Bio/Diversity Project
Lesson Title: Agricultural Biodiversity

Teacher: Erin Scott and Emily Granado
Grade Level: *9th*
Time: *40 minutes*

AZ State Science Standard:	*HS.L2U3.18* ● *Obtain, evaluate, and communicate about the positive and negative ethical, social, economic, and political implications of human activity on the biodiversity of an ecosystem*
Content Objective: Math, Reading, Science, Writing, Other:	● *Students will be able to explain the harm caused to the environment by current human agricultural practices and eating habits.* ● *Students will develop a solution to current agricultural practices and eating habits by constructing a food menu that fits more environmentally friendly parameters.*
Language Objective: (Optional)	N/A
Scientist of the Week:	*This is basic information about your diverse scientist of the week. This should be in kid-friendly language. Here you should list:* ● *Katherine Esau* ● *Professor at the University of Davis* ● *FromYekaterinoslav, Russian Empire* ● *Sixth woman in the world to be elected to the National Academy of Sciences* ● *She is considered to have created the most definitive source of research on plant tissue*

Vocabulary	**Materials**

• Indigenous Farming • Agrobiodiversity • Monoculture	• List of native Arizona food plants attached • Menus of various fast food restaurants • Paper and colored pencils for making menus • Samples of nopales, prickly pear jellies, and agave syrup

Seasonality:

Monsoons July-Sept.	*Autumn* Oct.-Nov.	*Winter* Dec.- Feb.	*Spring* Mar.-Apr.	*Dry Summer* May-June

Guiding Questions:

- Where are crops grown in Arizona?
- What is the history of farming in the Sonoran Desert?
- What are the health benefits for humans of eating a diverse array of foods?

Engagement/Introductory Activity:

- Ask students to name a meal that they make at home for celebrations or holidays
- Ask students to share their answers

Exploratory Activity:

- Show students a presentation that displays where the majority of our food comes from, where it originated, and how we grow it on a large scale and transport it all over the world.
    - Focus on the damaging effects of clear-cutting native ecosystems and installing nonnative monocultures as well as chemical inputs in the form of fertilizers, pesticides, and preservatives.
- Show the following videos:
    - https://www.calacademy.org/educators/what-is-the-environmental-impact-of-feeding-the-world
    - https://www.youtube.com/watch?v=P93jHiuA-VI
- Ask students to write down three facts from each video
- Show a short presentation to introduce students to foods and ingredients native to the area and how they can be used in modern cooking.
- Separate students into groups and give each group a list of native and sustainable desert foods that are grown in the Sonoran desert
- Ask students to pick a restaurant of their choice that they eat at.
- Instruct students to create two entrees from the menu as well as drinks and desserts that are made entirely from ingredients that can be sustainably grown in the desert.

    - Students will make their menu by folding a blank piece of paper in thirds and designing it with their two entrees, a drink, and a desert, all of which have to use at least one desert plant, have students work in groups of 2-3
    - The students will have access to the internet so they can look up more information on how to make the food (i.e. tortillas, buns).
- After students have finished ask a few students to share their menus with the class and discuss whether or not people would eat their food.
- Ask the students how growing food locally can reduce the harmful effects of commercial agriculture on the environment.

Explain:

- Ask the student what are the parts of your menu that you couldn't make without desert-friendly ingredients?
- Are there any parts of your menu that you would actually like to try?
- What kind of resources can be conserved by using the desert alternatives as opposed to what the foods are usually made of?
- Do you think that we can continue growing food like we currently do forever?

Extension Activity/Questions:

- Ask students to brainstorm ways that they can eat desert plants on a daily basis and discuss ways to affordably obtain locally grown food (Produce on Wheels, local Community Supported Agriculture [CSAs], home/school gardens, etc.).
- Pass out samples of nopales, prickly pear jellies, and agave syrup
- Ask students to rank their favorite sample on a scale from 1-4

Evaluation Activity:

- Ask students to write down a dish that they learned about and that they could make with desert friendly ingredients at home with their families.

Native Foods list:

- Prickly pear cactus pads - Earthy
- Prickly pear cactus fruit - Sweet and earthy
- Saguaro cactus fruit - Sweet, like a strawberry
- Cholla cactus buds - Sweet, like a strawberry
- Mesquite flour - Sweet, can be baked
- Agave syrup - Sweet, like honey
- Barrel cactus fruit - Tart, like pineapple
- Hedgehog cactus fruit - Sweet
- Jojoba - Slightly bitter, like an almond
- Wolfberry - Tart, like a cranberry
- Palo Verde seeds - slightly sweet, can taste like sugar snap peas

- Chia sage - small and flavorless, makes chia seeds
- Pinon pine - nutty, makes pine seeds

Example Menu:

Outside of your menu:

Answer these questions: • Why your restaurant is special? • Why is it important to eat desert foods?	• Write down all of the desert foods you used to make your menu	Name of your restaurant Names of people in your group

Inside of your menu:

Dinner option #1 • Write what your meal is made out of • Draw a picture of your meal	Drink #1 • Write what your drink is made out of • Draw a picture of your your drink	Desert #1 • Write what your dessert is made out of • Draw a picture of your dessert
Dinner option #2 • Write what your meal is made out of • Draw a picture of your meal	Drink #2 • Write what your drink is made out of • Draw a picture of your drink	Desert #2 • Write what your dessert is made out of • Draw a picture of your dessert