YES! Project Guide

Category: Water Quality and Conservation

Project Title: Indoor Hydroponics Station(s)

Approximate Cost: $100

Desired Results

Project Goal: **Students create an indoor sustainable hydroponic system using affordable and practical materials to grow plants (produce) all year.**

Water Quality and Conservation: **Water as a nutrient medium, importance of nutrients and chemistry to water quality, and conservative and sustainable self-watering gardening systems.**

UNDERSTANDINGS	ESSENTIAL QUESTIONS
• Plants can grow in multiple mediums • Importance of water quality to plant growth • How nutrients affect water quality • Design and applications of a hydroponic indoor growing system • What variables affect plant growth in hydroponic systems	How does water provide the nutrients necessary for plant growth? What is a hydroponic growing system and what are its benefits to plant growth? How to design a low cost hydroponic system and implement it into the classroom? How to evaluate quality and quantity of produce in a hydroponic plant system How to use and distribute produce to the classroom and beyond How to implement best practices through observation and the scientific method to improve hydroponic growing system

Knowledge and Skills Acquisition

Students will know…	***Students will be skilled at…***
• How to grow plants in water • How to design and implement a hydroponic growing system • How to observe, record, and use data to implement best practices • How to implement the scientific method • How to use data to create a statistical analysis/summary of experiment • How to grow food all year long • How to use and distribute food to increase food equity	• Designing a hydroponic plant system • Growing plants • Assembling and troubleshooting hydroponic system • Using the scientific method to collect data and make improvements • Harvesting plants and how to ensure continued harvest of lettuces • Creating creative ways to consume and use produce • Methods for creating revenue and/or food equity through food distribution

Data

Impact Evidence: Students can make scientific observations on best practices as well as quality assessments of produce. Students can record qualitative data on grow rate, amount of produce, and revenue if selling produce.

Qualitative (observations and descriptive data):

- Students create "Plant Quality" checklist and assess plants as needed
- Students write down observations during process of what works, what doesn't work, and record best practices
- Compare and contrast different plants as well as create scientific experiments changing desired variables (type or amount of light, nutrient solutions and percentages, plant varieties, and/or type of water used)

Quantitative (numerical data):

- Record data for seeds planted to seedlings transplanted
- Nutrient value concentrations
- Yield produced (to include weight)
- Gather both qualitative and quantitative data at end of school year to produce statistically analysis of total produce/yield

Timeline

Preparation: 1-2 hours, set up design and gathering materials (September-October)
Set-Up: 1-2 hours, planting, lighting, storage bins and storage unit (October)
Growing: Waiting for seedlings, transplant to net pots, and add water and nutrients to storage containers (October – June)
Harvesting: As needed (October – June)

Process

Preparation: Decide on set-up (recommend storage containers) and acquire materials list and order materials online or visit local hardware store.
Set-Up: Assemble storage shelving, lighting to include timer, storage containers (drill holes), plant starter seeds
Growing: When seedlings are established transfer to net pots, fill containers with nutrient solutions so base of net pot so roots are just touching water (ensure air in-between water and plant, eliminates the need for aerator). Set light timer for 12 hours light and 12 hours dark and ensure lights are adjusted (12-18") as plant grows.
Harvesting: Can harvest plants as microgreens or as mature plants. For lettuces, usually can harvest 2-3 times if cutting leaves. Continue to plant seeds and transfer seedlings to pots continuously.
Extension: Have students come up with recipes of how to use produce and cook as a group. Donate produce to school lunch, staff/students, local food shelf or co-op (if permitted). Create a business plan for a CSA or Farmers Market.

Resources

Hydroponics: The Very Easy Way – Larry Cipolla (Book - Amazon $25)
PDF Version
http://www.arboretum.umn.edu/UserFiles/File/2016%20Schoolyard%20Gardens/HydroponicsTheEasyWay_Cipolla.pdf