Simple Genetics Practice Problems

This worksheet will take about 20 minutes for most students. I usually give it to them after a short lecture on solving genetics problems. I don't normally take a grade on it, instead just monitor progress of students as they work and then have them volunteer to write the answers #5-15 on the board.

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

- AA __
- Bb __
- Cc __
- Dd __
- Ee __
- ff __
- Gg __
- Hh __
- Ii __
- Jj __
- Kk __
- Ll __
- Mm __
- Nn __
- Oo __
- Pp __

2. For each of the genotypes below, determine the phenotype.

**Purple flowers are dominant to white flowers**
- PP ______
- Pp ______
- pp _____

**Brown eyes are dominant to blue eyes**
- BB ______
- Bb ______
- bb ____

**Round seeds are dominant to wrinkled**
- RR ______
- Rr ______
- rr _____

**Bobtails are recessive (long tails dominant)**
- TT ______
- Tt ______
- tt _____

3. For each phenotype, list the genotypes. (Remember to use the letter of the dominant trait)

**Straight hair is dominant to curly.**
- SS ______
- Ss ______
- ss _____

**Pointed heads are dominant to round heads.**
- PP _____
- Pp _____
- pp _____

4. Set up the square for each of the crosses listed below. The trait being studied is round seeds (dominant) and wrinkled seeds (recessive)

- Rr x rr

- Rr x Rr

- RR x Rr
Practice with Crosses.

I've only included a couple of squares as samples here, most of these are very straightforward. Given enough practice, students will learn to do most of them without the squares.

5. A TT (tall) plant is crossed with a tt (short plant).
What percentage of the offspring will be tall? ______ all tall____

6. A Tt plant is crossed with a Tt plant. What percentage of the offspring will be short? ___ 25%__

7. A heterozygous round seeded plant (Rr) is crossed with a homozygous round seeded plant (RR). What percentage of the offspring will be homozygous (RR)? ______ 1/2 or 50%____

8. A homozygous round seeded plant is crossed with a homozygous wrinkled seeded plant. What are the genotypes of the parents? _____RR____ x ___rr____
What percentage of the offspring will also be homozygous? ______ 0%____

9. In pea plants purple flowers are dominant to white flowers. If two white flowered plants are cross, what percentage of their offspring will be white flowered? ______ all white____

If students are stuck on this one, advise them to make a "key" to help them sort it out.

PP = purple, Pp = purple, pp = white

10. A white flowered plant is crossed with a plant that is heterozygous for the trait. What percentage of the offspring will have purple flowers? _____ pp x Pp, 50% purple____

11. Two plants, both heterozygous for the gene that controls flower color are crossed. What percentage of their offspring will have purple flowers? Pp x Pp, 75% purple________
What percentage will have white flowers? ______ 25% white____

12. In guinea pigs, the allele for short hair is dominant.
What genotype would a heterozygous shorthaired guinea pig have? _Hh__
What genotype would a purebreeding short haired guinea pig have? _hh____
What genotype would a long haired guinea pig have? _HH____

Why did I use H instead of S for short hair. Students may discover the hard way that capital and lower case S's are hard to tell apart. This is a good time to talk to them about how to choose their letters. You can choose the letter of the dominant trait, or you can choose the letter for the trait itself (H is for hair).

13. Show the cross for a pure breeding short haired guinea pig and a long haired guinea pig. HH x hh
What percentage of the offspring will have short hair? _____all____

14. Show the cross for two heterozygous guinea pigs. Hh x Hh
What percentage of the offspring will have short hair? _75%____
What percentage of the offspring will have long hair? _25%____
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? \( Hh \times Hh \) Show the cross to prove it! most students just point to the cross right in #14