

Project Name: Agriculture in Eastern Kentucky

Big Idea: Solving EKY's Food Desert

Essential Question: There is a lack of agriculture in EKY, however culturally people grow their own food. How can we continue this practice for increased food stability?

Team Members: Andy Burke

School/Organization Name: John M. Stumbo Elementary

Location (City, State/Province, and Country): Grethel, KY, USA



Engage:

What challenge does your project address?

- Upholding the tradition of growing your own food for increased food stability

Why did your team select this topic or challenge?

- Growing our own food is a tradition that reaches back generations, however, that skill is being lost more and more with each upcoming generation

How is it a real world problem or concern?

- EKY felt the food shortage during covid as not every item was available instore that we wanted/needed. Preserving the ability to grow our own food both with traditional farming and hydroponics allows for increased food stability

Engage

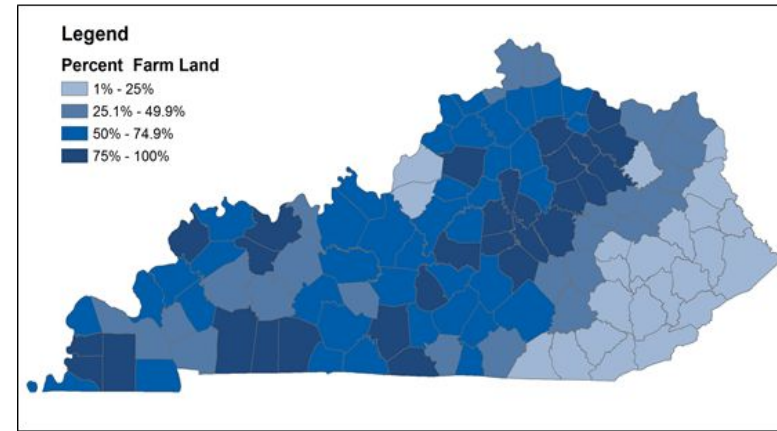
- Soil based farming is a tradition in Eastern Kentucky. It is not uncommon to drive down any given 'holler' (hollow, a secluded valley between mountains) and see a family with a garden in their yard
- Many families are raised in the garden where they learn many life lessons from hard work, patience, appreciation, and even science!
- These lessons can be transferred into the classroom as not every student is given this experience at home!
- Pictures feature our school custodian, Mary's garden!
 - She grows a garden every year and involves her grandkids and kids



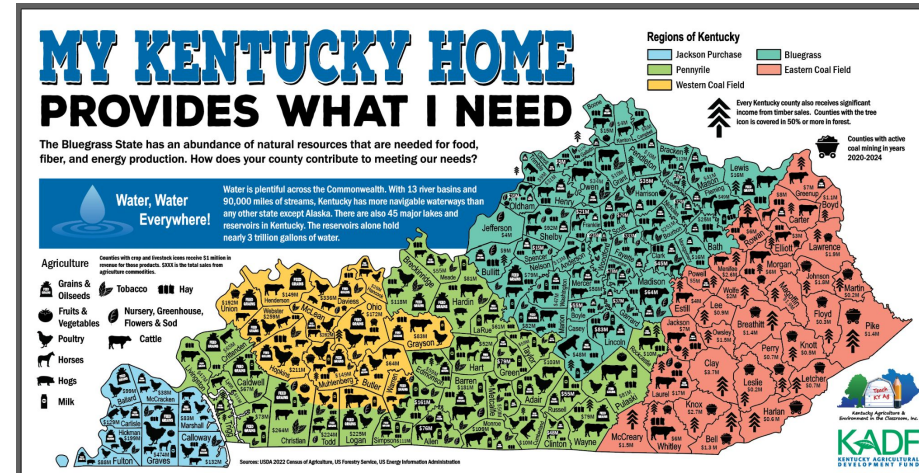
County Farm Land as Percent of Total Land

Engage

- EKY is a food desert
- Our area needs to import its food
- EKY lacks strong agriculture
- We face many challenges such as:
 - Much of our terrain being hills
 - Roads that making exporting expensive
 - Poverty stricken area with a lack of jobs and opportunity
 - Most agriculture in KY comes from the central and western portion of the state
- Solution: Hydroponics
- Top image shows the lack of farmland available in the different parts of KY but highlights the lack of farmland in EKY
- Bottom image shows what each county contribute toe the economy agriculturally which shows a lack of it in EKY



Source: 2012 Census of Agriculture, NASS



Engage

- Hydroponics solves a major problem EKY has: lack of agriculture
- Terrain does not matter when utilizing hydroponics as this technique of growing plants uses no soil
- Growing conditions and variables can be manipulated since hydroponics can take place in doors
- Hydroponics can open a door to many job opportunities such as:
 - Farmers
 - Coders
 - Technicians
 - Plant managers
 - Distribution
 - Marketing
 - Entrepreneurship

- Systems repair
- Installation
- CDL drivers (especially coal truck drivers who have lost their jobs due to mines shutting down)
- And more!
- Picture features plants being grown from our hydroponic machines!



Engage

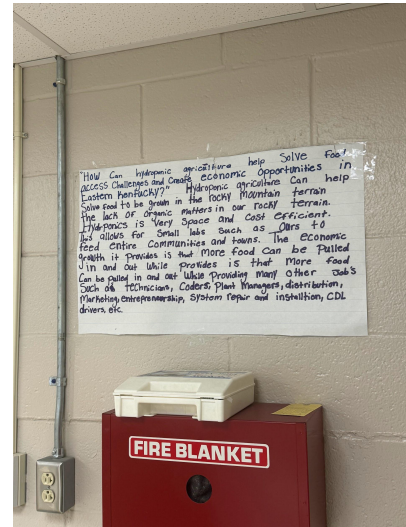
- The goal is to spread awareness about hydroponics and to teach our students how to grow using this method
- It will not replace traditional farming as that will always have a place in the real world
- They both have their pros and cons
- In order for our area to grow and thrive and be what we imagine it could be, we must find solutions to the problems that plague EKY
- And hydroponics can be that answer
- Picture featuring WYMT reporter visiting our school to help spread information on hydroponics on the local news channel WYMT



Investigation:

Through text and images, tell us the story of what your team learned and discovered as part of your investigations.

- Hydroponic agriculture can help solve food access challenges and create economic opportunities in Eastern Kentucky.



Problems with Agriculture in EKY

- Students have researched and learned about the different barriers that prevent EKY from being successful in the agriculture industry
 - Lack of flat land
 - Most flat land is used for building businesses
 - Poor terrain
 - Steep, thin soil, and risk of erosion
 - Import and export difficulties (as featured in picture)
 - Poor road conditions and road quality
 - Less roads leading into and out of EKY
 - Cheaper to start a business in bigger city such as Lexington
 - And more!



What is the better method for growing plants?

- Compare and contrast hydroponics vs traditional
 - Various factors such as:
 - Growth time
 - Yield
 - cost
 - success
- **Most importantly in this whole process, students must be allowed to make mistakes**
 - Often teachers correct students too early and do not let them learn through experience
 - Over watering, choosing wrong seeds for the wrong conditions, transplanting too early and in the wrong environment, etc.
- Featured pictures show both means of growing techniques in our classroom



How can the introduction of hydroponics help EKY?

- The best way to bring hydroponics to EKY is to educate
 - Students learn how to grow plants without soil
 - They learn the reasoning behind tracking data such as pH, EC, temperature, etc,
- Once students learn how to grow plants hydroponically, they can spread this information to family and other friends
- Other means of introducing hydroponics to EKY involves spreading the information via panels, showcases, or even through social media!
- Featured pics show students visiting local college, UPIKE, and exploring their hydroponics lab and students learning traditional farming from Mary our school custodian!



Action:

Through text and images tell us about your team's solution concept for the challenge you identified and what actions has your team taken so far to address this challenge.

Include related outputs that showcase your creative use of technology to address the challenge. This might include things like podcasts, digital games, apps, data visualizations, interactive maps, or something else. Show us what's possible!

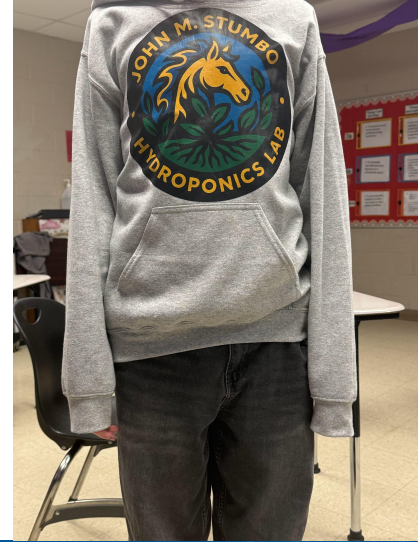
Hydroponics Lab

- Students have begun the rigorous process of learning to grow plants by comparing the two different methods of hydroponics and traditional soil based farming
- Through help from the community and local experts, we were able to start growing various plants
- The lab is student ran and maintained by them
- Students were able to grow enough lettuce to provide salads at lunch for the school!



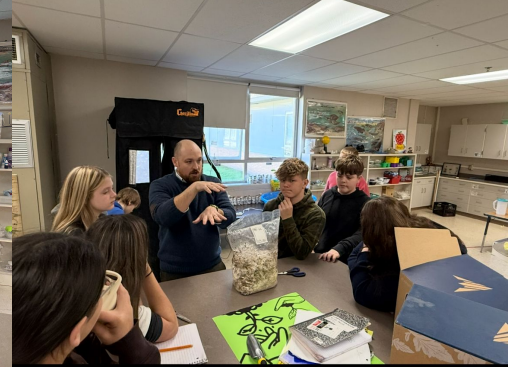
Logo and T-Shirt Business

- In order to fund raise for supplies needed, students created a logo for the hydroponics lab and inquired our school nurse who makes t-shirts to help us create memorabilia to sell
- Students were able to sell t-shirts, hoodies, sweat shirts, and long sleeves
- Pictures feature our student made logo and an example of a hoodie that was made displaying it



Mushroom Growing

- Through reaching out to the community, we discovered a professor at UPIKE that is an expert in hydroponics and mushroom growing
- Professor B. Meade allowed us to use his supplies to grow different types of edible mushrooms that he thinks one day will be a solution to food shortages
- Students use this opportunity to witness a different way of growing organisms
 - Mushrooms are fungi, not plants
- Pictures feature Professor Meade visiting our classroom, a blue oyster mushroom we were able to grow using a growth tent, and a class picture of us and a mushroom! (And a picture after I fried them all)



Pollinators and Flowers and soil health

- Pollinators are important to ecosystems as they help spread pollen among plants
- As we have learned through being unable to grow some plants in our lab, some plants require pollinators to be able to fruit!
- This has resulted in growing flowers in the lab to promote pollinators to our area by planting a combination of milkweed and a variety nectar flowers
- We also plan to grow butterflies and release them along side the flowers when they are ready to plant after the last frost
- We have also began a worm form to collect worm castings to promote healthy soil and vegetable growth

- Picture features our flower seeds freshly planted with soil we curated to ensure proper drainage for the seeds and a visit from a retired teacher that began a worm farm and taught the importance of worms in soil and gave us part of her farm for us to take care of!

