**Name** _____ **Date** _____ **Per** _____

# Basic Genetics Practice Problems

**1. Match the term with the correct definition.**

A. **Dominant Trait**
B. **Recessive Trait**
C. **Genotype**
D. **Phenotype**
E. **Gene**
F. **Allele**

_____ Portion of DNA which codes for a protein, which leads to a trait.

_____ The *different forms of a gene*, represented by letters.

_____ The trait which appears in the F1 hybrid generation.

_____ The trait which is "hidden" in the F1 generation.

_____ The genetic makeup of an organism (BB, Pp, ff)

_____ The physical expression of alleles (Brown hair, blue eyes).

**2. For each genotype, indicate whether it is heterozygous (HE) or homozygous (HO)**

AA _____ Bb _____ cc _____ DD _____ Ee _____

ff _____ Gg _____ HH _____ Ii _____ jj _____

**3. For each of the genotypes below, determine the phenotype, using the given information.**

*Purple flowers are dominant to white flowers*

**PP** _____

**Pp** _____

**pp** _____

*Brown eyes are dominant to blue eyes*

**BB** _____

**Bb** _____

**bb** _____

*Green seeds are dominant to yellow*

**GG** _____

**Gg** _____

**gg** _____

*Freckles are dominant to no freckles*

**FF** _____

**Ff** _____

**ff** _____

**4. For each phenotype, list ALL possible genotypes. (Remember to use the letter of the dominant trait)**

*Straight hair is dominant to curly hair*

_____ **Straight hair**

_____ **Curly hair**

*Widow's peak is dominant to normal hairline*

_____ **Widow's peak**

_____ **Normal hairline**

**5. Set up the punnett square for each of the crosses listed below. The characteristic being studied is seed texture - round seeds (dominant) and wrinkled seeds (recessive).**

Rr x rr

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|---|---|
| | |

What percentage of the offspring would you expect be round? _____

Wrinkled? _____

Rr x Rr

| | |
|---|---|
| | |

What percentage of the offspring would you expect be round? _____

Wrinkled? _____

RR x Rr

| | |
|---|---|
| | |

What percentage of the offspring would you expect be round? _____

Wrinkled? _____

## Complete the punnett squares below using the given information.

**6. A TT (tall) plant is crossed with a tt (short plant).**

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**Which trait is dominant? _____**
**Give the expected probabilities for each genotype and phenotype.**

**TT: _____%** **Tt: _____%** **tt: _____%**

**Tall: _____%** **Short: _____%**

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**7. A hybrid tall (Tt) plant is crossed with a hybrid (Tt) plant. Give the expected probabilities for each genotype & phenotype.**

**8. A heterozygous round seeded plant (Rr) is crossed with a homozygous round seeded plant (RR). Give the expected probabilities for each genotype and phenotype.**

**9. A homozygous round seeded plant is crossed with a homozygous wrinkled seeded plant. What are the genotypes of the parents?**

**_____ x _____**

**What percentage of the offspring will also be homozygous? _____%**

**10. In pea plants purple flowers are dominant to white flowers. If two white flowered plants are crossed, what percentage of their offspring will be white flowered? _____%**

**11. A white flowered plant is crossed with a plant that is heterozygous for the trait. What percentage of the offspring will have purple flowers? _____%**

**12. Two plants, both heterozygous for the gene that controls flower color are crossed. Give the expected RATIOS for each genotype and phenotype.**

**Phenotype Ratio - _____ : _____**

**Gentoype Ratio - _____ : _____ : _____**

**13. In guinea pigs, the allele for short hair is dominant over long hair. Two short haired guinea pigs are mated several times. Out of 100 offspring, 25 of them have long hair.**

**What are the probable genotypes of the parents?**

**_____ x _____ (Show the cross to prove it!)**

**Use the information for SpongeBob's traits to answer the questions that follow.**

**14. Everyone in Squidward's family has light blue skin, which is the dominant trait for body color in his hometown of Squid Valley. His family brags that they are a "purebred" line. He recently married a nice girl who has light green skin, which is a recessive trait. Create a Punnett square to show the possibilities that would result if Squidward and his new bride had children.**

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**Give the expected RATIOS for each genotype and phenotype.**

**Phenotype Ratio - _____ : _____** **Gentoype Ratio - _____ : _____ : _____**

**Would Squidward's children still be considered purebreds? Explain.**

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| | |

**7. Assume that one of Squidward's sons married a girl that is heterozygous for her light blue skin.. Create a Punnett square to show the possibilities that would result if they had children.**

**Give the expected RATIOS for each genotype and phenotype.**

**Phenotype Ratio - _____ : _____**

**Gentoype Ratio - _____ : _____ : _____**

**8. Mr. Krabbs and his wife recently had a Lil' Krabby, but it has not been a happy occasion for them. Mrs. Krabbs has been upset since she first saw her new baby who had short eyeballs. She claims that the hospital goofed and mixed up her baby with someone else's baby. Mr. Krabbs is homozygous for his tall eyeballs, while his wife is heterozygous for her tall eyeballs. Some members of her family have short eyes, which is the recessive trait.**

| | |
|---|---|
| | |
| | |

**Give the expected RATIOS for each genotype and phenotype.**

**Phenotype Ratio - _____ : _____**

**Gentoype Ratio - _____ : _____ : _____**

**Did the hospital make a mistake? Defend your answer with an explanation.**