**Genetics Practice Problems Worksheet**

# Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period:\_\_\_\_\_\_\_

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

|  |  |  |  |
| --- | --- | --- | --- |
| AA \_\_\_\_\_ | Ee \_\_\_\_ | Ii \_\_\_\_\_ | Mm \_\_\_\_\_ |
| Bb \_\_\_\_\_ | ff \_\_\_\_ | Jj \_\_\_\_\_ | nn \_\_\_\_\_ |
| Cc \_\_\_\_\_ | Gg \_\_\_\_ | kk \_\_\_\_\_ | oo \_\_\_\_\_ |
| DD \_\_\_\_\_ | HH \_\_\_\_ | LL \_\_\_\_\_ | Pp \_\_\_\_\_ |

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

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

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| *Straight hair is dominant to curly.*  \_\_\_\_ straight  \_\_\_\_ straight  \_\_\_\_ curly | *Pointed heads are dominant to round heads.*  \_\_\_\_\_ pointed  \_\_\_\_\_ pointed  \_\_\_\_\_ round |

4.  Set up the Punnett squares for each of the crosses listed below. *Round seeds are dominant to wrinkled seeds.*

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| Rr x rr | |  |  | | --- | --- | |  |  | |  |  | | What percentage of the offspring will be round? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  What percentage will be wrinkled? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  What percentage of the offspring will be homozygous? \_\_\_\_\_\_\_\_\_\_  What percentage of the offspring will be heterozygous? \_\_\_\_\_\_\_\_\_\_ |
| RR x rr | |  |  | | --- | --- | |  |  | |  |  | | What percentage of the offspring will be round? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  What percentage will be wrinkled? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  What percentage of the offspring will be homozygous? \_\_\_\_\_\_\_\_\_\_  What percentage of the offspring will be heterozygous? \_\_\_\_\_\_\_\_\_\_ |
| RR x Rr | |  |  | | --- | --- | |  |  | |  |  | | What percentage of the offspring will be round? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  What percentage will be wrinkled? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  What percentage of the offspring will be homozygous? \_\_\_\_\_\_\_\_\_\_  What percentage of the offspring will be heterozygous? \_\_\_\_\_\_\_\_\_\_ |
| Rr x Rr | |  |  | | --- | --- | |  |  | |  |  | | What percentage of the offspring will be round? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  What percentage will be wrinkled? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  What percentage of the offspring will be homozygous? \_\_\_\_\_\_\_\_\_\_  What percentage of the offspring will be heterozygous? \_\_\_\_\_\_\_\_\_\_ |

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| **Practice with Crosses.  Show all work!**   |  |  | | --- | --- | |  |  | |  |  |   5.  A TT (tall) plant is crossed with a tt (short plant).   * What percentage of the offspring will display the tall phenotype?  \_\_\_\_\_\_ * What percentage of the offspring will display the short phenotype?  \_\_\_\_\_ * What percentage of the offspring will be homozygous? \_\_\_\_\_\_ * What percentage of the offspring will be heterozygous? \_\_\_\_\_\_  |  |  | | --- | --- | |  |  | |  |  |   6.  A Tt plant is crossed with a Tt plant.   * What percentage of the offspring will display the tall phenotype?  \_\_\_\_\_\_ * What percentage of the offspring will display the short phenotype?  \_\_\_\_\_ * What percentage of the offspring will be homozygous? \_\_\_\_\_\_\_ * What percentage of the offspring will be heterozygous? \_\_\_\_\_\_   7.  A heterozygous round seeded plant (Rr) is crossed with a homozygous round seeded plant (RR).   * What percentage of the offspring will display the round seed phenotype?  \_\_\_\_\_\_  |  |  | | --- | --- | |  |  | |  |  |  * What percentage of the offspring will display the wrinkled seed phenotype?  \_\_\_\_\_ * What percentage of the offspring will be homozygous? \_\_\_\_\_\_\_ * What percentage of the offspring will be heterozygous? \_\_\_\_\_\_   8.  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?  \_\_\_\_\_\_\_ * What percentage of the offspring will also be heterozygous?  \_\_\_\_\_\_\_ * What is the phenotypic ratio for the offspring? \_\_\_\_\_\_\_\_\_\_\_\_\_  |  |  | | --- | --- | |  |  | |  |  |   9.  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?  \_\_\_\_\_\_   * What were the parent’s genotypes? \_\_\_\_\_\_X\_\_\_\_\_\_\_ * What is the genotypic ratio for the offspring? \_\_\_\_\_\_\_\_\_\_  |  |  | | --- | --- | |  |  | |  |  |   10.  A white flowered plant is crossed with a plant that is heterozygous for the trait.   * What were the parent’s genotypes? \_\_\_\_\_\_X\_\_\_\_\_\_\_ * What is the genotypic ratio for the offspring? \_\_\_\_\_\_\_\_\_\_ * What percentage of the offspring will have purple flowers? \_\_\_\_\_\_\_\_\_\_\_  |  |  | | --- | --- | |  |  | |  |  |   11. Two plants, both heterozygous for the gene that controls flower color are crossed.   * What were the parent’s genotypes? \_\_\_\_\_\_X\_\_\_\_\_\_\_ * What is the genotypic ratio for the offspring? \_\_\_\_\_\_\_\_\_\_ * What percentage of their offspring will have purple flowers?  \_\_\_\_\_\_\_\_ * What percentage will have white flowers?  \_\_\_\_\_\_\_\_\_\_\_   12.  In guinea pigs, the allele for short hair is dominant.   |  |  | | --- | --- | |  |  | |  |  |  * What genotype would a heterozygous short haired guinea pig have? \_\_\_\_\_ * What genotype would a homozygous short haired guinea pig have? \_\_\_\_\_\_\_ * What genotype would a long haired guinea pig have? \_\_\_\_\_\_\_\_\_\_\_\_\_ * What is the phenotypic ratio for the offspring? \_\_\_\_\_\_\_\_\_\_\_\_\_ * What percentage of the offspring will have short hair?  \_\_\_\_\_\_\_\_ * What percentage of the offspring will have long hair?  \_\_\_\_\_\_\_  |  |  | | --- | --- | |  |  | |  |  |   13. Show the cross for a pure breeding of a shorthaired guinea pig and a longhaired guinea pig.   * What is the phenotypic ratio for the offspring? \_\_\_\_\_\_\_\_\_\_\_\_\_ * What percentage of the offspring will have short hair?  \_\_\_\_\_\_\_\_ * What percentage of the offspring will have long hair?  \_\_\_\_\_\_\_  |  |  | | --- | --- | |  |  | |  |  |   14. Show the cross for two heterozygous guinea pigs.   * What were the parent’s genotypes? \_\_\_\_\_\_X\_\_\_\_\_\_\_ * What is the genotypic ratio for the offspring? \_\_\_\_\_\_\_\_\_\_ * What is the phenotypic ratio for the offspring? \_\_\_\_\_\_\_\_\_\_\_\_\_ * What percentage of the offspring will have short hair?  \_\_\_\_\_\_\_\_ * What percentage of the offspring will have long hair?  \_\_\_\_\_\_\_   15. 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! |
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