

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Genetics Practice 2: Dihybrid Crosses**

1. Tall plants (T) are dominant to dwarf plants (t). Purple flowers (P) are dominant to white flowers (p). Cross a homozygous dominant parent with a homozygous recessive parent.


Probability of producing tall/purple plants?

Possible genotypes?

Probability of dwarf/white plants?

Possible genotypes?

Probability of tall/white plants?

Probability of dwarf/purple flowers?

Possible genotypes?

Possible genotypes?

2. Black guinea pigs (B) are dominant to white guinea pigs (b). Rough fur (R) is dominant to smooth fur (r). Cross a heterozygous parent with a heterozygous parent.


Probability of black/rough guinea pigs?

Possible genotypes?

Probability of black/smooth guinea pigs

Possible genotypes?

Probability of white/rough guinea pigs?

Probability of white/smooth guinea pigs?

Possible genotypes?

Possible genotypes?

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3. A tall pea plant with terminal flowers (flowers on the ends of the stems) is crossed with a short plant that has axial flowers. All 72 offspring are tall with axial flowers. This is a dihybrid cross with the height and flower position traits showing independent assortment.
  - a. Name the dominant and recessive alleles.
  - b. Give the genotypes of the parents and offspring in this cross.
  - c. Predict the F<sub>2</sub> offspring when the tall-axial F<sub>1</sub> plants are allowed to self-pollinate.
  
4. Suppose a white, straight-haired guinea pig mates with a brown, curly-haired animal. All five babies in their first litter have brown fur, but three are curly and two have straight hair. The second litter consists of six more brown offspring, where two are curly and four are straight haired.
  - a. Assuming curly is dominant to straight, what are the genotypes of the parents and the offspring?
  - b. What is the probability of getting two female guinea pigs with straight hair in a row?
  
5. About 55% of Americans get a bitter taste from the substance called phenylthiocarbamide (PTC). It is tasteless to the rest. The "taster" allele is dominant to non-taster. Also, normal skin pigmentation is dominant to albino. A normally pigmented woman who is taste-blind for PTC has an albino-taster father. She reproduces with an albino man who is a taster, though the man's mother is a non-taster. Show the expected offspring of this couple.
  
6. In pigeons, the checkered pattern is caused by a dominant allele. A plain (non-checkered) pattern is recessive. Red color is also caused by a dominant allele and brown color by a recessive allele.
  - a. Show the expected offspring of a cross between a homozygous checkered red bird and a plain brown one. Carry out this cross through the F<sub>2</sub> generation.
  - b. Carry out to the F<sub>2</sub> generation a cross between a homozygous plain red bird and its homozygous checkered brown mate.
  - c. A plain brown female pigeon laid five eggs. The young turned out to be 2 plain red, 2 checkered red, and 1 checkered brown. Describe the father pigeon. Give the genotypes.