

GNG Advanced Placement Computer Science Principles

Food security and computer technology*

How might computer technology contribute to food security?

The purpose of this lesson is to learn about food security in different cultures and to research agricultural practices that contribute to food security.

Background

What is food security?

The World Food Summit of 1996 defined food security as existing “when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life.” <http://www.who.int>

Food security is a measure of the availability of food and individuals' ability to access it. Affordability is only one factor. https://en.wikipedia.org/wiki/Food_security

Food Security is determined by:

- **Availability:** sufficient quantities of food are available on a consistent basis
- **Access:** there are sufficient resources to obtain appropriate foods for a nutritious diet
- **Use:** appropriate use including preparation and handling, as well as adequate water and sanitation

Agriculture remains the largest employment sector in most developing countries and international agriculture agreements are crucial to a country's food security. Some critics argue that trade liberalization may reduce a country's food security by reducing agricultural employment levels. Concern about this has led a group of World Trade Organization (WTO) member states to recommend that current negotiations on agricultural agreements allow developing countries to re-evaluate and raise tariffs on key products to protect national food security and employment. They argue that WTO agreements, by pushing for the liberalization of crucial markets, are threatening the food security of whole communities.

Warm-up Activity:

- Watch the video “Agricultural Innovation for family farmers” https://www.youtube.com/watch?v=-1TrJjGiwM&feature=emb_logo (2:25)
- Discuss innovations in this video including but not limited to drones, robotics, aquaculture, vertical farming, data collection with cell phones and tablets

Research Project

Select a computer innovation that impacts food security.

You are required to have at least 3 different credible resources; one resource must be from the current year.

Your presentations must include a visual (Google Draw, Piktochart, Canva) and a video (FlipGrid)

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Your written research must include the following information:

- What is the purpose of your computer innovation?
- What is the agricultural / food security problem your computer innovation is intended to address or condition it is intended to improve?
- What are the beneficial effects of your computer innovation?
- What are the harmful effects of your computer innovation?
- What specific group in society does the computer innovation impact or how does it impact the economy or culture?
- What data is used by your computer innovation? (include input / output / processing / storage)
- How is the data is consumed, produced OR transformed?
- What are the data storage, data privacy, or data security concerns?

Potential websites to visit

World Health Organization: <https://www.who.int/en>

Food and Agriculture Organization and the United Nations: <http://www.fao.org/home/en/>

UN Environment Programme: <https://www.unep.org/>

Articles to Read

Artificial Intelligence best-practices in agriculture can help bridge the digital divide while tackling food insecurity <http://www.fao.org/news/story/en/item/1309630/icode/>

AI in Agriculture (article with embedded videos) <https://emerj.com/ai-sector-overviews/ai-agriculture-present-applications-impact/>

*Project adapted from “Oh Soy Good! Cultural Awareness Research Project”
<https://grownextgen.org/curriculum/oh-soy-good>

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RUBRIC: Food Security Research Project

The visual / computational artifact (a visual using Google Draw, Piktochart, Canva or a video using FlipGrid)
____ / 10 The computational artifact includes the computing innovation AND provides an illustration, pre-presentation, or explanation of the computing innovation's intended purpose, function and/or effect.

In written form:

____ / 1 State a fact about the computing innovation's intended purpose or function

____ / 1 Identify at least ONE problem your computer innovation is intended to address or condition it is intended to improve

____ / 1 Identify a beneficial effect of the identified computing innovation

____ / 1 Identify a harmful effect of the identified computing innovation

____ / 1 Explain how ONE of the identified effects relates to society, economy or culture

____ / 1 Identify the data that the identified computing innovation uses

____ / 1 Explain how the data is consumed, produced OR transformed

____ / 1 Identify one data storage, data privacy OR data security concern related to the identified or computing innovation

____ / 1 References through in-text citation

____ / 1 Three sources of (current) information