

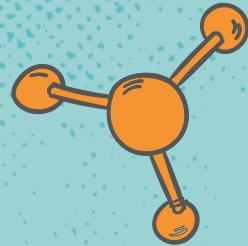
# Section 1: Applied Genetics



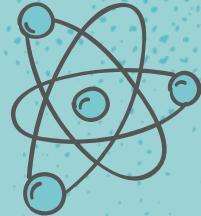
# MAIN IDEA

Selective breeding is used to produce organisms with desired traits.

K <i>What I Know</i>	W <i>What I Want to Find Out</i>	L <i>What I Learned</i>

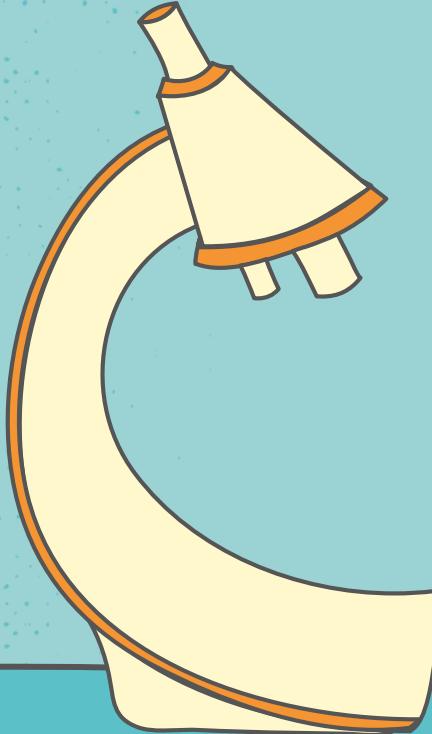


# ESSENTIAL QUESTIONS



- How is selective breeding used to produce organisms with desired traits?
- What are similarities and differences between inbreeding and hybridization?
- How does a Punnett square test cross help assess the genotypes of organisms?

# VOCABULARY 01



Review

- Hybrid

New

- selective breeding
- inbreeding
- test cross



# SELECTIVE BREEDING

- The process by which desired traits of certain plants and animals are selected and passed on to their future generations is called **selective breeding**.
- Desired traits can be passed on through **hybridization** and **inbreeding**.

**Selective Breeding:**  
Breed best-performing plants

**1st GENERATION**  
Breed plants with biggest fruit and highest yield



**2nd GENERATION**  
Repeat



**3rd GENERATION**



# SELECTIVE BREEDING HYBRIDIZATION



## Hybridization

- Hybridization involves crossing parent organisms with different forms of a trait to produce offspring with specific traits.
- Hybrid organisms can be bred to be more disease-resistant, to produce more offspring, or to grow faster.
- A disadvantage of hybridization is that it is time consuming and expensive.

## Real Example of Hybridization:



Horse

Big, Fast,  
Excitable

Donkey

Small, Slow,  
Calm

Hybrid



Mule

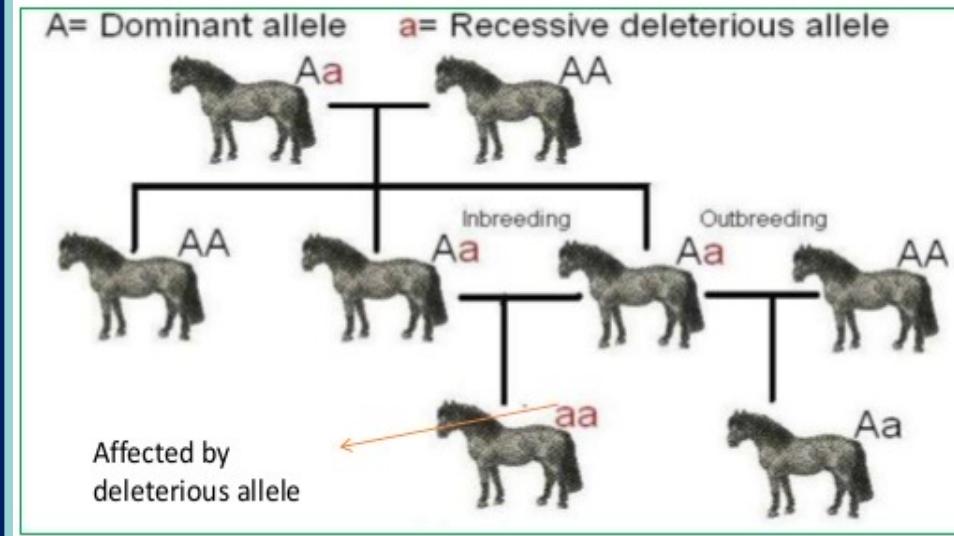
Strong, Calm  
Endurance

The hybrid is often stronger and hardier than its parents: Hybrid Vigor

# SELECTIVE BREEDING INBREEDING

## Inbreeding

- Inbreeding is the process in which two closely related organisms are bred to pass on a desirable trait to future generations.
- Inbreeding can increase the chance of homozygous recessive offspring that may have harmful traits.



# TEST CROSS

- A test cross involves breeding an organism that has the unknown genotype with one that is homozygous recessive for the desired trait.
- If the unknown parent genotype is homozygous dominant, all the offspring will have the dominant phenotype.
- If the unknown parent genotype is heterozygous, the offspring will show a 1:1 phenotypic ratio.

		Homozygous white grapefruit	
		w	w
Homozygous red grapefruit	w	Ww	Ww
	w	Ww	Ww
		Heterozygous white grapefruit	
		w	w
Homozygous red grapefruit	w	Ww	ww
	w	Ww	ww



## Essential Questions

- How is selective breeding used to produce organisms with desired traits?
- What are similarities and differences between inbreeding and hybridization?
- How does a Punnett square test cross help assess the genotypes of organisms?

## Vocabulary

- selective breeding
- inbreeding
- test cross

A female scientist wearing a white lab coat, a green hairnet, a green surgical mask, and safety glasses. She is wearing green nitrile gloves and holding a clear glass flask containing a liquid. She is looking directly at the camera with a slight smile. The background shows a laboratory setting with teal-colored cabinets and various pieces of equipment. In the foreground, there is a white counter with a rack of test tubes containing different colored liquids (red, orange, blue) and some small containers.

THANK  
YOU!!