Name _____

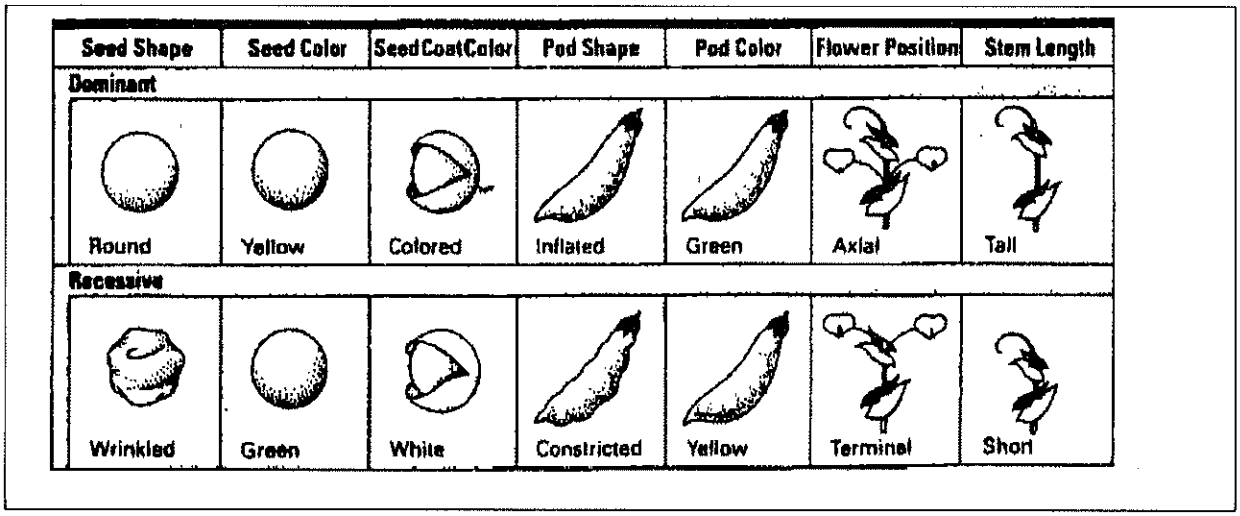
Heredity & Mendelian Genetics

Heredity -the passing of traits from parent to offspring

Genetics -the science that studies the laws of heredity

"Father of Genetics"- Gregor Mendel -an Austrian monk who studied the passing of traits in many organisms, especially the garden pea plant. (He published his results in 1866, but scientists did not understand his work. When his work was rediscovered in 1900 it formed the basis for a new branch of science called Genetics.) Mendel chose to study pea plants because they had traits that were easy to tell apart, only 2 very different forms of a gene (never a mixture of the two).

Allele -different forms a gene may have for a trait



Pure -refers to an organism or cell in which the alleles for a pair of traits are **identical**

Ex. RR=round rr=wrinkled TT=tall tt=short

Mendel cross pollinated pea plants to observe results when he crossed two different alleles.

Ex- Pure tall plant (TT) x Pure short plant (tt) **A tool called the** Punnett Square **is used to predict the results.**

TT x tt

	T	T
t	Tt	Tt
t	Tt	Tt

(4/4)

Results: 100% (ALL) of the offspring from pure parent plants only show ONE of the alleles of the trait. This is called hybrid or heterozygous.

Although one of each allele is present in the offspring's genes, only one of the traits will show up, the other will be masked or hidden.

Dominant -the form of the trait that appears to dominate or "show up" (and masks the other form)

Recessive -the form of the trait that can be hidden or "masked" by the dominant trait

Mendel decided to allow the offspring (all hybrids) to self-pollinate. What did he get?

Tt x Tt

	T	t
T	TT	Tt
t	Tt	tt

Results:

TT : (1/4) 25 %

Tt : (2/4) 50 %

tt : (1/4) 25 %

Genetic Symbols

Use the FIRST letter of the dominant trait.

DOMINANT trait = capital letter RECESSIVE trait = lower case letter

***ALWAYS use the **SAME** letter for the trait (only vary the ALLELE for the trait with capital or lower case letters).

Homozygous or "PURE" = same letters exactly

Ex- (TT, gg, bb, RR)

Heterozygous or "HYBRID" = different letters (one capital, the other lower case)

Ex- (Tt, Gg, Bb, Rr)

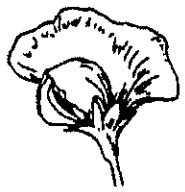
The only time a **recessive** trait will appear (or be expressed in an organism) is when it is pure /homozygous. Ex- (tt, gg, bb, rr)

Any time the **dominant** form of the trait (dominant allele) is present in the organism, it will show up.

When results are recorded, scientists use two pieces of data:

Genotype - the actual genetic makeup of the alleles (the "letters")

Ex- (Rr, BB, Gg, rr)

Phenotype - what the organism looks like (the "words")

Ex- (Round, Blue, Green, Wrinkled)