

Biology: GMO

Connections to Next Gen Standards (DCI):

HS-LS3 Heredity: Inheritance and Variation of Traits

HS-LS4 Biological Evolution: Unity and Diversity

- *HS-LS3-2. Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.*
- *HS-LS4-3. Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.*
- *HS-LS4-4. Construct an explanation based on evidence for how natural selection leads to adaptation of populations.*

Enduring Understandings:

- Students will understand the difference between GMO crops and non-GMO crop
- Students will recognize the impacts (social, economic, environmental, political) of genetic engineering in agriculture
- Students will be able to engage in a debate around the pros and cons of GMO
- Students will understand the concept of seed sovereignty
- Students will know how to read labels to understand whether they contain GMO ingredients
- Students will understand the importance of seed-saving, and will know how to save seeds from a variety of crops

Essential Questions:

- Where does food come from?
 - What is the connection between politics and agriculture?
 - How does consuming GMO crops affect the world?
 - How does growing GMO crops affect the world?
 - What does it mean to “Vote with your Fork?”
1. (10) What is Genetic Modification
 - a. Definition from students
 - b. Official definition
 - c. Difference between a hybrid and GMO?
 - i. Activity: Using your knowledge of classification, create a hybrid organism, and a GMO organism, and present both to the class
 2. (20) Why is this such a hot topic?
 - a. Top ten GMO foods

- b. FDA labeling – why should we have access to this information?
- c. Pros and cons (break into two groups to make a list, and share)
 - i. Nutrient density
 - ii. Environmental degradation
 - iii. Human health
 - iv. Biodiversity
 - v. Hunger
 - vi. Disease
 - vii. Unintended consequences
3. (10) What does this have to do with us?
 - a. Seed consolidation (show graphic)
 - b. Vote with your fork!
 - c. Seed saving; seed bank
4. (20 mins) In the garden
 - a. Plant garlic with last year's seeds
 - b. Save seeds for the spring
 - i. Label seed packets using classification terminology

Resources:

- GMO quiz: http://www.pbs.org/pov/foodinc/photo_gallery_quiz.php#.UoOYfpR4bpg
- Article on Hybrid vs. GMO: <http://www.motherearthnews.com/real-food/hybrid-seeds-vs-gmos-zb0z1301zsor.aspx#axzz2kXWDr9Fy>
- Seed consolidation graph: <https://www.msu.edu/~howardp/seedindustry.html>
- Top 10 GMO crops: <http://www.cornucopia.org/2013/06/top-10-most-common-gmo-foods/>; <http://recipes.howstuffworks.com/5-common-genetically-modified-foods.htm>; <http://dsc.discovery.com/tv-shows/curiosity/topics/10-genetically-modified-food-products.htm>