**Cover Page for for Plant GIFTS (Genetics In Farming Technology and Science)**

Plant GIFTS aligns with ASPB's Breeding principles for teaching plant biology, including Breeding, with a focus on how "selection of particular plant phenotypes has been integral to the development of human society" and "tracking changes in allelic diversity...allows plant breeders...to improve crop productivity".

For undergraduate classes, our module will additionally align with the Biological Evolution objective that covers Biodiversity and Humans, including the following topics:
● Human selection has affected almost every aspect of crop plants, including their structure, reproduction, genetics, and adaptation.
● Agriculture shapes human populations, including their size, distribution, and cultures.

The module covers the following core concepts and competencies from Vision and Change:
● Information flow, exchange, and storage
● Evolution
● Systems
● Ability to apply the process of science
● Ability to use modeling and simulation
● Ability to understand the relationship between science and society

For upper-level high school courses, our module will also cover the following core concepts:
● The functions of genes and their products can be affected by the environment and other genes at one or many steps involved in producing a trait.
● Evolution by natural selection is a process by which inherited traits influence how likely an organism is to survive, reproduce, and pass those traits to its offspring.
● Genetic variation and the phenotypic variation it leads to are the basis for evolution.

Supplies and Estimated Cost:

- Computer with access to Google slides or PowerPoint and ability to project to room (assumed that teachers have access to this)
- Optional supplies:
    - Paper for printing out tomato modifications and other handouts-$ varies based on number of students
    - Dice for randomizing selection of modification and selling scenarios-$10
    - 4 colors of 3x5 notecards per student, for polling MCQ answers-$10

Targeted Age/Grade:
Successfully piloted with high school AP biology courses, introductory undergraduate biology course, and upper division undergraduate biology course. Likely would work with advanced freshman or sophomore high school classes as well as non-AP junior or senior level classes.
Estimated length of activity
For high school classes, a minimum of 3 hours. For undergraduate classes, can be done in a single 50-minute class, but likely needs 2 50-minute class periods or at least one 75-minute class period. See **Pacing Guide** for further information.