

Greenhouses: Making Plants Happy! Urban Gardening	
Next Generation Science Standards (NGSS)	5-ESS3-1. 4-ESS2-1. 3-5-ETS1-1.
Materials Needed	Jayden's Impossible Garden by Melina Mangal, Plant Growth Data Sheet, cleaned 2L clear soda bottle, scissors, biodegradable plant cups, seedlings, paper/crayons/pencils for promotional flier, promotional flier guidelines (included in lesson plan), chart Paper for KWL chart
Phenomenon	
Urban gardening is the practice of growing plants, fruits, and vegetables in urban areas. These gardens could be grown on a rooftop, out of a box, community gardens, or can even start in a plastic container.	
Engage	As part of a class discussion, students will be asked what they think of when they think of big cities. They will then create a KWL chart about garden benefits. Students will also be asked how we can bring plants and gardens into our own classroom/school community.
Explore	On day 2 students will be split into groups of 2 or 3. Each group will be given materials to create a planter. They will work on this planter for the rest of the class.
Featured Sources	<ul style="list-style-type: none"> • Plant Growth Data Sheet • "10 Urban Agriculture Projects in Berlin, Germany" • "Berlin's Airport Garden" • "Berlin Eats It's Greens" • "How Plants Grow for Kids" • "Jayden's Impossible Garden by Melina Mangal" • Picture of Manhattan • Prinzessinnengarten • "Strengthening Local Food Systems Through Urban Gardening"
Explain	Students will construct a planter.
Create a Prototype	In their groups, students will share their prototype planters with the class and explain why they designed their plant home in the way they chose.
Elaborate	On day 3, students will learn more about German Urban Gardens and create their own promotional flier about an urban garden in Germany.
Evaluate	Students will use the Plant Growth Data Sheet that is provided and will need to check back each week to measure their plant growth and compare with other groups who have a different design.

PHENOMENON

What is an urban garden and what are the benefits? Urban gardening is the practice of growing plants, fruits, and vegetables in urban areas. These gardens could be grown on a rooftop, out of a box, community gardens, or can even start in a plastic container.

Target Grade Level: 3rd – 5th Grade

Target Course(s): STEM/Science

INQUIRY OVERVIEW:

Students will be introduced to urban gardening and watch a quick video about urban gardening in Germany. Students will discuss what urban gardening is and the benefits it provides a community. Students will then create their own greenhouse garden using recycled materials. This model will be kept in the classroom and observed over time. At the end of the unit, students will research urban gardens in Germany that have successfully brought plant life into the big cities and will create a promotional flier that showcases these urban gardens and shows students' understanding of the unit.

Source:

- DW News. "Berlin Eats It's Greens." *YouTube*, 2016, <https://www.youtube.com/watch?v=rYlk-Hd3Y3I>.

TEACHER BACKGROUND INFORMATION:

Urban gardening is the practice of growing plants, fruits, and vegetables in urban areas. These gardens could be grown on a rooftop, out of a box, community gardens, or can even start in a plastic container.

Benefits of urban gardening: gardens are being grown locally instead of on faraway farms, so it cuts down on transportation needs and carbon emissions; these green spaces in cities help reduce "urban heat island effect"; urban gardens help connect the community and build friendships, and healthier diets from the produce grown promotes healthier diets and improved well-being.

Listen to the podcast, "[Strengthening Local Food Systems Through Urban Farming](#)" for more information on urban gardening. (24 minutes)

Examples of Urban Gardens in Germany:

- [Prinzessinnengarten](#) - an urban garden in the heart of Berlin at the former Neuer St. Jacobi cemetery. A collection of dedicated Berliners takes care of this space. They specialize in plants and bees of the Prinzessinnengarten. The previous 6,000 m² ecological and social garden landscape at Moritzplatz is used as an inclusion and community garden for the neighborhood.
- Berlin Tempelhof Airport - this airport turned into a garden in 2011. This once empty and vast space within Berlin was overrun by weeds, trash, and squatters. Today this space offers over 5,000 meters of space and over 300 raised planter beds.

For more information on Urban Gardening in Germany and the US, please see:

- "Green Urban Projects | About.visitBerlin.de." *About.visitberlin.de*, about.visitberlin.de/en/green-urban-projects. Accessed 6 May 2024.
- Christiansen, Jody. "Urban Gardens Promote Education, Nutrition and More." *Www.usda.gov*, 28 Oct. 2015 www.usda.gov/media/blog/2015/10/28/urban-gardens-promote-education-nutrition-and-more.

Sources:

- Gray-Ward, Melisa. "Berlin's Airport Garden." *Wonderground*, 25 Nov. 2015, <https://wonderground.press/gardens/templehof-airport-garden/>.
- "Prinzessinnengarten." *Prinzessinnengarten.net*, <https://prinzessinnengarten-kollektiv.net/>. Accessed 6 May 2024.
- "Strengthening Local Food Systems Through Urban Gardening." *Florida Organic Growers*, 18 Oct. 2021, <https://freshtake.buzzsprout.com/491938/9389766-strengthening-local-food-systems-through-urban-farming>

SUGGESTED TIME FRAME:

Approximately 3 days with 45-minute sessions each day. Checking on plants throughout a timespan of a few weeks.

CONCEPT LIST:

- Photosynthesis
- Chlorophyll
- Respiration
- Urban gardens
- Indoor farming

MATERIALS NEEDED:

- **Plant Growth Data Sheet** (attached at end of lesson)
- **Scoring Rubrics** (attached at end of lesson)
- Book (also available on *YouTube*): Jayden's Impossible Garden by Melina Mangal
- Cleaned 2L clear soda bottle
- Scissors
- Biodegradable plant cups
- Seedlings
- Paper/crayons/pencils for promotional flier
- Promotional flier guidelines (included in lesson plan)
- Chart Paper for KWL chart

FEATURED SOURCES:

- *Agclassroom.org*, 2024, cdn.agclassroom.org/media/uploads/2019/03/26/manhattan-271453_960_720.jpg. Accessed 6 May 2024.
- DW News. "Berlin Eats It's Greens." *YouTube*, 2016, <https://www.youtube.com/watch?v=rYlk-Hd3Y3I>.
- Elementary Book Nerds. "Jayden's Impossible Garden by Melina Mangal." *YouTube*, 2023, <https://www.youtube.com/watch?v=vM7APYsnYo>.
- Gray-Ward, Melisa. "Berlin's Airport Garden." *Wonderground*, 25 Nov. 2015, <https://wonderground.press/gardens/templehof-airport-garden/>.
- Learn Bright. "How Plants Grow for Kids." *YouTube*, 2023, <https://www.youtube.com/watch?v=u46A0WKp2nk>.
- "Prinzessinnengarten." *Prinzessinnengarten.net*, <https://prinzessinnengarten-kollektiv.net/>.
- Small, Sarah. "10 Urban Agriculture Projects in Berlin, Germany." *Foodtank*, Mar. 2014, <https://foodtank.com/news/2014/03/ten-urban-agriculture-projects-in-berlin-germany/>.
- "Strengthening Local Food Systems Through Urban Gardening." *Florida Organic Growers*, 18 Oct. 2021, <https://freshtake.buzzsprout.com/491938/9389766-strengthening-local-food-systems-through-urban-farming>

Next Generation Science Standards (NGSS) / State Content Area Standards:

5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environment.

4-ESS2-1. Earth’s Systems: Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

3-5-ETS1-1 Engineering Design: Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

► **Key Literacy Connections:**

CCR Writing Anchor #2: Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

WHST.6-8.2: “...Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples...”

WHST.9-10.2: “...Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience’s knowledge of the topic...”

WHST.11-12.2: “...Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience’s knowledge of the topic...”

► **Relevant Domain(s) of Disciplinary Core Ideas:**

Life Sciences, Earth and Space Sciences, Technology

► **Science and Engineering Practices:**

Asking questions and defining problems, engaging in argument from evidence, and constructing explanations (for science) and designing solutions (engineering).

► **Crosscutting Concepts:**

Structure and function, Energy and Matter, Cause and Effect

PHENOMENON / MAIN PROBLEM:

What is an urban garden and what are the benefits?

Engage:

On day 1, students will be pulled together for a class discussion. Show a picture of a big city with buildings. Students will be asked what they think of when they think of big cities (buildings, people, lights, etc.). What about gardens, plants, fruits and vegetables? Students will respond and have a quick discussion about vegetation in big cities.

Students will then create a KWL (Know/Want to Know/Learned) chart about garden benefits. Students will be shown pictures of urban gardens from [Berlin Templehof Airport](#) and [Prinzessingarten](#). Students will be given the opportunity to add what they already know about garden/plant benefits, and questions they may have about gardens/plants. At the end of the unit, the class will refer to the “L” portion of the chart to add what was learned.

The teacher will then read the picture book or view the read aloud video “Jayden’s Impossible Garden” by Melina Mangal. Students will have a quick discussion about the book and how the garden in the big city helped the characters in the book.

Students will then be asked how we can bring plants and gardens into our own classroom/school community (plant flowers, vegetation, start a garden outside). Students will discuss what is needed to make their own indoor planter. Teachers will make a list of student ideas on the whiteboard. Ask, “What do plants need to survive?” (water, sun, a home, some need dirt, etc.). If students are struggling, the teacher can show the YouTube video “[How Plants Grow for Kids](#)” for more information.

► Sources:

- *Agclassroom.org*, 2024, cdn.agclassroom.org/media/uploads/2019/03/26/manhattan-271453_960_720.jpg. Accessed 6 May 2024.
- Elementary Book Nerds. "Jayden's Impossible Garden by Melina Mangal." *YouTube*, 2023, <https://www.youtube.com/watch?v=vM7APYysnYo>.
- Learn Bright. "How Plants Grow for Kids." *YouTube*, 2023, <https://www.youtube.com/watch?v=u46A0WKp2nk>.

► Anticipated Guiding Questions:

- How can you design an indoor planter that will house your own plant?
- How can you adjust your model to help your plant grow better?

Explore:

On day 2, students will be split into groups of 2 or 3. Each group will be given materials to create a planter. Materials include: an empty and clean 2L plastic bottle, scissors, biodegradable plant cups, seedlings, soil, and a small cup of water. Students will be told they need to create an indoor garden with the materials provided. Students will discuss with their groups what important elements need to be included in their indoor garden model. The teacher will prompt the groups to cut their 2L plastic bottle to help create condensation inside the bottle and to let the most amount of light in. The teacher will let the students explore different ways to construct the best home for their plants.

Explain:

Students should be able to construct a planter, making sure the plant can breathe (holes, cuts, etc.), has soil for the roots to expand, the ability for sunlight to pass through, and the ability to water or collect its own water.

► Create a Prototype / Investigating Solutions:

Students in their groups will share their prototype planters with the class and explain why they designed their plant home in the way they chose. This section of the lesson will need to be collected over a few weeks.

*The **Plant Growth Data Sheet** is attached at the end of the lesson plan.

Elaborate:

On day 3, students will learn more about German Urban Gardens that are relevant in Germany today. Students can watch the YouTube video, "Berlin Eats It's Greens", which is an overview of urban gardening in Germany. Students will review the article "10 Urban Agriculture Projects in Berlin, Germany" to learn about various urban gardens in Berlin. Older students can research these urban gardens on their own with teacher-led support.

Students will then create their own promotional flier about an urban garden in Germany of their choosing. They will continue research on the garden and include it in their flier. In the flier they can include: their German urban garden's name, a picture (drawn or found online), benefits of urban gardening, where the garden is located, some plants that are grown there, activities they have at the garden, and what type of planters they have at the garden (vertical, raised beds, containers, etc.).

To wrap up the lesson, students will return to the KWL chart to review everything they have learned about urban gardening and add any information in the "L" column.

► Sources:

- DW News. "Berlin Eats It's Greens." *YouTube*, 2016, <https://www.youtube.com/watch?v=rYlk-Hd3Y3I>.
- Small, Sarah. "10 Urban Agriculture Projects in Berlin, Germany." *Foodtank*, Mar. 2014, <https://foodtank.com/news/2014/03/ten-urban-agriculture-projects-in-berlin-germany/>.

Evaluate:

Students will use the **Plant Growth Data Sheet** (attached at end of lesson) and will need to check back each week to measure their plant growth and compare with other groups who have a different design. Pick a day to come back to measure (Mondays, Wednesdays, etc.).

VIRTUAL EXCHANGE:

Students may be able to attend a virtual exchange with the Prinzessinnengarten in Germany.

CAREER CONNECTION EXPLORATION:

Students could develop a career connection to farming, gardening, or engineering.

MODIFICATIONS FOR DIFFERENTIATION:

- Students should be paired intentionally. Students may also alternatively draw a picture of the plant cycle and how to use the materials to create a comfortable atmosphere for their plant.
- Students can use technology/computers to design their promotional flier.



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