


Activity C: Heterozygote superiority	<u>Get the Gizmo ready:</u> <ul style="list-style-type: none"> • Click Reset. • If necessary, set DD and dd to 34%. 	
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Introduction: In the case of **heterozygote superiority**, individuals who are heterozygous for a particular trait are more fit than either of the homozygous varieties. For example, individuals with one copy of the sickle cell allele are resistant to malaria but do not have sickle cell anemia.

Question: How will allele frequencies change if heterozygous individuals have the greatest fitness?

1. Observe: To model heterozygote superiority, set the **Fitness of DD** and the **Fitness of dd** to 60%. Set the **Fitness of Dd** to 100%.

Based on the color of the trees, which parrots will be easiest for predators to spot and kill?

2. Predict: How do you expect the proportions of **DD**, **Dd**, and **dd** genotypes to change over the course of five generations? _____

3. Gather data: Click **Begin**. Play through the simulation for five generations. Select the TABLE tab and record the genotype populations over time in the spaces below.

Generation	DD	Dd	dd
0			
1			
2			
3			
4			
5			

4. Analyze: What patterns do you see in your data? _____

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5. Interpret: Select the ALLELE GRAPH tab. What does this graph show? _____

6. Interpret: Select the GENOTYPE GRAPH tab. What does this graph show? _____

7. Calculate: Suppose that the *dd* genotype represents a debilitating disease such as sickle cell anemia. In this population, what percentage of the offspring has sickle cell anemia?

8. Think and discuss: Malaria is transmitted through mosquito bites. Symptoms include high fever, joint pain, and violent shivering. It can be deadly, especially in children or the elderly.

A. Why do you think the sickle cell allele is still common in tropical regions?

B. How might the occurrence of sickle cell anemia change if anti-malaria drugs and preventative measures (such as the use of mosquito netting) become more widespread in tropical regions?
