

Name: \_\_\_\_\_

## Applying Hardy-Weinberg to Rock Pocket Mouse Field Data

Dr. Nachman and his colleagues collected rock pocket mice across 35 kilometers of Arizona Sonoran Desert, which include both dark, rocky laval outcrops and light, rocky granite areas. They recorded substrate color and coat-color frequencies for six locations. The data is summarized in the table below.



### Field Data Summary

Collecting Site	Substrate Color	Number of Mice	Phenotype	
			Light	Dark
1	Light	6	6	0
2	Light	85	80	5
3	Dark	7	0	7
4	Dark	5	0	5
5	Dark	45	3	42
6	Light	77	34	43

1. Calculate the frequency of light colored mice and dark colored mice found on light substrates.

Frequency = number of mice of one color / total number of mice on that substrate

Frequency of light colored mice = \_\_\_\_\_ | Frequency of dark colored mice \_\_\_\_\_

2. Calculate the frequency of light colored mice and dark colored mice found on dark substrates.

Frequency of light colored mice = \_\_\_\_\_ | Frequency of dark colored mice \_\_\_\_\_

3. Use the Hardy-Weinberg equation, complete the table. (Show work!)

$$p^2 + 2pq + q^2 = 1 \text{ and } p + q = 1$$

	Light Substrate	Dark Substrate
Frequency of dd ( $q^2$ )		
Frequency of DD ( $p^2$ )		
Frequency of Dd ( $2pq$ )		

---

4. Show a punnett square of two heterozygous mice crossed.

How many of the offspring are expected to be DD \_\_\_\_\_ Dd \_\_\_\_\_ dd \_\_\_\_\_

How does this percentage compare to the percentages observed using the Hardy-Weinberg equation?

5. How can the Hardy-Weinberg equation be used to show that a population is evolving?

6. Which fur color has the greatest advantage on each substrate?

7. Some people suggest that evolution is a process that occurs in other animals but not humans. Suggest a way that you could use the Hardy-Weinberg equation to show that humans also evolve?