

## “Service Learning: Ways to Solve Real World Problems”

Hook: How would you make the world a better place?

- Brainstorm a list with your group
- Video: <https://www.youtube.com/watch?v=-ZSgO8ZtbTw>

### 1. Ecological Footprint: What is your ecological footprint on the world today?

- a. Discuss your footprint with a partner (How many earths?)
- b. Think-Pair-Share: What can you do to limit your footprint?
  1. Choose ONE to focus on this week. Share your results.
  - ii. Source: <https://islandwood.org/footprint-calculator/#>

### 2. Food Facts Challenge: True & False

- i. Complete Individually, then compare with Partner (All are TRUE)
- ii. Source: <https://fooduction.com/2017/01/09/food-waste-trivia/>

Breakout Sessions

- World Languages: (10) **Two Groups (5 & 5)**
  - **What to Eat?** Students brainstorm around the meaning of malnutrition and possible root causes of malnutrition. In pairs, they construct an ideal diet for a day, considering how many calories and which nutrients are important to include in their meals. (from facing the future curriculum)
    - This would help assess students on their food vocabulary!
      - Extension: Write the resources and processes it took to produce your country’s favorite meal. There are many steps required to make your item, including the resources needed to produce, process, deliver, serve, and dispose of it. Create a web diagram to visualize this process and explain the impacts from each of these processes
        - U.S. Example: Hamburger, Fries, and a Cola
          - Assesses Components of Ecological Footprint: Oxygen, Food, Water, Fiber, Energy, Infrastructure, Waste Disposal, Recreation
          - What does this tell you about your country’s sustainability? Offer recommendations.
- Social Studies: (12) **Three Groups (4x3)**
  - **What the World Eats:** In a matching exercise, students work to connect countries’ food availability with information about each country’s geographic, economic, and sociopolitical features. Students identify factors that may contribute to food availability or scarcity within a

particular country. By examining a map of world hunger, students see for themselves where hunger is most prevalent in the world and discuss possible root causes. (from facing the future curriculum)

- Global Economic Development
- English: (11) **Three Groups (4 & 4 & 3)**
  - Food Fight: Students will research and debate the question of whether a vegetarian lifestyle is advisable, considering both environmental resources and human health. (from facing the future curriculum)
    - Strong Persuasive Arguments
- Math: (9) **Two Groups (3 & 3 & 3)**
  - Insectivores: Humans have been eating insects since prehistoric times. Although in some world regions, including America, it is considered taboo, the reality is 1,000 species of insects are eaten in over 80% of countries in the world. Insects are a dietary staple in regions of Asia, Africa, Oceania and Latin America. (from 21st Century Math Projects)
    - In “Nutrition Facts of an Insectivore”, students begin practicing translating verbal expressions into inequalities and graphing them on a number line.
    - In “Sustainability of an Insectivore”, students will look at the environmental impact of common food versus insects. They will continue practicing writing inequalities from verbal expressions, solving them and graphing them on a number line.
    - In “Insectivore: Share the News Infographic” students should use information from their research in their project.
- Science: (22) **Five Groups (3 Groups of 4, 2 Groups of 5)**
  - Sustainable Food Web: Students will design a sustainable ecosystem to understand the multi-dimensional aspect of food security. Students will also discuss challenges such as continuing population growth, impacts of climate change and ecological degradation. (from Living Environment Bootcamp)

### Lesson Closure

1. Service Learning Posters: Each group will make a poster highlighting what they learned from their activity. Students will then summarize their posters for the class. Highlight “The Most Important Thing”
2. Making the World a Better Place Checkback: Students will look back at their lists from the beginning of the lesson. Would they make additions to this list after today’s activities? Give students two minutes to discuss in groups. Report out to the class!

## Breakout Sessions

World Languages: What to Eat? (from Facing the Future Curriculum)

LEQ: What is the meaning of malnutrition?

Objectives: Students will be able to

- Become familiar with suggested dietary guidelines
- Understand how their daily nutrition choices can impact personal well-being
- Recognize that malnutrition can affect both poor and wealthy people

Materials:

- Side by Side Lunch Comparison
- What to Eat? Handout (1 per pair)

Lesson:

1. Ask students to do 5-minute free write about what they typically eat in a day. Ask them to reflect on what foods they usually eat for breakfast, lunch, and dinner. Do they think they eat enough food? Too much food? The right kinds of foods to keep them healthy and feeling good?
2. Ask if anyone has a definition for the word “malnutrition.” (*You can ask them to consider the meaning of the prefix “mal” and the root of the word “nutrition.”*)
3. Let students know that malnutrition can be the result of eating too little, eating too much, or eating the wrong kinds of food. In other words, malnutrition includes both undernutrition and overnutrition. It impacts people worldwide, not just those who live in poverty.
4. Ask students to collectively think about what a daily diet should entail. In a think-pair-share activity, have student pairs brainstorm what sorts of foods, nutrients, calories, or other considerations should be taken into account.
5. Show students the *Side-by-Side Lunch Comparison handout* and have students analyze both lunches. Ask them which lunch appears to be the better choice for an active high school student. What makes this diet the better choice?
6. Let them know that they will be constructing an ideal diet for a day. An ideal diet would help them to maintain a healthy weight based on their level of activity, age, and height. Students should use websites below to help them understand what an ideal diet looks like

7. Divide students into pairs and provide a copy of the handout: *What to Eat?*
8. Allow them 30 minutes to construct their 3 meals for the day.
  - Note: Shorten this activity by asking them to only construct 1 meal.
  - a. Website Resource: <http://fnic.nal.usda.gov>
  - b. Choose My Plate: <https://www.choosemyplate.gov/variety>
  - a. Ethnic/Cultural Food Pyramids” to view food pyramids for traditional diets, including Latin America, France, Germany, etc.  
<http://www.fao.org/nutrition/education/food-dietary-guidelines/home/en/>
  - b. Latin America My Plate:  
<https://whatscooking.fns.usda.gov/sites/default/files/featuredlinks/HealthyTastyAffordableLatinCooking.pdf>
9. When students are finished, ask them to summarize the types of foods that comprise their ideal diet. Are they primarily grains? Vegetables? Meats?
10. Lead a discussion using the following questions.

## Discussion

1. How would you summarize the diet you created? What kinds of food should you eat more or less of?
2. What are possible barriers to actually eating the ideal diet you constructed? (
3. Is the ideal daily diet you constructed likely to be more or less expensive than what most people you know eat? Why do you think this is?
4. What are root causes of obesity?
5. What are root causes of hunger and nutrient deficiencies?
6. What would convince you and other students you know to eat better?

## Breakout Session

What the World Eats (from Facing the Future Curriculum)

LEQ: What are some possible root causes of malnutrition?

Objectives: Students will be able to

- Connect a country's geographic, economic, and sociopolitical features with its degree of food security
- Extrapolate information from a map of world hunger
- Discuss root causes of food scarcity

Materials:

- Handout: *What the World Eats*, 1 per pair
- World map available for students to locate countries
- Handout: *FAO Hunger Map 2010*, 1 color copy to display
  - Website Resource: [www.fao.org/hunger/en/](http://www.fao.org/hunger/en/)

## Lesson

1. **Pairs Read:** Students will read about food security (*availability versus scarcity*). What does it mean to be “food secure”? What factors might contribute to food security?
2. Distribute a copy of the handout, *What the World Eats*, to each student. This should be completed in student pairs.
  - Allow students at least 20 minutes to try to match the 8 countries with their consumption and health statistics. Students should complete the first and last columns.
    - Students should do this in pencil as mistakes may be made
3. When students have completed the handout, stop for a quick discussion

Discussion:

1. What features of a country appear to be associated with high caloric availability per person?
2. What features of a country seem to be correlated with low caloric availability per person?
3. How does caloric intake available per person correlate with life expectancy?
4. What additional factors do you think might influence this relationship?

5. Can you predict a country's overweight population based on caloric intake available? If not, what other factors might influence a population's likelihood of being overweight?

#### Lesson Continued

1. Show students the interactive map of world hunger. The map provided is visible online at <http://www.fao.org/hunger/en/>.
2. Ask them to study the map for a few minutes.
3. Ask them to discuss the map with a partner sitting near them. What generalities can you make about world hunger from this map? What factors might be driving hunger in these places?
4. Have a brief discussion, asking pairs to share the ideas they discussed.
5. Conclude with a discussion using the following questions.

#### Discussion

1. Why are maps like the FAO World Hunger Map useful tools? How could they be used to inform policy and decision-making?
2. What are possible unintended consequences of generalizing about a region based on information like the World Hunger Map?
3. Which countries appear to be the most food insecure? How do you know?
4. What factors seem to be correlated with food insecurity? Can you think of any other possible factors that would either contribute to food scarcity or be a consequence of food scarcity?
5. For the more food insecure countries, what would you recommend to move them toward greater food security?

## Breakout Session

Food Fight (from Facing the Future Curriculum)

LEQ: Is a vegetarian lifestyle advisable, considering both human health factors and environmental factors?

Objectives: Students will be able to

- Research information about different diet choices
- Determine the environmental and health consequences of a particular diet
- Take and defend a position on whether a vegetarian diet or one that includes meat is preferable

Materials:

- Handout: *Viewpoints A-C* –make enough copies so that 1/3 of students receive Viewpoint A, 1/3 of students receive Viewpoint B, and 1/3 of students receive Viewpoint C
- Website: *WaterFootprintNetwork* <http://www.waterfootprint.org> *Water Footprint Network provides statistics about water usage for growing various crops and raising different kinds of livestock. Click on “Product Water Footprints” to learn more.*

## Lesson

1. Ask students to provide their own definitions for the word “vegetarian.” (A vegetarian is a person who does not eat meat. However, many vegetarians eat animal products such as dairy and eggs.)
2. You may want to have a quick discussion to further engage students: What thoughts or feelings come to mind when they hear that word? Are any students vegetarian? Do they know any vegetarians?
3. Let them know that they will be exploring the pros and cons of a vegetarian diet. Their goal will be to answer the question: Is a vegetarian lifestyle advisable, considering both human health factors and environmental factors?
4. Break students into groups of 3. Assign each student in a group to Viewpoint A, B, or C so that each group includes all viewpoints.
  - a. Viewpoint A: A vegetarian diet is the best way to promote personal health and environmental sustainability.
  - b. Viewpoint B: A diet that includes meat is necessary to maintain personal health and well-being.

- c. Viewpoint C: Eating meat raised through environmentally sustainable practices is an important way to sustain rural economies.
5. Pass out the appropriate handout (Viewpoint A, B, or C) to each student in the group. Give students 20 to 25 minutes to complete Part 1 of their handouts independently. They can use the suggested websites or any other relevant references.
6. Ask students to return to their groups and share their findings. As they share, group members should fill out Part 2 of the handout. Allow 10 to 15 minutes for this part of the activity.
7. Ask students to spend a few minutes a group discussing which argument (Viewpoint A, B, or C) is most compelling and why.
8. Tell students that they will need to choose which Viewpoint resonates the most with them. Each student should explain why they chose a particular viewpoint. Let students know that they can change their minds if they hear a particularly compelling argument that makes them rethink their original decision.

Discussion:

1. What other possible viewpoints could have been included in this debate?
2. Which choice seems best from the standpoint of human health?
3. Which choice seems best from the standpoint of environmental resources?
4. How do you think the three viewpoints rank in terms of price to the consumer? Does this make you rethink your argument?
5. How might a person's cultural or religious background impact the decision to eat or not eat certain foods?



## Breakout Session

Sustainable Food Web (from Living Environment Bootcamp)

LEQ: How do you create self sustaining ecosystems?

Objectives: Students will be able to

- Make a food web
- Design an ecological pyramid
- Predict an ecosystem's response to change
- Read population curves
- Identify Symbiotic Relationships
- Demonstrate understanding of different Niches

Materials:

- Hunger Games: Blowing up the Supplies Video:  
[https://www.youtube.com/watch?v=7P\\_PfCJ4pOA](https://www.youtube.com/watch?v=7P_PfCJ4pOA)
- Living inside a Biosphere Video:  
[https://www.youtube.com/watch?v=a7B39MLVeIc&disable\\_polymer=true](https://www.youtube.com/watch?v=a7B39MLVeIc&disable_polymer=true)
- Ecology Lab Handout (1 per pair)

## Lesson

1. Have students watch the video, "Hunger Games: Blowing up the Supplies"
  - a. In groups, discuss the effects that destroying the food supply would have on the community living within the arena.
  - b. Determine what emotions would you feel if you were to be sealed in an arena in which you have no outside food or supplies.
  - c. How would you grow everything you need and recycle your waste in order to survive?
2. In 1991 – 1993 Eight people were sealed in a dome about the size of two football fields for a period of almost two years. They have no outside food or supplies. They must grow everything they need and recycle their waste in order to survive. They called it BIOSPHERE 2. Have students watch the video, "Living inside a Biosphere"
  - a. With your group, write down 10 ways how your daily activities impact the environment negatively and 10 ways it impacts the environment positively.
  - b. Assess the statement below to explain how it is relevant to what you saw in "Living in a Biosphere" and "Hunger Games" videos.

- *The relationship among living things is complex, interconnected, and based on resource allocation. Changes in one resource level can impact others via a ripple effect.*
3. In pairs, complete the Ecology Lab handout. Here students will need to **design a sustainable ecosystem considering the following:**
    - a. **The food web, symbiotic relationships, and population**

#### Discussion

The World Food Summit states that **food security** "exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious **food** to meet their dietary needs and **food** preferences for an active and healthy life".

1. With your group, explain how sustainable ecosystems affect our food security
2. How would climate change affect our food security within an ecosystem?
3. How would an expanding global population affect our food security within an ecosystem?
4. How would pollution affect our food security within an ecosystem?

## Breakout Session

Insectivores (from 21st Century Math Projects)

LEQ: How do some use insects to supplement their diet and is it a practical solution for hunger and aid global warming efforts?”

Objectives: Students will be able to

- Use information to solve, interpret and graph the solutions of inequalities on a number line.
- Communicate to the masses that eating insects could be a dietary and environmental solution by creating a visual representation of data, graphs and facts.

Materials:

- [Insects Are the Perfect Sustainable Food Article](#)
- [Are Sustainability Advocates Ready for the Insectivores Dilemma? Article](#)
- [Could Insects Be the Wonder Food of the Future? Article](#)
- Insectivores Handout (1 per student)
- Website Source: <https://infogram.com/>
  - Create an infographic

## Lesson

1. Introduce the idea of Insectivores by having students read three different articles pertaining to the sustainability of insects. Each group will read a different article.
2. Have each group summarize their VIPS and state their opinion.
3. Students will then complete the Insectivores Handout
4. After completing “Nutrition Facts of an Insectivore” and “Sustainability of an Insectivore” students will then create a “News Infographic” to communicate to the masses that eating insects could be a dietary and environmental solution by creating a visual representation of the data, graphs and facts from their Insectivore Activities.
  - a. Each group will create their own infographic
    - Rubric:
      1. the product is informative and outlines the essential issues with water rights
      2. at least 5 pieces of mathematical evidence
      3. at least 2 types of graphs
      4. the product is visually engaging and easy to read
    - To shorten lesson, all nine students can create ONE infographic