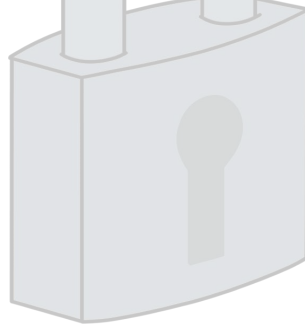


The Amoeba Sisters™

Handout Answer Keys



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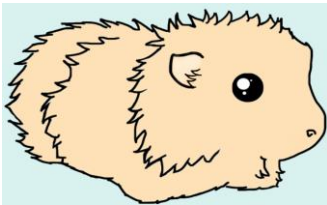
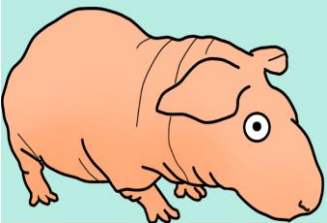
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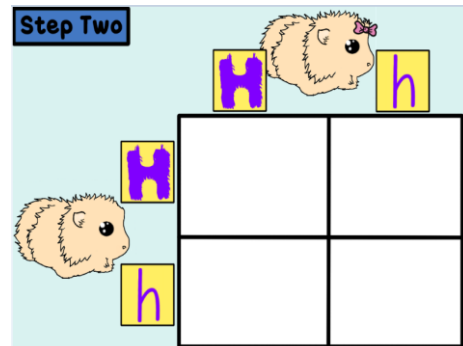
KEY: Amoeba Sisters Video Recap: Monohybrid Crosses (Mendelian Inheritance)

Vocabulary practice! Fill in missing boxes assuming that having hair for guinea pigs follows Mendelian inheritance, where the H dominant allele codes for hair and h codes for a lack of hair (hairless).

Image	Genotype	Heterozygous or Homozygous?	Phenotype
	HH	1. Homozygous	2. Hair
	3. hh	4. Homozygous	Hairless
5. Student illustration should be guinea pig with hair.	6. Hh	Heterozygous	7. Hair

8. An **allele** is a form of a gene.

In the Punnett square on the right, how many H/h alleles does a baby guinea pig inherit from the **mother**? 1
 How many H/h alleles does a baby guinea pig inherit from the **father**? 1.



If a baby girl guinea pig looks almost identical to its mother, does this then mean that it inherited more alleles from its mother? Explain. (Hint: Think about the vocabulary words **dominant** and **recessive**.)

No. The guinea pig offspring inherits an equal number of alleles from its mother and father.

However, its traits are based on the combination of the alleles (dominant and recessive).

For example, consider another trait they could have such as hair color. If guinea pig's father is homozygous recessive and the mother is homozygous dominant, then the offspring's genotype is heterozygous. While it received one allele from each parent, the fact that it received a dominant allele from its mother means that dominant trait expressed (like mother).



KEY: Mysterious Fred: A Guinea Pig Test Cross

There is a teacher from Texas that loves hairless guinea pigs. In guinea pigs, the dominant allele H codes for the trait of having hair and the allele h codes for the trait of being hairless. (Assume Mendelian inheritance). Let's say that this teacher receives her wish of finding a hairless guinea pig at a pet store and names her Genevieve. She finds another guinea pig at a store with hair that she names Fred.



While she can be certain of Genevieve's genotype, how could she determine what genotype Fred is? She can do a **test cross**! A test cross involves breeding an organism with a dominant trait (like Fred) with an organism that exhibits a recessive trait (like Genevieve).

9. Genevieve has the genotype hh.

10. Fred's genotype could be HH or Hh.

11. If Fred was genotype HH and bred with Genevieve...

12. Please draw Punnett Square below to show prediction for offspring.

	H	H
h	Hh	Hh
h	Hh	Hh

13. If Fred was genotype Hh and bred with Genevieve...

14. Please draw Punnett Square below to show prediction for offspring.

	H	h
h	Hh	hh
h	Hh	hh

15. Explain in your own words how the offspring from the test cross could help determine Fred's genotype.

If Fred and Genevieve were bred and had any hairless offspring, then you know Fred is Hh based on the Punnett Square above. If no hairless offspring are born, it is less likely that Fred is Hh. However, since these are just probabilities, more testing would need to be done.

16. What could be some weaknesses with using a test cross to determine Fred's genotype?

Punnett squares are probabilities so as mentioned above, just because no hairless offspring are born doesn't for sure determine that Fred is HH. It does, however, mean you can determine that Fred is Hh if hairless offspring are born from this cross.

