

Environmental Influences

An organism's genotype is not the only thing responsible for the phenotype of the organism

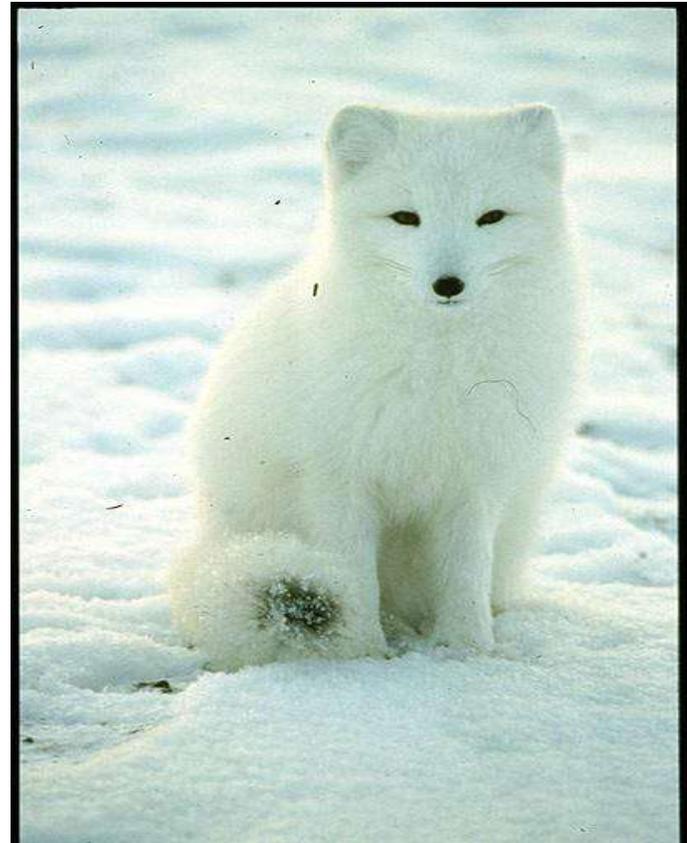
- Many phenotypes are influenced by the environment
 - Phenotype = All the observable characteristics of an organism, such as shape, size, color, and behavior, that result from the interaction of its genotype (total genetic makeup) with the environment.

The Arctic Fox

- When the outside temperature is warm the hair is made with dark pigment



- When it is cold the hair is made with no pigment



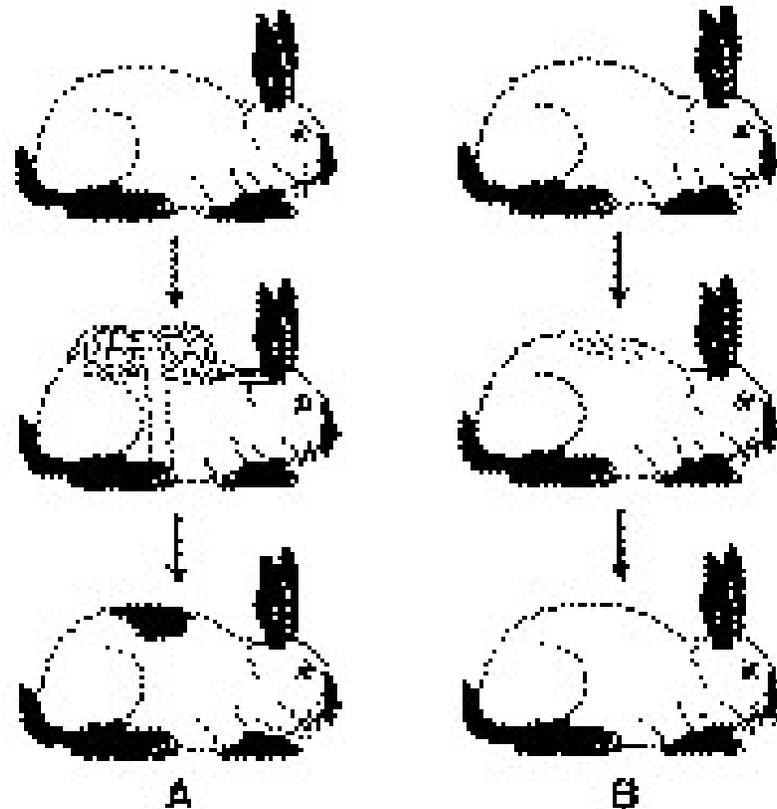
The Himalayan Rabbit

- This rabbit has white fur with black fur on its ears, nose and tail



- A scientist conducted an experiment to determine the effect of environment on the color of fur of a Himalayan rabbit.
- The scientist shaved an area of hair on the back of each rabbit, then placed an ice pack over the shaved area on one rabbit

- Black pigment is deposited in fur when the temperature falls below 33°C
- When hair is shaved and an ice pack is placed in the area, the new fur will grow in black



Identical Twin Studies

- Identical twins have identical genes
- They share DNA but not fingerprints
- Have identical brain-wave patterns
- Occur once in every 254 births

- A **twin study** is a kind of genetic study done to determine heritability.
- Some researchers believe that since identical twins have identical genotypes, any differences between them are solely due to environmental factors.

- By examining the how twins (especially twins raised apart) are different, a study may determine the extent that a particular trait is influenced by genes or the environment.

The Jim Twins

- Jim Springer and Jim Lewis are identical twins that were separated four weeks after birth
- They were reunited 39 years later!



1965. 1965. 1965. 1965. 1965. 1965. 1965. 1965. 1965. 1965.



- The “Jim Twins” shared many things:
 - They had first wives named Linda and second wives named Betty
 - They both named their sons “James Allen”
 - They drove the same model and color car
 - They both chewed their fingernails
 - They got headaches the same time of day
 - They enjoyed mechanical drawing and carpentry
 - They were good at math but failed spelling in school

- The environment molds your personality, but your genes determine what kind of environment you have, seek and attend to
- Since the early 1960s, several twin studies have reported that identical twins reared apart are actually more alike than those raised in the same home

- By studying identical and fraternal twins and their families, we can estimate how genes and environment interact to influence character, strengths, vulnerabilities, and values.

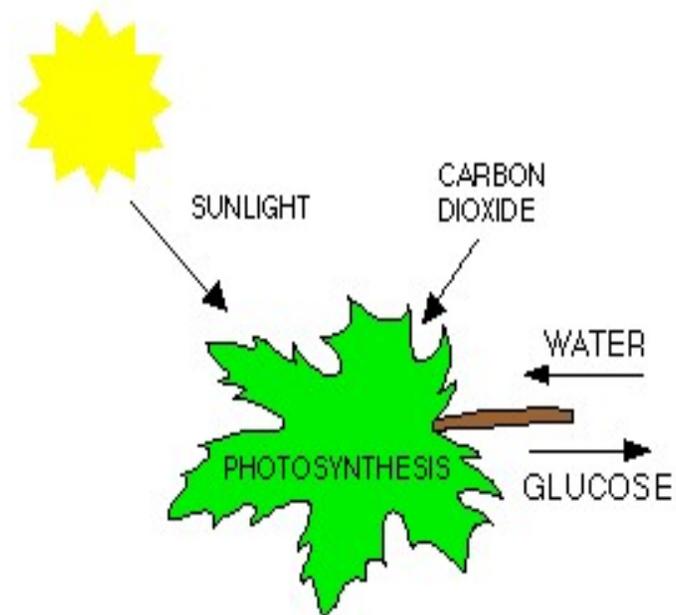
- Identical twins are genetic duplicates.
- Fraternal twins share 50% of their genes.
- Both types of twins share common life experiences

Chlorophyll production

- Chlorophyll is the pigment necessary for photosynthesis to occur
- Chlorophyll is the green color in leaves



- Light is necessary for production of chlorophyll in green plants
- Chlorophyll is degraded in the fall when days are shorter



- Other pigments in the leaf like orange carotenes and yellow xanthophylls can show through
- That is why the leaves turn different colors



Diabetes

- Diabetes is a disease that results in high glucose levels in the blood cause by the lack of usable insulin
 - Type 1 Diabetes – body does not produce insulin
 - Type 2 Diabetes – body does not use insulin well

- Type 1 vs. Type 2 Diabetes:
 - Type 1 Diabetes is not often associated with excess body weight, unlike Type 2
 - Type 1 Diabetes diagnosed quickly; Type 2 diagnosed over time
 - Type 1 Diabetes caused by genetic predisposition; Type 2 caused by poor nutrition (high glucose levels)