

GENETICS PRACTICE

PART #1: USING VOCABULARY

*For each genotype, tell whether or not it is HE (heterozygous) or HO(homozygous)

BB _____ CC _____ EE _____ Rr _____

Ee _____ Zz _____ FF _____ tt _____

Gg _____ HH _____ rr _____ TT _____

*What is another name for the heterozygous genotypes? _____

*What is another name for the homozygous genotypes? _____

PART #2: Genotypes → Phenotypes

*Remember, a phenotype is what a 5 year old can tell you

*For the phenotypes below, give a genotype

*Remember, we usually use the letter of the dominant trait

A. In pea plants, purple flowers are dominant to white flowers

PP _____

Pp _____

pp _____

B. Short pea plants are recessive to tall pea plants

TT _____

Tt _____

tt _____

C. In fruit flies, the allele for long wings is dominant to the allele for short wings

WW _____

Ww _____

ww _____

D. In cats, the bobtail condition is recessive to the normal tail condition

TT _____

Tt _____

tt _____

PART #3: Phenotypes → Genotypes

A. Short hair is dominant to long hair Short _____ or _____, Long _____

B. Hitchhiker's thumb is dominant to normal Hitchhiker _____ or _____

C. Non-tongue rolling is recessive to tongue rolling Non-tongue rolling _____

D. Free earlobes are dominant to attached Free _____ or _____, Attached _____

E. PKU is a recessive genetic disorder (use P) Normal _____ or _____, PKU _____

PART #4: PUNNETT SQUARES (Show all work)

A. Cystic Fibrosis is a genetic disorder. A recessive allele causes CF so the only way a child could have CF is to be homozygous recessive. A healthy man and woman have a child with cystic fibrosis. Identify genotypes for this trait for both the parents and the child.

B. Patrick, SpongeBob's friend, is pink. In starfish like Patrick, pink color is dominant to yellow. If Patrick is homozygous pink and he marries his high school sweetheart Penny who is yellow, what are the chances of them having a pink child?

C. Two hamsters, Honey and Ritz, are about to have babies. Honey is heterozygous brown (Bb) and Ritz is a handsome black (bb) hamster. What are the possible genotypes **and** phenotypes for their babies?

D. In dogs, the allele for spotted coat (S) is dominant over the allele for a solid coat (s). Suppose you own a male dog with a spotted coat and a female with a solid coat. You allow them to mate. Calculate the probability that the first offspring would have a solid coat. Hint: think about all possible scenarios.

E. Everybody in Greg Grasshopper's family is green, which is dominant for grasshoppers. His family is rather stuck up and always brags that they are purebreds. Last month, he married a beautiful gray grasshopper, which is the recessive trait. What are the chances of having a child that is green? Would Greg's children keep the purebred line "alive?"

F. In Oompah Loompahs, blue face is dominant to orange face. If two heterozygous Oompahs have children, what proportion of the offspring would have orange faces?

G. Lanny lobster and his beautiful wife Laura just had several babies. They both have long antennae. When they got home with their 20 children, they noticed that one of them had short antennae. They call to the hospital and complain saying the hospital made a mistake, the hospital says no... the drama continues. Can you solve this? Did the hospital make a mistake?? (Lanny is homozygous, Laura is heterozygous, use A) Be able to prove your answer!

H. Oompah Loompahs can have red, blue or purple hair. Purple hair results from the heterozygous condition. Is this an example of codominance or incomplete dominance? _____ If two purple haired Oompah's have children, what are the chances that they might have one with red hair?

I. In a certain breed of cattle, the heterozygote is Roan (both red and white hairs on one individual). Is this codominance or incomplete dominance? _____ If a roan bull was mated with a roan cow, how many calves would be roan?

PART #5: ADVANCED-DIHYBRID CROSSES

A.) In pea plants, yellow peas are dominant to green and round peas are dominant to wrinkled. If a pea plant with yellow round peas (YYRR) is crossed with a pea plant that has yellow wrinkled peas (YYrr), what are the possible phenotypic ratios?

B.) In llamas, floppy ears are dominant to pointy ears and bowlegs are recessive. *(use this info to answer the next few questions)* A llama with floppy ears (Ff) and bowlegs is crossed with one that is heterozygous for both traits. Show the genotypes of the two parents.

C.) Referring to B: draw a Punnett square to show resulting offspring of that cross.

D.) A llama that is heterozygous for both traits is crossed with another llama that is heterozygous for both traits. What are the genotypes of the two parents?

E.) Referring to D: using a Punnett square, determine the phenotypic ratios of the cross