inheritance Patterns



# Non-Mendelian Inheritance

**In:** Line up the the back of the classroom from tallest to shortest. Do you think height is only carried in one set of genes? We will discuss as a class.

**Polygenic Traits:** the inheritance pattern is controlled by \_\_\_\_\_ genes each with two alleles.

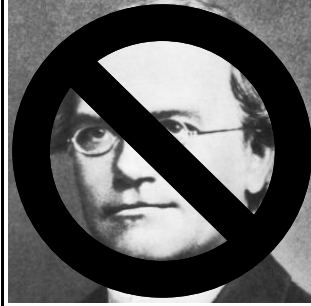
**Examples:** hair color, hair texture, foot size, etc. **Write down any other traits you can think of that may be polygenic.**

## Non-Mendelian Inheritance

**Definition:**

**Examples:**

1. Polygenic Traits
2. Incomplete Dominance
3. Codominance
4. Multiple Alleles Traits
5. X-Linked Traits



## Incomplete Dominance

**Definition:**

Cross a red four o'clock flower (RR) with a white four o'clock flower (WW). What color will the offspring be?


## Codominance

**Definition:**

Cross a black cow (BB) with a white bull (WW). What color will the calves be?

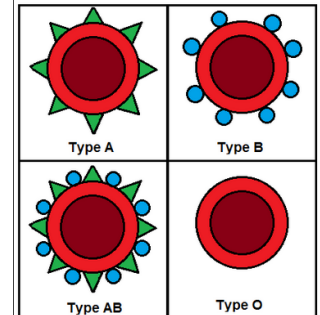

## Multiple Alleles Traits

**Definition:** Traits are determined by more than two alleles.

**Example: Blood Types**  
Human blood types are an example of both multiple alleles traits and codominance.

A heterozygous type A mother has a child with a heterozygous type B father. Could their child have type O blood?

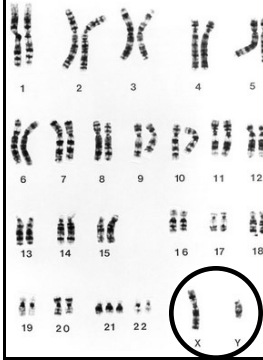
Blood Type	Genotype	Can Receive Blood From:
A	$I^A I^A$ or AA, $I^A i$ or AO	A or O
B	$I^B I^B$ or BB, $I^B i$ or BO	B or O
AB	$I^A I^B$ or AB	A, B, AB, O
O	ii or OO	O

## X-Linked (or Sex-Linked) Traits

**Definition:**

A hybrid normal mother ( $X^C X^c$ ) has children with a colorblind father ( $X^c Y$ ). What percentage of the possible male offspring will be colorblind?




**Out:** With a T-chart or Venn diagram, compare and contrast Mendelian and Non-Mendelian Traits. (At least three differences/similarities!)

# 6F Inheritance Patterns



# Non-Mendelian Inheritance Practice

## Polygenic Traits:

Skin color in humans is **Polygenic**. If **A, B, C, and D** all promote **skin pigment (darkness)**; while **a, b, c, and d** **DO NOT** promote **skin pigmentation**; list the letters of the following genotypes in order from **DARKEST** to **LIGHTEST** skin color.

- a. AaBBCcDd
- b. aabbCcdd
- c. AABbCcDD
- d. AabbccDd
- e. AABbccDd
- f. AABBCcDD

List from Dark to Light:

## Incomplete Dominance:

In ground hogs, Brown (B) is **incompletely dominant** to white (B<sup>1</sup>).

What will be the phenotype of heterozygous individuals?

Cross 2 heterozygous ground hogs.


Genotypic Ratio:

Phenotypic Ratio:

## Codominance:

In parrots, Blue (B) is **codominant** with Yellow (Y).

What will be the phenotype of heterozygous individuals?

Cross a Blue parrot with a heterozygous parrot.


Genotypic Ratio:

Phenotypic Ratio:

## Multiple Alleles Traits:

**BLOOD MYSTERY!** First, we have to pick a random female famous person and a random male famous person.  
Female: \_\_\_\_\_ Male: \_\_\_\_\_

\_\_\_\_\_ (F) and \_\_\_\_\_ (M) have a son with type O blood. If \_\_\_\_\_ (M) has homozygous type A blood, while \_\_\_\_\_ (F) has type O blood, can they really be this child's parents? Solve/Prove it with a cross!


Genotypic Ratio:

Phenotypic Ratio:

Is he the father of the child?

## X-Linked (AKA Sex-Linked) Traits:

Hemophilia is a blood disorder in which a person's blood cannot form clots correctly, meaning even small injuries can result in dangerous blood loss.

$X^H X^H$  = female, normal

$X^H X^h$  = female, carrier

$X^h X^h$  = female, hemophiliac

$X^H Y$  = male, normal

$X^h Y$  = male, hemophiliac

Show the cross of a man who has hemophilia with a woman who is a carrier.


Genotypic Ratio:

Phenotypic Ratio:

What percentage of possible male offspring will have hemophilia?