**Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Period:\_\_\_**

**Activity Objectives:**

1. Determine the probability of a genetic phenotype and genotype of an animal
2. Contrast dominant and recessive traits

**Equipment and Materials:**

One plastic cup for each student

 Ten Pinto (Speckled) beans

 Ten Red beans

Procedure

This activity involves developing an animal with a solid red hair coat through selective breeding. A solid red coat will be represented by 20 red beans.

1. Obtain 10 red beans and 10 speckled beans. Put them in a cup to hold them. This is the gene pool of your animal.
2. Pour the beans into your neighbor’s cup. Shake the beans to get a good mix.
3. Without looking at the beans, count out 20 beans into the empty cup.
4. Record the new genotype on Table 2. This will simulate record keeping by the producer.
5. Continue mixing your beans with others in the class. You may ask classmates for his/her records to examine the animal before committing to mixing (breeding). The more breedings with animals genetically stronger than yours, the better the chance that animal will have a pure red coat.
6. After a member of the class has reached the objective or time is called by the teacher, return the beans to the source and complete Table 2.

**Table – Selective Breeding Record**

|  |  |  |
| --- | --- | --- |
|  | Red Beans | Pinto Beans |
| Initial Genotype |  |  |
| Genotype after breeding #1 |  |  |
| Genotype after breeding #2 |  |  |
| Genotype after breeding #3 |  |  |
| Genotype after breeding #4 |  |  |
| Genotype after breeding #5 |  |  |
| Genotype after breeding #6 |  |  |
| Genotype after breeding #7 |  |  |
| Genotype after breeding #8 |  |  |
| Genotype after breeding #9 |  |  |
| Genotype after breeding #10 |  |  |

**Key Questions:**

1. If you were not able to develop a pure animal, how many more breedings do you think it would have required?
2. Suppose the beans in this exercise represent cattle and it takes 18 breedings to develop a pure red animal. How many years of development would this represent?
3. Why is record keeping in livestock production programs important?
4. How do scientists use genetics to eliminate genetic disorders?
5. List two ways to determine the genetic makeup of an animal?