

Alternatives to Traditional Gardening

Brief Description:

In this project-based learning lesson, students will read articles and view digital media to gather information about plant growth. They will learn about the nutrients plants need and the environmental factors that contribute to healthy plant growth. They will explore how people who live in urban areas get their food as well as learn alternative gardening methods including hydroponics, aquaponics, container gardening and vertical gardening. The students will research at least two of the gardening methods that interest them using multiple sources such as interviews, articles and videos. They will compare and contrast the gardening methods they research and then write an opinion essay on the gardening method they prefer, using evidence from their sources to support their position. The students will then work in teams to design and construct an alternative garden using recycled materials. Using the rubric, they will organize their information and use digital resources to prepare a presentation.

Objective:

Students will:

1. Learn about the nutrients and environmental factors that contribute to healthy plant growth and what factors prevent some people and communities from gardening.
2. Design and plan an alternative (non-traditional) garden and present their findings to the class.

Time:

Introduction: one class period

Activity 1: 50 minutes to create a survey; one week - daily data collection

Activity 2: 50-100 minutes to research information; one week to complete presentation in class or after school

Background:

Anytime is a great time to try a different approach to traditional vegetable gardening! If you don't have the proper resources,

the physical ability, or the space for a large garden there are alternatives. Limited space and light can also be a good reason to try something different. There are many different types of alternative gardens; some do not require soil, some require less space, some use different methods of supplying nutrients to the plants, some are specific to a culture or geography and some are themed. Examples of theme gardens include salsa, pizza or soup gardens (see pages 27-28).

Examples of alternative gardens that require less space and in some cases no soil are:

Container gardening is a good option for apartments, rooftops, balconies, terraces and other small spaces. Almost all vegetables can be grown in a variety of containers as long as they are big enough and provide adequate drainage.



Florida Standards:

SC.6.N.1.1, SC.7.N.1.3, SC.7.L.17.3, SC.8.N.1.4, LAFS.6.RI.1.1, LAFS.6.RI.1.2, LAFS.6.RI.2.6, LAFS.6.RI.3.8, LAFS.6.RI.3.9, LAFS.6.SL.1.2, LAFS.6.SL.2.4, LAFS.6.SL.2.5, LAFS.6.W.1.1, LAFS.6.W.2.6, LAFS.6.W.3.9, LAFS.7.RI.1.1, LAFS.7.RI.1.2, LAFS.7.RI.2.6, LAFS.7.RI.3.8, LAFS.7.RI.3.9, LAFS.7.SL.1.2, LAFS.7.SL.2.4, LAFS.7.SL.2.5, LAFS.7.W.1.1, LAFS.7.W.2.6, LAFS.7.W.3.9, LAFS.8.RI.1.1, LAFS.8.RI.1.2, LAFS.8.RI.2.6, LAFS.8.RI.3.8, LAFS.8.RI.3.9, LAFS.8.SL.1.2, LAFS.8.SL.2.4, LAFS.8.SL.2.5, LAFS.8.W.1.1, LAFS.8.W.2.6, LAFS.8.W.3.9, MAFS.6.G.1.4, MAFS.6.SP.2.5, MAFS.7.RP.1.1, MAFS.7.RP.1.2, MAFS.7.RP.1.3

Hydroponics gardening is a method of growing plants without soil but instead using mineral nutrient solutions in water.

Aquaponics gardening is a food production system that combines conventional aquaculture (raising aquatic animals such as snails, fish, crayfish or prawns in tanks) with hydroponics (cultivating plants in water) in a symbiotic environment.

Vertical gardening can use trays stacked against a wall or containers attached to a vertical structure. Whether it's because of limited space or to cover an unattractive wall, this is great way to cultivate and grow small plants and herbs.

Introduction:

1. Conduct class discussion about what plants need to grow. Students should have an understanding of what nutrient are available in the soil (nitrogen, potassium and phosphorous) as well as environmental factors such as sunlight and space. See lesson "Feed Me-Nutritional Building Blocks" from *Gardening for Grades* or "In Search of Essential Nutrients" from *Gardening for Nutrition* for more about NPK.
2. Brainstorm the factors that might prevent people in various communities or dealing with challenging conditions (urban areas, deserts, limited water or soil) from vegetable gardening.
3. Brainstorm or discuss different type of gardens from different methods to different designs and themes.

Activity 1:

1. Students will work in groups to design a survey method to gather more information about the drawbacks to traditional gardening in their community.
2. They will survey their community about what prevents them from vegetable gardening or how they are able to garden at their homes using various resources (blogs, pencil/paper survey, interviews). Possible survey questions are:
 - a. Do you have a vegetable garden?
 - b. If yes, what does your garden look like? Is it a traditional bed, hydroponics, container, etc.?
 - c. Why did you choose that gardening method?
 - d. If no, why don't you garden?
 - e. What, if anything, would encourage you to garden?

Activity 2:

1. In groups, students will explore two alternatives to traditional gardening that meet the needs of the community they selected. If the surveys showed that people in the community were not gardening due to lack of space, then

have students choose the best two methods that grow the most food in the least amount of space. If the survey showed that it was not lack of space, then other methods can be chosen based on either cultural or theme.

2. Students (as a group or individually) will write an opinion essay (one page typed, double-spaced or two pages handwritten) using evidence from the resources they use to explain the alternative gardening methods they chose. At least three sources must be used; two of them being government- or education-based and one can be a personal opinion or blog. The parameters of this part of the activity can change with the teacher and class.
3. Each group will prepare a multimedia presentation (PowerPoint, Prezi, infographic, etc.) that documents the results of their research. They will explain which non-traditional method they chose that best meets the needs of a particular community and include the pros and cons of the methods. Students will design and determine the resources (including costs) needed to construct the alternative garden, as well as prepare a scaled-down model of what the garden will look like once completed. Suggest that presentations be at least five minutes long and include the how-to model.
4. A sample rubric is included on page 152 to assist with planning and organizing presentation.

Extensions:

1. Seek funding and volunteers to assist with constructing and maintaining the alternative garden.
2. Each team can construct the alternative garden and compare the results.
For instance...
How long did it take the seeds to germinate?
How much did each garden yield?
What was the cost of each garden?
3. Use Google Earth to determine places in the community where gardens could be created.
4. Discuss the drawback(s) to each alternative garden.
5. Have students brainstorm ideas for other forms of alternative gardens.
6. Create an infomercial for one of the alternative gardening methods.

Evaluation:

1. Grade students on the thoroughness of their surveys and ability to work in a group.
2. Use sample rubric on page 152 to grade multimedia presentation.

Resources:

<https://app.discoveryeducation.com/search?Ntt=what+plants+need+to+grow> (video)

<https://afsic.nal.usda.gov/education-and-research/classroom-and-curricula>

<http://www.globalgardenfriends.com/2013/01/everything-you-need-to-know-about-hydroponics/>

<http://www.growingpower.org/education/what-we-grow/aquaponics/>

<https://www.youtube.com/watch?v=-z1kozprw8Y>

<http://www.rodalesorganiclife.com/garden/container-gardening>

<http://containergardening.about.com/od/vegetablesandherbs/ss/10-Great-Vegetables-to-Grow-In-Containers.htm>

<http://www.woollypocket.com/vegetable-herb-gardening?gclid=CKi5yq3tnMcCFcEUHwod23EKAg>

<http://www.diynetwork.com/how-to/outdoors/gardening/how-to-grow-a-vertical-vegetable-garden>

Project-Based Learning: Alternatives to Traditional Gardening

Sample Pre-Post Test Assessment

List three advantages and three disadvantages to:

1. Hydroponics gardening

2. Container gardening

3. Vertical gardening

4. Aquaponics gardening

Alternative Gardening - Multimedia Presentation Rubric

| Criteria | 4 | 3 | 2 | 1 |
|--|---|--|--|--|
| Research of Community | <input type="checkbox"/> Use of three or more sources <input type="checkbox"/> Factual information is accurate <input type="checkbox"/> Narrow focus of topic | <input type="checkbox"/> Use of two sources <input type="checkbox"/> Most information can be confirmed <input type="checkbox"/> Topic could be more narrowly focused | <input type="checkbox"/> Use of one internet source <input type="checkbox"/> Some errors in information <input type="checkbox"/> Topic somewhat broad | <input type="checkbox"/> Use of only one source <input type="checkbox"/> Numerous errors in information <input type="checkbox"/> Topic too general |
| Organization (Outline or Storyboard for Planning) | <input type="checkbox"/> Logical sequencing <input type="checkbox"/> Menus and paths are clear <input type="checkbox"/> Original, inventive, creative | <input type="checkbox"/> Somewhat logical sequencing <input type="checkbox"/> Menus and paths are mostly clear <input type="checkbox"/> Original | <input type="checkbox"/> Sequencing is poorly planned <input type="checkbox"/> Menus and paths are sometimes confusing <input type="checkbox"/> Little originality | <input type="checkbox"/> Sequencing is confusing <input type="checkbox"/> Menus and paths are confusing <input type="checkbox"/> Inconsistent <input type="checkbox"/> Rehash of other people's ideas |
| Gardening Graphic/ Design Method | <input type="checkbox"/> Covers topic completely and in depth <input type="checkbox"/> Accurate list of materials <input type="checkbox"/> Effective combination of multimedia and persuasive design elements | <input type="checkbox"/> Covers topic <input type="checkbox"/> List of most materials <input type="checkbox"/> Good combination of multimedia and design elements | <input type="checkbox"/> Barely covers topic <input type="checkbox"/> Some materials <input type="checkbox"/> Some use of multimedia and design elements | <input type="checkbox"/> Does not adequately cover topic <input type="checkbox"/> Very few materials listed <input type="checkbox"/> Zero to one media used |
| Mechanics | <input type="checkbox"/> Correct grammar, usage, mechanics and spelling <input type="checkbox"/> All sources are correctly cited | <input type="checkbox"/> Few grammar, usage, mechanics or spelling errors <input type="checkbox"/> Most sources are correctly cited | <input type="checkbox"/> Several grammar, usage, mechanics or spelling errors <input type="checkbox"/> Some sources are incorrectly cited | <input type="checkbox"/> Obvious grammar, usage, mechanics, or spelling errors <input type="checkbox"/> Sources are not cited |
| Teamwork (optional) | <input type="checkbox"/> Work load is divided and shared equally | <input type="checkbox"/> Some members contribute | <input type="checkbox"/> Few members contribute | <input type="checkbox"/> One or two people do all of the work |

Name: _____

Team: _____

Final Score: _____