

## Independent Assortment of Chromosomes

Biology I

Name \_\_\_\_\_

Meiosis provides the mechanism by which traits carried on separate chromosomes can assort *independently*, resulting in the variety of traits we can observe in siblings of the same parents.

In this exercise, you will assort gametes produced by genotypes. If only a single trait is considered, this is simple:

Example: genotype Bb – 50% of gametes will carry the B allele  
50% of gametes will carry the b allele

genotype BB - 100% of gametes will carry the B allele

If 2 or more traits are considered, we must consider slightly more complex possibilities for how the alleles will assort into gametes.

Example: genotype Aa Bb assort gametes as follows: 

$\frac{1}{4}$  AB,  $\frac{1}{4}$  Ab,  $\frac{1}{4}$  aB,  $\frac{1}{4}$  ab

Assort the gametes produced by the following genotypes. Use arrows to show the various combinations and give ratios of each kind of gamete produced.

1. Bb Cc

2. Tt Gg

3. Cc bb

4. RR gg

5. rr Gg

6. tt Ww

7. ++ Nn

8. tt rr

9. Vv nn

Tall stem is dominant to dwarf stem and red flower is dominant to white flower. Determine the kind of gametes that each of the following individuals can produce.

1. homozygous tall – heterozygous red

2. heterozygous tall – white

3. dwarf – white

4. hybrid tall – true-breeding red

1. For each genotype below, indicate whether it is heterozygous (**He**) or homozygous (**Ho**)

AA \_\_\_\_\_

Ee \_\_\_\_\_

Ii \_\_\_\_\_

Mm \_\_\_\_\_

Bb \_\_\_\_\_

ff \_\_\_\_\_

Jj \_\_\_\_\_

nn \_\_\_\_\_

2. For each of the **genotypes** below determine what **phenotypes** would be possible.

*Purple flowers are dominant to white flowers.*

PP \_\_\_\_\_

Pp \_\_\_\_\_

pp \_\_\_\_\_

*Round seeds are dominant to wrinkled seeds.*

RR \_\_\_\_\_

Rr \_\_\_\_\_

rr \_\_\_\_\_

*Brown eyes are dominant to blue eyes*

BB \_\_\_\_\_

Bb \_\_\_\_\_

bb \_\_\_\_\_

*Bobtails in cats are recessive.*

TT \_\_\_\_\_

Tt \_\_\_\_\_

tt \_\_\_\_\_

3. For each **phenotype** below, list the **genotypes** (remember to use the letter of the dominant trait)

*Straight hair is dominant to curly. Pointed heads are dominant to round heads.*

\_\_\_\_\_ straight

\_\_\_\_\_ pointed

\_\_\_\_\_ straight

\_\_\_\_\_ pointed

\_\_\_\_\_ curly

\_\_\_\_\_ round