CONCEPT: OVERVIEW OF INTERACTING GENES

● Genetics is very rarely clear cut, as many traits exist on a _____ (ex: height or weight)

□ **Polygenic** describes traits controlled through multiple traits

- Often the expression is continuous (ex: height)

EXAMPLE:

Assume there are two genes (P1 and P2) that both determine a plant's color (purple).

P1/p1/P2/p2 x P1/p1/P2/p2

You get four offspring outcomes

1.	Homozygous or Heterozygous dominant for both genes	P1/-/ P2/-	2 doses
2.	Homozygous or heterozygous dominant for gene 1	P1/-/ p2/-	1 dose
3.	Homozygous or heterozygous dominant for gene 2	p1/-/ P2/-	1 dose
4.	Homozygous recessive for both gene 1 and gene 2	p1/-/ p2/-	0 doses

□ Multiple genes can interact, causing very different phenotypic effects

- **Pleiotropy:** describes when a single gene has multiple effects on the phenotype of an organism

- Variations of Dominance: describes multiple ways a dominant allele can effect the phenotype

- Epistasis: is the interaction of two different genes and how the interaction effects the phenotype

- Penetrance: is the percentage of individuals with a given allele who exhibit the phenotype

- **Expressivity:** measures the degree to which a given allele is expressed at a phenotypic level

PRACTICE:

1. Which of the following terms describes an interaction between two genes?
    a. Penetrance
    b. Pleiotropy
    c. Incomplete dominance
    d. Epistasis

2. Polygenic traits are controlled through which of the following ways.
    a. Multiple alleles for one gene
    b. Multiple genes
    c. Epistasis
    d. Penetrance

3. True or false: Polygenic traits are usually continuous traits?
    a. True
    b. False