

Rooftop Garden

Explore the benefits a rooftop garden provides an urban environment including agriculture, beauty, parks and clean air. Construct your own rooftop garden prototype incorporating structural and architectural engineering principals to ensure your design can support the building, plants and soil.

Materials:

- 2 small shoeboxes – should be at least 5 inches tall
- 2-4 thermometers (use digital thermometers if available)
- 6" x 6" sheets of dark plastic (trash bags)
- Aluminum foil
- Construction paper
- Foam board strips
- Glue gun/glue (optional)
- Heat lamp
- Heavy clear tape
- Ruler
- Scissors
- Sheets of black sand paper
- Small sections of sod/ moss or pre-potted ground cover
- Timer, clock, or stop watch

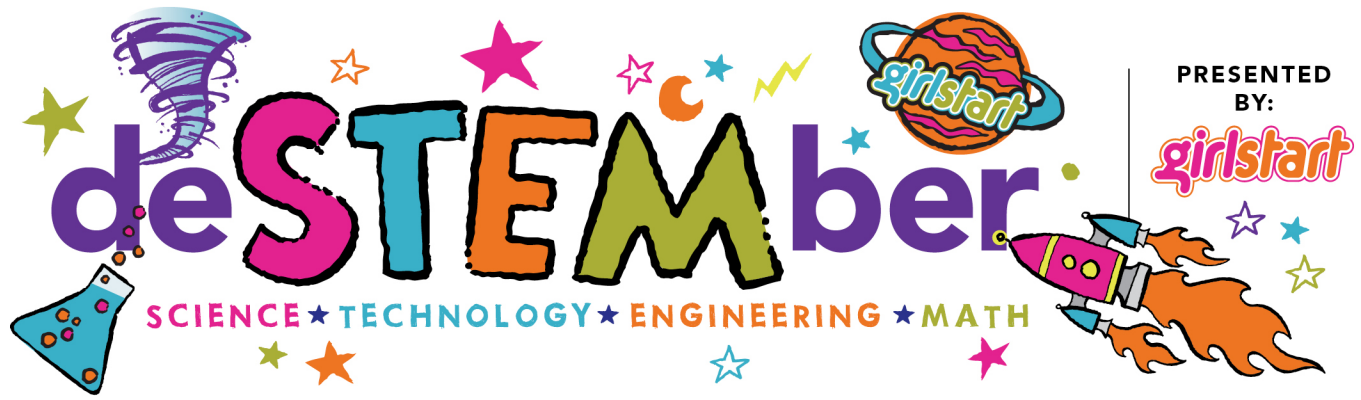
TEKS:

- 4.6B Differentiate between conductors and insulators.
- 5.7C Identify alternative energy resources such as wind, solar, hydroelectric, geothermal, and bio-fuels.
- 5.9D Identify the significance of the carbon dioxide-oxygen cycle to the survival of plants and animals.
- 6.7B Design a logical plan to manage energy resources in the home, school, or community.

How To

1. Turn your shoe box upside down so the open side is on the table.
2. Cut a doorway into the bottom of one side, leaving the door attached so it can be closed.
3. Attach the black sandpaper to the top of the box.
4. Attach the black trash bag on top of the sandpaper.
5. Arrange soil and plants over the plastic.
6. Attach strips of foam board around the perimeter of the roof to create a small wall around the plants.
7. Decorate your building!
8. Turn your second shoe box upside down and attach black sandpaper to the top.

31 Days of STEM FUN!



Rooftop Garden

How To Continued...

- Place both shoeboxes under a heat lamp and put a thermometer inside each box, as well as on top of each box.
- Record the starting temperature of each thermometer.
- Record the temperature of each after 5 minutes. Do this 3 times.
- Now remove the shoeboxes from under the heat lamp and place a fan blowing on them. Turn off the lights to simulate nighttime.
- Repeat steps 10-11 for the windy night scenario.

Why Does it Work?

The temperatures inside the buildings will be cooler because the building insulates from some of the heat. The garden may be cooler since black absorbs more heat. A rooftop garden acts as an extra insulator, keeping the house cooler in heat and warmer in the cold. Soil is moister and takes longer to heat up, which cools down the house during hotter times. It also holds heat during the colder days because it takes longer to cool down than concrete and tar.

Career Connection:

Structural engineers design or reinforce buildings so they are strong enough to support rooftop gardens. They might also determine how best to direct water to flow from the roof of the building to the ground. **Environmental engineers** play a role in determining how effective the garden might be at improving air quality. **Agricultural engineers** find ways to improve crop yield so that people in the city can grow their own food.

Resources: http://www.teachengineering.org/view_activity.php?url=collection/cub_/activities/cub_rooftop/cub_rooftop_lesson01_activity1.xml
http://www.huffingtonpost.com/2009/08/31/8-rooftop-gardens-from-ar_n_268573.html
<http://www.dailymail.co.uk/news/article-2139899/New-Yorks-secret-skyline-Amazing-aerial-shots-rare-glimpse-hidden-rooftop-world.html>

31 Days of STEM FUN!

www.destember.org | #deSTEMber | © 2013 by Girlstart www.girlstart.org

DeSTEMber is a trademark of Girlstart