## Werner Wildlife: Snowflake the Albino Deer

**Standards**: 5th Grade Science 8.1.3 &.5

**Objectives:** **Students will learn:**

* The difference between dominate and recessive genes
* How albinism affects animal species
* Rates of albinism occurrence in species
* How camouflage aids animal survival
* How to use a Punnett Square

**Materials**: 100 dry brown beans, 100 white beans, Punnett Square worksheets, Albinism Quiz, Smartboard with Internet access, dictionaries

**Vocabulary:** albinism, camouflage, melanin, mutation, pigment, recessive, Punnett Square

**Anticipatory Set:** On your Smart Board show different pictures of albino animals. A good site for pictures <http://www.lifeinthefastlane.ca/35-ghosts-of-nature-albino-animals-of-the-wild/weird-science>

**Procedure:**

1. **Ask students the following questions:**
* What does albinism mean?
* Have they ever seen an albino animal?
* Ask students why they think albinism occurs?
* Do you think albinos are exactly the same as other animals except for their color?
* Do you think all animal species have albino members?
* Why do only a small percentage of animals display characteristics of albinism?
* How do you think other animals react to an albino?
* Would albinism be an advantage or disadvantage to animals in the wild?
* What is the purpose of camouflage?
1. Give them the vocabulary list and have students find and write definitions.
2. **Conduct the activity:**

Before your class, scatter 100 white beans and 100 brown beans in a dirt pit on your playground. The area should be large enough so that the students have enough space to safely collect the beans. Inform students that they are going to go outside and pretend to be deer predators. The students have one minute to collect beans. After each bean is found, the student places the bean in a jar. The student may then capture another bean. After collecting beans for one minute, ask the students to bring the jars into the classroom. Students will count the beans of each color. Display the totals on the board, and graph the results. Ask students: Were there more white or brown beans recovered? Why do you think that is? How does this activity demonstrate the importance of camouflage? How does this activity represent the challenges that albino animals experience.

*(This activity is based on the Survival of the Mutant Toad) Source :www.eduref.org*

1. Share the background information on albinism.
2. Discuss how albinism occurs and share occurrence rate of albinism in species.
3. Demonstrate how to use Punnett Square on the board.
4. Hand out Punnett Square worksheets and have students complete.
5. Finally give the albinism quiz to the students.

**Enrichment:** Take students on a field trip to the Werner Wildlife Museum to see Snowflake the albino mule deer.

**Additional Challenge Questions for essay assessment:**

1. What are the chances that the offspring will have albinism if one parent has albinism?
2. Compare and contrast albinism with leucism.
3. What challenges do albino animals encounter when living in their natural habitat?
4. Would albinism be an advantage or a disadvantage or have no effect on the animal’s ability to find a mate or protect itself from predators?

**Background Information:**

Every animal makes melanin and can have albinism, without any melanin, hair and skin are both white and eyes are pink because the blood vessels show through. However, some animals can have a slightly reduced melanin and look the same as their family. It is caused by a rare genetic mutation. http://mdc.mo.gov/conmag/2005/06/all-about-albinism

We make melanin in specialized cells and that melanin colors our eyes, skin and hair. Since melanin absorbs every wavelength of light, melanin protects our skin from damage by the sun’s ultraviolet rays.

In people, doctors often diagnose albinism using an eye exam. Since melanin plays a part in eye development, people with albinism universally have unusual eye anatomy and less-than-perfect vision. Albinism isn't contagious, so you can't catch it. In albinism, the mutation can happen in three areas: people eyes are usually blue or green

Unfortunately, animals born with albinism in the wild have a tough time of survival because they stand out from the herd and predators easily stop them. In addition, their family may exclude them for being different.

* In mammals: researchers believe that albinism occur 1 out of every 10,000.
* In fish: researchers believe that albinism occur 1 out of every 20,000.
* In birds: researchers believe that albinism occur 1 out of every in 1,764.
* In people: researchers believe that albinism occur 1out of every 17,000.

<http://health.howstuffworks.com/skin-care/problems/medical/albinism2.htm>

**Snowflake Background Information:**

This albino mule deer doe died on Thanksgiving Day in 2008, apparently from natural causes she was probably around nine (9) years old at the time of her death as resident’s along Robertson Road recall seeing her as far back as 1999. Nine years is a very long time, even for a normal deer. For an albino it is extraordinary. During her lifetime she gave birth to a number of fawns, and to the best of our knowledge, all with normal color.

Albinism is a recessive trait (antoisomal recessive mutation) found in many animals including mammals, birds, reptiles, and even plants. Albino animals do not have the gene for normal coloration and do not produce the enzyme responsible for skin, hair, and tissue coloration. The result of this genetic oddity is the total absences of melanin, a body pigment. Without melanin the skin has no protection against harmful ultraviolet radiation from the sun. In addition to the lack of body pigment, the eye of albinos is pink because blood vessels behind the lenses show through the unpigmented irises. As you can guess albinism is not a great trait for an animal, either predator or prey. Most albinos born in the wild will die young. Perhaps this is why albino deer are very rare. It is nature’s way of preventing the gene for albinism from becoming widespread in wild populations.

Some birds and mammals, ptarmigan and weasels for example, may turn white only during the winter. This condition (leukemism) should not be confused with albinism. The opposite of albinism is melanism – the condition in which the animal is generally all black. This again is due to genetic mutation. More melanistic than albinistic forms of wildlife survive to reproduce because they are less likely to encounter problems with predator detection

Albinism is a complete lack of the cells that produce pigments whereas these cells are 'switched off' or faulty in animals with leucism. Thus some animals can have partial albinism.