A Farm to School teaching project at the Iditarod Area School District

MOBILE HYDROPONICS

An Educational Cornucopia

“What you do today can improve all your tomorrows.

-Ralph Martson

Introduction

CTE Instructor: Christopher “Matt” Shelborne

Goals:

- using hydroponic construction to develop employability skills
- using hydroponic construction to develop career skills
- learn how hydroponics can be a sustainable system for farmers in areas with poor soil, but ample water; or to help farmers in extremely arid environments conserve water and achieve sustainability.
- applied mathematics in real world setting
- promote student interest in the continued exploration of a healthy diet through ownership of an agricultural project
- certification in a nationally recognized training program

Opportunity and Desire

1. National Center for Construction Education's core curriculum.

2. Employability instruction

3. Creating individual ownership of educational goals and career direction

1. Community service projects

ABOUT NCCER

NCCER is a not-for-profit 501(c)(3) education foundation created in 1996 as The National Center for Construction Education and Research. It was developed with the support of more than 125 construction CEOs and various association and academic leaders who united to revolutionize training for the construction industry. Sharing the common goal of developing a safe and productive workforce, these companies created a standardized training and credentialing program for the industry. This progressive program has evolved into curricula for more than 70 craft areas and a complete series of more than 70 assessments offered in over 4,000 NCCER-accredited training and assessment locations across the United States.

NCCER develops standardized construction and maintenance curricula and assessments with portable credentials. These credentials are tracked through NCCER's registry that allows organizations and companies to track the qualifications of their craft professionals and/or check the qualifications of possible new hires. NCCER's registry also assists craft professionals by maintaining their records in a secure database.

NCCER's workforce development process of accreditation, instructor certification, standardized curriculum, registry, assessment and certification is a key component in the industry's workforce development efforts. NCCER also drives multiple initiatives to enhance career development and recruitment efforts for the industry.

(from nccer.org)

NCCER CERTIFICATION

How do I offer NCCER training or assessments at my organization?

To offer NCCER training or assessments at your organization, you must become an Accredited Sponsor. You can download and review the NCCER Accreditation Guidelines, or read the Accreditation Process FAQ for more information.

If you are a school or educational organization, you must be connected with an Accredited Sponsor in the construction and maintenance industry and become an Accredited Training Educational Facility (ATEF). Please download and review the NCCER ATEF Guidelines for more information. If you do not have an industry partner that is an NCCER Accredited Sponsor, please contact NCCER and ask for our Workforce Development department at 888.622.3720.

(from nccer.org)

Pros and Cons of Hydroponics

- Increased harvests due to efficient process
- Dramatic decrease in evaporation as water can be circulated out of contact with sun.
- No wasted water from runoff
- Dramatically reduced pesticides, as most pests are soil bound
- No weeds, so no herbicides are needed
- No pollution from waste water run-off
- No need to “work the soil” or create farmable soil
- Nutrient rich water can be recycled or released to use on soil based crops
- Space is maximized, and can be stacked
- Plants can be grown year round, indoors or outdoors
- Substrate is reusable and can be made from recycled materials

- Clean water is needed
- Equipment and facility maintenance
- Poorly monitored organic fertilized systems can harbor salmonella
- Some American staple crops are a poor choice; including potatoes and carrots.
- Harvested cropland cannot be turned over to grazing
- Initial expense can be higher than soil
- In most hydroponic forms, a substrate is needed
- All plants on the system are subject to the same failures due to environmental variance being minimal.

Summer Garden in Interior Alaska

Outdoor gardens grow great in Alaska. However, they may not be readily available as teachable resources year round.

(Shelborne family garden, McGrath)

Science, Arts, and Mathematics

Science and Technology

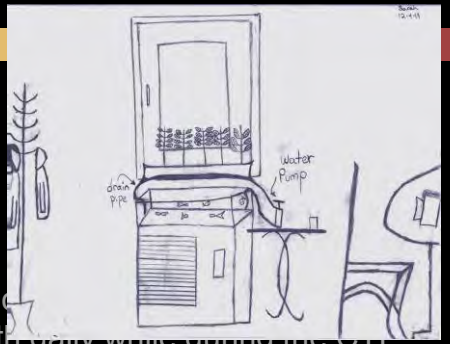
discriminate between responsible and irresponsible uses of technology
test organic hydroponic food versus store bought for pesticides, disease, and contaminants
charting, graphing, scientific process

Arts and Vocational Education

developing self employment/ employment opportunities
learn about a wide variety of materials, gfi's, etc
design systems specific to their home, business, or school
design systems to increase the aesthetic value of their home, kitchen, etc

Mathematics

using fractions
reading a tape measure
calculating cost
calculating materials
projecting cost/materials
students use applied math daily while during the CTE portion.
ratios are used to maintain the systems nutrients and ph
students will balance fiscal limits to practical needs, both individualized and on the world scale
students will use mathematics in daily life
students will use mathematics in other curriculum areas



Social, Cultural, and Personal Health

Social Studies and History

competition and partnerships: natural resources
geography and technology
project feed the world, origins and effects of philanthropy, internationalism, and food aid
human relationships within the geographic theme of climate
non-renewable resources wasted by transporting

Cultural Awareness and Appreciation

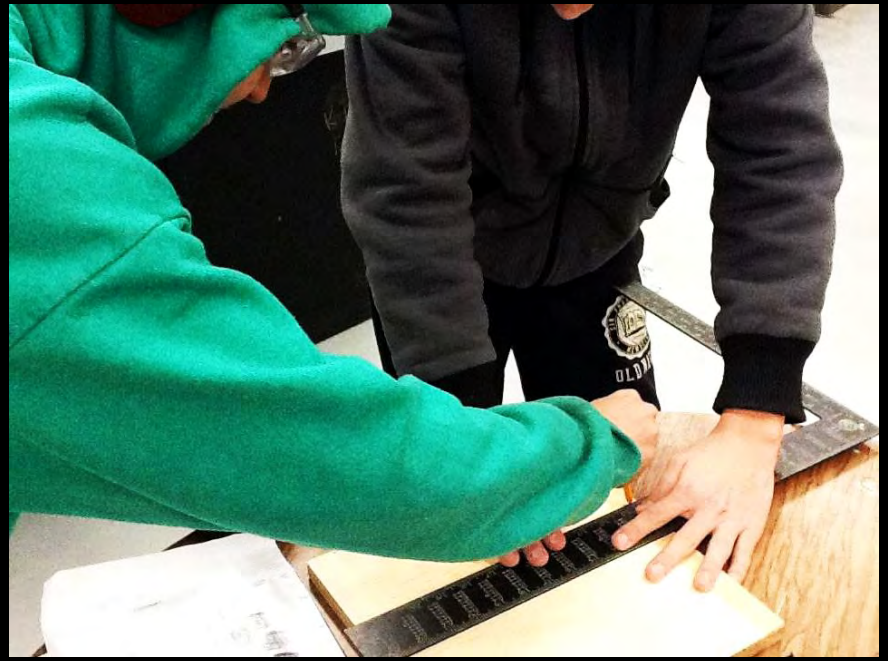
subsistence patterns
developing social and labor roles
anticipate the nutritional changes that occur when cultural systems come into contact with another
comparing traditional nutrition

Social and Physical Health

gathering data through all the senses
participating in lifetime activities
finding humor
thinking interdependently
remaining open to continuous learning
students share ideas about how to improve their designs and how to share and expand their successes

Early Aztec Hydroponics

Skill Building



I. Skills Building (calculation, assembly)
a. Building (principles, assembly)
b. 3-4-5 (applied knowledge)
c. Validating traditional education

II. Using Diverse Methods
a. Plywood, Fiberglass Epoxy, Flooring Resin (use, safety)
b. Expandable glues
c. Carriage bolts (back drilling)
d. Dados

III. Soft Skills
a. Team work
b. The reward of seeing a job through
c. Work is fun

IV. Site and Self Improvement
a. Using construction to benefit others
b. Building a sense of ownership
c. Promoting leadership roles
d. Building confidence as valued community members

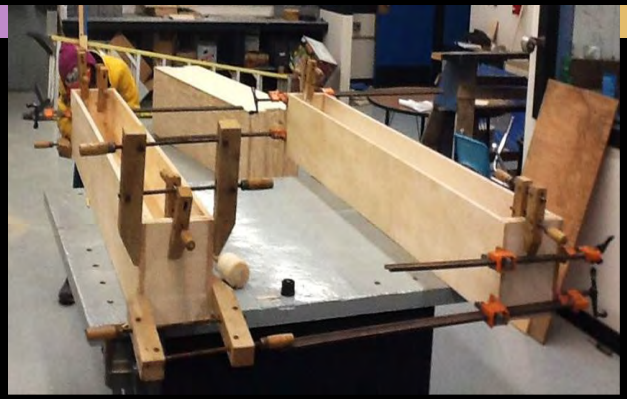
During cuts, students use a “pit-boss” style system to ensure that all safety protocols are followed.

Throughout the project, students learn to trust and rely on one another’s contributions to advance group goals.

Demonstrating Skill

Students learn to use tools correctly and to value precision. The project introduces students to important trades skills and a variety of processes.

What Ownership Means



Taking on Water

Using Fiberglass to Waterproof

supply (top)

return (bottom)

Community Outreach

KSKO 870 am

"Radio for the Western Interior"

Use whatever means you have to get the word out about your program. Build support for Farm to School programs and ask you representatives to continue supporting your children by providing Alaska Grown educational opportunities.

A Mobile Hydroponics System

Hydroponics systems can be made from countless designs, using a wide variety of new and recycled materials. Some projects are more expensive, or require more expertise than others. Select the project that best fulfills your educational goals. Hydrofarming is an educational cornucopia. Have fun and enjoy your Farm to School project!

This project was made possible by a Farm to School grant.

Basic Resources to Get You Started

akjacks.com

farnorthgardensupply.com

sbsalaska.com

foodaid.org

nccer.org

feedtheworld.org

wfp.org (UN World Feed Program)

simplyhydro.com

https://www.youtube.com/watch?v=LhWud4a5Aj8 (how to make anything waterproof with fiberglass)

iditarodsd.org (mobile hydroponic plans)