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| Lesson Plan (LP) | Author: Hannah McTier |
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| Course: Basic Agricultural Science (02.47100) |
| LP Title: Vertical Farming with Squash |
| Estimated Time: 45 minutes (project will need to be completed at home and also have more class time devoted to it once the designs are built and plants growing) |
| Grade Level: 9 th – 12 th Grade |

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| Materials, Supplies, Equipment, References, and Other Resources: |
| <p><u>Materials:</u> enough summer squash seed (yellow squash, zucchini, patty pan) for every student to have 2 seeds, access to water and an area to plant the seeds, myriad of building supplies dependent on the students' garden designs, drawing materials</p> <p><u>References:</u> https://www.georgiaffa.org/curriculum2/topic.aspx?ID=6&TID=4 , https://money.cnn.com/video/news/2018/02/07/plenty-indoor-vertical-farming.cnnmoney/index.html , for more thoughts on and activities related to vertical farming look here http://teachers.egfi-k12.org/engineer-a-vertical-farm/</p> |
| Standards: |
| <p>AFNR-BAS-12 Apply principles of environmental science as it relates to agricultural production and sustainability.</p> <p>12.4 Demonstrates how intensive production systems such as aquaculture and vertical farming can maximize production while minimizing space requirements.</p> |

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| Essential Questions/Objectives: |
| The student will be able to... |
| 1. Demonstrate how vertical farming can maximize production while minimizing space requirements by building a vertical squash garden at school. |

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| The logo for "Oh My Squash!" features the text "Oh My" in a cursive font above a circular illustration of a yellow squash and green leaves, with "Squash!" written below in a bold, sans-serif font. | farmtoschool.georgiaorganics.org | GA Standards | 45 min |
| | farmtoschool.georgiaorganics.org | #ohmysquash | |

Accommodations

For students with disabilities, the instructor should refer to the individual student's IEP to insure the accommodations specified in the IEP are being provided within the classroom setting. Instructors should familiarize themselves with the provisions of Behavior Intervention Plans that may be part of a student's IEP. Frequent consultation with a student's special education instructor will be beneficial in providing appropriate differentiation within any given instructional activity or requirement.

Interest Approach**Estimated Time:** 5 minutes

Show the following video clip as an introduction to vertical farming:
<https://money.cnn.com/video/news/2018/02/07/plenty-indoor-vertical-farming.cnnmoney/index.html> .
 Instruct students to pay special attention to what the crops are growing in and on. Explain to students that they will be designing their very own vertical farm to be built and tested at school.

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| Learning Activity 1 | Estimated Time: 15 minutes |
| Instructor Directions/Materials/ Teaching Procedure | Brief Content Outline |
| <p><i>Vertical Structure Design</i></p> <p>Have extra drawing materials ready for students Allow technology access if possible Remind them they must complete the building at home or before/after school by bringing in materials</p> | <p>This lesson is meant to be continued at home on the students' own time or before/after school. The in-class portion of the lesson is meant to be an introduction for them to the task at hand – building a vertical farm on school grounds.</p> <p>Instruct each student to get out paper and pencil. If you have technology access, then they can also use that. The project is simple. Squash has rarely, if ever, been grown in vertical farms because of the size of the adult plants and weight of their fruit.</p> <p>Each student must build their own vertical structure to grow their squash plant on or in. They must do this at home and using materials that can be easily gathered from their household without having to buy any additional materials. Students will have a week or two to build their structure and bring it into class.</p> <p>Once they bring it in, they will place it over the squash plant they planted or plant their squash plant within it and, over time, the class will determine which structure was the best. Thus, coming to an overall conclusion about how they can implement vertical farming on school property in the future.</p> |


farmtoschool.georgiaorganics.org
GA Standards
45 min
farmtoschool.georgiaorganics.org
#ohmysquash

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| Learning Activity 2 | Estimated Time: 20 minutes |
| Instructor Directions/Materials/Teaching Procedure | Brief Content Outline |
| <p><i>Planting the Garden</i></p> <p>Get permission to have a garden Have the area staked out where you will be planting Have signage ready to label each students' plant with Have all digging and watering tools ready for use Regularly water the plants as they grow in preparation for the structures to be placed</p> | <p>After students have had a little time to think about what kind of structure they are going to build, take them to where the garden will be. This can be in a greenhouse, in a raised bed, along a fence line, etc. – anywhere that was approved by the school ahead of time or already designated for planting.</p> <p>Each student should stake out their own spot, plant their two seeds, and label their spot for future reference. Remind students that this is the space their structure will have to fit in and the plant will have to grow on or in the structure. The whole point of this exercise is to save space and increase fruit production, so be sure the students plant their seeds closer together than is advised on the seed packets. I suggest going ahead with the planting of the seed because it can take several weeks before the plant is big enough to trellis or transplant.</p> <p>You can also start the seeds in small pots or seed trays for easy transplanting later. If students have ideas that involve planting the seed within the structure they create, this may be the best route for you.</p> <p>*If space is limited or students struggle with the concept, consider allowing two or three students to work together rather than alone.</p> |

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| Summary (Reflection) | Estimate Time: 5 minutes |
| Have students submit a rough sketch or summary of what they are planning to build to grow their squash plant on or in. They should submit this plan as a ticket out the door. | |

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| Assessment |
| Formative: Assess the students' creations as they bring them into class and assign them a participation or formative grade based on their efforts. Grant bonus points to the student whose design holds up the best in the end. |
| Summative: N/A |

