Making the Selection – Student Worksheet

1. Define Selective Breeding:
   1. The selection of certain seeds or animals for reproduction so that the next generation has the same desirable traits.
2. Define Hybrid Vigor, and give an example:
   1. Hybrid Vigor- desirable characteristics that give the organisms a competitive edge over the parent organism
      1. Example: A chicken that grows larger than its parents, (many possible examples).
3. Complete the Chart:

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| Selection: | Definition: |
| **Natural Selection** | Organisms and species that survive and reproduce are the sole ancestors to the next generation. There is no human intrusion. |
| **Selective Breeding** | Selection of animals or seeds for reproduction based on desired traits. This selection happens because of human selection, it is not natural |

1. Define Inbreeding:
   1. Inbreeding is the continued breeding of individuals with similar characteristics in order to maintain the desired characteristics in a line of organisms.
2. What is the consequence of inbreeding? Give an example.
   1. Inbreeding depression, or the increased chance that a cross between two individuals will bring together two recessive alleles for a genetic defect.
      1. Ex: Deafness in Dalmatians.
3. Name two consequences of selective breeding.
   1. Loss of variety in the population
   2. Can amplify undesired traits unintentionally
4. What is one reason that the Irish Potato Famine was so devastating?
   1. There was no diversity in the Irish potato crop, all potatoes were the same so the fungus was able to wipe out all the potatoes.
5. Name two advantages of selective breeding.
   1. Humans have used it to develop many different breeds of dogs.
   2. Can take advantage of positive genetic traits in two organisms and combine into their offspring.

Answers to Follow Up Questions on Activity:

1. What happened to the number of hybrid individuals in succeeding generations after the first one?
   1. It should decrease by about one-half each time; roughly on a pattern of 50 to 25 to 12 to 6 to 3 to 1 or 0 as you go from first to sixth generation.
2. Why does the number of hybrids change as it does?
   1. Original parents contribute only the gene they possess, either an A or a B. Each hybrid organism could contribute either the A or the B, so the odds of getting two As or two Bs is 1:4; an A and a B is 1:2.
3. How do these results explain why farmers must buy new hybrid seed each year, instead of keeping seed from the hybrid crop to plant?
   1. If two hybrids are interbred, gene recombination always occurs according to the Mendelian ratio of 1:2:1 for a monohybrid -- or one trait -- cross. Of the offspring, 1/4 would have both genes from the one parent 1/4 would have both genes from the other parent, and 1/2 would have one from each parent, the hybrid type. Each generation would produce fewer and fewer hybrids, so you would lose the hybrid vigor you wished to obtain if you use the seed produced by the hybrid plants instead of buying new hybrid seed each year.