Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Scientific Selection of Agricultural Animals

**Purpose**

The purpose of this exercise is to demonstrate knowledge of how to predict the probable outcome of phenotypes in a genetic cross, through selective breeding. You are to develop an animal with a solid white hair coat through selective breeding. **20 white beans = solid white coat.** The first person in the class to obtain a solid white coat wins! [[1]](#endnote-1)

**Procedure**

 **Materials**

1. White beans

2. Speckled beans/dark beans

3. Cups (1 per student)

**Sequence of Steps**

1. Obtain ten each of white and speckled beans, and a cup to hold them.
2. “Breed” your animal to a neighbor’s by pouring your beans into his/her cup. Gently shake the beans to get a good mix.
3. Pour the beans into your hand. Close your hand, and without looking, count out 20 beans into your classmate’s cup.
4. ![C:\Users\Angela\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\DRP2N1IJ\MCj04242300000[1].wmf]()Pour the remaining twenty beans into your own cup.
5. Record the new genotype on Table 1. This will simulate record keeping by the producer.
6. Continue to “breed” your animal to others in the class. You will naturally want to breed your animal to one that has more white color than yours. You may ask the classmate for his/her records and to examine his/her animal before committing to breed.
7. Conversely it’s not in your interest to breed with an animal that has fewer white beans than yours.
8. ![C:\Users\Angela\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\DRP2N1IJ\MCj04242300000[1].wmf]()The more breedings you have with animals better than yours, the better chance you have to obtain a pure white coat.
9. After a member of the class has reached the objective or the teacher calls time, return the beans to the source and complete the worksheet.

![C:\Users\Angela\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\DRP2N1IJ\MCj04242300000[1].wmf]()**Observations**

 Table 1. Selective Breeding Record

|  |  |  |
| --- | --- | --- |
|  | Number of White Beans | Number of Speckled Beans |
| Initial gene pool | 10 | 10 |
| Gene pool after breeding 1 |  |  |
| Breeding 2 |  |  |
| Breeding 3 |  |  |
| Breeding 4 |  |  |
| Breeding 5 |  |  |
| Breeding 6 |  |  |
| Breeding 7 |  |  |
| Breeding 8 |  |  |
| Breeding 9 |  |  |
| Breeding 10 |  |  |
| Breeding 11 |  |  |
| Breeding 12 |  |  |
| Breeding 13 |  |  |
| Breeding 14 |  |  |
| Breeding 15 |  |  |

**Analysis**

1. If you were not able to develop a pure animal in the above exercise, how many more breedings do you think it would take to develop a pure animal?
2. Suppose the animals in this exercise are cattle, and it takes you 18 breedings to develop a pure white animal. How many years of development would this represent? (It takes 9 months for a cow to have a calf, and a cow must be one year of age before they can breed.)
3. Suppose the gene pool was much larger for the above exercise – maybe 200 white and 200 speckled. How many breedings would it take to develop a pure animal?
4. Suppose you wanted to start a new breed of animal. How would you go about it and how long do you think it would take?
5. Why is it important to keep records on animals?
6. Why is this exercise called selective breeding? Compare this lab with selective breeding in real life.
7. Compare and contrast natural selection vs. selective breeding.
1. Goehring, JessaLee (2008).Scientific Selection of Agricultural Animals. *Lodi High School, Agriculture Department*. [↑](#endnote-ref-1)