

Name: _____

Date: _____

Simpsons Genetic Probability Worksheet- Complex Patterns of Inheritance

There are four Punnett square problems featured below. You will be graded on both filling in the Punnett square as well as filling in the correct answer next to the multiple choice questions after each problem.

Problem One: Incomplete Dominance

Homer has decided he wants to go into the dog breeding business and wants to use Santa's Little Helper. Santa's Little Helper is heterozygous light brown (BB'), a combination of dark brown (B) and white (B'). Homer wants to get puppies that are dark brown, light brown and white and has two choices of dogs he can mate with Santa's Little Helper: Penelope, who is also light brown (BB') or Samantha, who is white ($B'B'$). Create Punnett Squares for each dog to help Homer figure out the answer.

Penelope

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Samantha

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2. Which dog would be best to mate with Santa's Little Helper to get the most different colored puppies?
- a. Penelope b. Samantha c. Neither one d. Either one (same odds)

Problem Two: Codominance

Itchy and Scratchy created two brand new breeds of flowers: one lime green (GG) and one bright orange (OO). Green is codominant with orange. Itchy and Scratchy know that because of codominance, if they cross these two plants, the flowers should be both green and orange. If they cross these two plants, how many will be both green and orange if they grow ten plants?

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| | |

Itchy & Scratchy



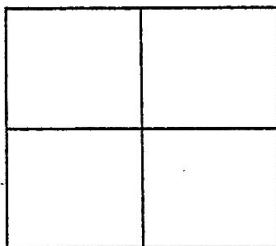
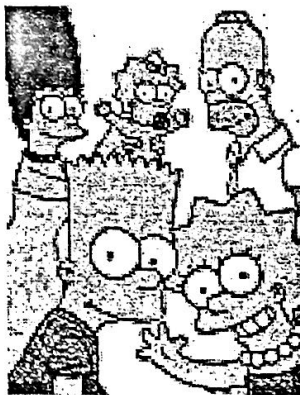
3. How many out of 10 will be orange and green?
- a. 0 b. 5 c. 7 d. 10

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Problem Three: Multiple Alleles

Mr. Burns is in desperate need of a blood transfusion but unfortunately has the rare blood type OO and needs a donor that is also OO. He offers a reward to anyone who could help him (enter Homer). Homer knows unfortunately that his blood type is heterozygous type A (AO) and that Marge is heterozygous type B (BO). What is the probability that one of the Simpson's children will have the blood type to match Mr. Burns?



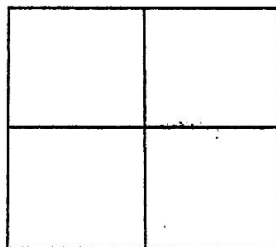
4. What is the likelihood that one of the Simpson children has the OO blood type?

- a. 0% b. 25% c. 50% d. 75%

Problem Four: Sex-linked Traits

Dr. Hibbert is treating a young Springfield couple who are having a child. The parents are worried that since the mom is a carrier for the disorder of color blindness (XX^c), which is linked only to the female sex chromosome X^c , that the child will have color blindness as well. The father does not have color blindness (XY) which is the dominant gene. What are the odds that the child will NOT have color blindness?

X = no color blindness (dominant)
 X^c = color blindness (recessive)



5. What are the odds that their child will not be color blind?

- a. 0% b. 25% c. 50% d. 75%