

TrashMasters!™  
Team **Up** to Clean **Up**



High School Division  
Bronx Borough  
Honorable Mention

**Cardinal Spellman  
High School**

# 2012 GOLDEN APPLE AWARDS

This certificate is awarded with the sincere appreciation and esteem of a grateful Department and City in recognition of your school's efforts to help make New York City shine.



City of New York  
Department of Sanitation  
Bureau of Waste Prevention, Reuse and Recycling  
[nyc.gov/wasteless](http://nyc.gov/wasteless)

**NYC**  
recycle more,  
waste less!

# 2012 Golden Apple Awards Contest Entry Judging Info

(This sheet prepared for judges' use by DSNY BWPRR)



**ID Info:** 12030  
**School:** Cardinal Spellman High School  
**Grade Division:** HS  
**Borough:** BX

**Golden Shovel Award contestant**  
(for borough Master School Composter)

## 2012 Project Entries received for:

**School Population: total #** 1463

**TrashMasters! Super Recyclers** Received:

**TrashMasters! Reduce & Reuse Challenge** Received:

**TrashMasters! Team Up to Clean Up** Received: 5/1/2012    
Vertical Garden Using Recyclable Materials

Our Living Environment and Earth Science classes have created designs for vertical gardens using recyclable materials. In the school, these plants are grows in, displayed in, and stay in housing that has come from materials that would normally be thrown away.

## Prior Year Entries:

first entry

## School Contact Information:

**Phone:** 718-881-8000 x269  
**Address:** 1 Cardinal Spellman Pl  
Bronx 10466

**Block&Lot:** 2049050265  
**DOE Location:**  
**DOE Bldg:**

## REQUIRED for Super Recyclers only:

**Custodian:** Frank Ortiz  
**Custodian's Phone:**  
**Custodian's Email:** fortiz@cardinalspellman.org

## Sustainability Coord:

**Contest Coordinator:** Rita Pilerio  
**Coord Phone (if different):**  
**Coordinator Email:** kodonnell@cardinalspellman.org

**Principal:** Dan O'Keefe  
**Principal Email:** dokeefe@cardinalspellman.org

## Comments (may not be relevant to judging)

**Info Confirmed:**

## **SCHOOL INFORMATION:**

- School Number:
- 
- Official School Name: Cardinal Spellman High School

## **CONTEST ENTRY INFO:**

- Borough: Bronx
- Grade Division: High School)
- Contest Entry Title : Cardinal Spellman's Recyclable Vertical Gardens
- Contest Entry Summary:

Students are creating vertical garden structures using recycled materials. The project was inspired by the Botanical Gardens vertical gardening exhibit and also from their ecology education which inspired awareness of limited soil space in urban areas. The students decided to use the following recycled material to germinate and grow their plants: aluminum cans, cardboard toilet rolls, and plastic water and soda bottles. Some of the other materials used in the project are "re-used" materials that the Spellman community has been collecting over time. These materials include: an old blanket, plastic flower pots, and old paint. By using these products the students feel that they would reduce landfill space. The students developed their designs after researching possible vertical structures that would be conducive to our environment. They then formulate a budget, vendor list, design, supply list and a procedure for constructing the structures. The structures will then be displayed in the Spellman Community. Areas include a community courtyard, a memorial garden and a metal fence that is surrounds an area of the school. Students involved in the germination process collaborated with the Botanical Gardens on seed germination and soil mixtures. The germination team set up a potable greenhouse and germinated their seeds in toilet tubes. They chose this method to "reduce "waste. The cardboard rolls will be placed in the pots after germination is complete. The rolls will eventually dissipate since they are biodegradable.

## **STUDENT INVOLVEMENT**

- Student Participation: Core Group #4-6 students
- Student Participation: Total #155
- School Population: Total #1650

## **CLEANUP AND GARDENING PROJECTS**

For each project you initiated, briefly describe and document the following:

### IMPLEMENTATION

- **Why this?**

This project was chosen because we, as a school community, wanted to create a garden in an urban area in which space is. To create the garden we chose to "go green" when looking into materials to germinate our seeds and construct our gardens

so as to do our part to minimize landfill expansion. Our biology classes have been working developing their knowledge of ecology and with this information they were given the task to design, create and implement the production of vertical gardens. They will then, hopefully, use these techniques in their own communities for the embitterment of the environment. It also creates an awareness of landfill usage and how detrimental soil pollution is to their everyday life.

- **What did you do?** Describe and include photos of the site before, during, and after your efforts. (*Submit project plans if your project is not completed by contest entry deadline.*)

To help the students realize their goal of using waste byproducts as a means of creating a vertical garden, they first had to develop a plan for a.) how the structure would look and b.) how the soil would be cultivated so the seeds could germinate. The biology classes are in charge of making the structure for the plants to sit upon. They had to create a drawing of their concept, decide what recyclable materials they would use, how much it would cost and where it would be set up. The Earth Science classes had to create a recyclable pot and then determine what minerals and nutrients they would use to create a viable soil for the plants to germinate.

- **Project planning.** Your objectives, and the planning and organization that drove this project.

Our objective for this project is to create a vertical garden using recyclable materials. Being inspired by the exhibit at the Botanical Garden, our classes wanted to create structures that could make a difference in the planet while also making a difference in our school community. Some of the materials that had to be coordinated to be brought in were: Self watering pots two liter bottles and 16.9 oz bottles, Aluminum cans, Toilet Paper Rolls, Recyclable materials to pad out the pots to be covered by soil and reusable materials that would normally be disposed of in the trash (shower curtain and blankets).

- **Student involvement.** All student efforts to plan and implement the project. Include activities conducted by classrooms, cluster, grade, school wide, team, club, or afterschool program.

To achieve the task, each member has been assigned a role in the group by a peer leader and all will collaborate in order to successfully complete their objective. Students have submitted a preliminary design & procedure with vendor list, supply list which would include the use of recycled and reused materials. The Earth Science classes are broken down in a similar fashion, but they had to come up with a plan on what type of recyclable materials they could use to make a pot for planting and what nutrients would be best suited for their plant to grow optimally.

- **Promotion.** Efforts to promote this project, such as announcements, memos, flyers, posters, letters, web pages, skits, songs, assembly programs, media coverage, or other special events.

Teachers announced to students in their classes to bring in from their home materials such as: toilet rolls, plastic bottles, old flower pots, and materials that people would no longer use that we could use in the designs (old blanket, twine, rebarb pipe, shower curtain). Structures will be displayed at various school functions such as Open House so more people in the community can be educated on the vertical garden concept.

- **Collaboration.** Any corroboration with other schools, professionals, businesses, or community organizations on this project. Did you solicit donations or help?

The Botanical Garden has been an extremely helpful partner in this project. Representatives from the Garden supplied the seeds and many wonderful ideas as to how to set up our gardens. A special collaboration with... helped drive the project to

- **Educational components.** Include learning standards met, lesson plans, and exemplary samples of student work.

Standard 1: Students will use mathematical analysis, scientific inquiry, and engineering design, as appropriate, to pose questions, seek answers, and develop solutions.

Standard 2: Students will access, generate, process, and transfer information using appropriate technologies.

Standard 4: Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.

Standard 5: Students will apply technological knowledge and skills to design, construct, use, and evaluate products and systems to satisfy human and environmental needs.

Standard 6: Students will understand the relationships and common themes that connect mathematics, science, and technology and apply the themes to these and other areas of learning.

Standard 7: Students will apply the knowledge and thinking skills of mathematics, science, and technology to address real-life problems and make informed decisions.

## **PROJECT ANALYSIS**

### **What worked:**

To date the most successful aspects of this project are the designs for the gardens that the students created from research. Students had to make a conscience effort to measure and

design their space, work with a peer team, and also incorporate the vertical gardening theme with recycled and re-useable materials. The students also learned that not everything should be thrown into the trash. The students had to "Clean Up" their area and sort their trash in order to accumulate all of their material needed for the designs. . Valuable lessons have been learned, even though the project has not yet been completed to date.

- The use of the 2 liter soda bottles and the 16fl ounce water bottles for the self-watering plant holders is truly genius. Since our project is centered on gardening, we have not yet attached these items to the fence ,that it is intended for, due to the temperature(night frost) The inspiration came from the following video: <http://greenesgardenthings.forumotion.com/t38-self-water-soda-bottle-planters>
- Use of an old blanket or re-used shower curtain attached to the fence with aluminum can as an herb garden will prove to be quite efficient. Their inspiration came from the following video: <http://greenupgrader.com/8460/diy-vertical-herb-garden-with-a-shoe-organizer/>
- Stacking pots to form a vertical structure is easy and also can help in recycling and the re-use of material. Before you stack the pots you have to place an object inside the pot to give the structure height before putting soil (placing old plastic flower pots or aluminum cans will suffice) into the pot before you can put the next pot on top to create the vertical design. Their inspiration came from the following video: <http://www.youtube.com/watch?v=tF9WuvMb5IQ>
- The tipsy turvy design uses a re-bar donated from a parents garage that was used for plumbing Their inspiration came from the following: <http://www.youtube.com/watch?v=kQmm6bp9FCo&feature=related>
- The germination team used left-over cardboard toilet rolls to germinate their seeds. Students collected these cardboard rolls from the Spellman community and reached-out to their families and friends. Their inspiration came from the following: <http://www.simplyforties.com/2009/02/making-toilet-paper-roll-seed-starter.html>

Pictures of the above designs have been attached as reference.

- **What didn't work?** What were the least successful aspects of this project?

The most challenging aspects of this project are the time and weather constrains.

- Teaching a high content science curriculum in a limited time period is always challenging. When you incorporate a massive project into the mix you feel the pressure not only to complete the project but also to have a successful outcome. We were both very determined and ambitious with this project, so therefore we proceeded with a few glitches.
- Limited lab time with the students. The students meet two times within an eight day period.
- The germination team set up a portable greenhouse in the courtyard that was hit by unexpected torrential rain and high power winds. The greenhouse toppled with all of its contents. They forge ahead, and repeated the germination process again. This delayed the time-frame for planting.
- Since the weather is still questionable for planting we have not placed the structures outdoors yet. The structures will be completed by the end of this week, May 4th and it looks as if our plants (herbs & flowers) will be in their pots by May 11<sup>th</sup>. We will send an addendum with pictures of the vertical gardens in their locations.
- **hat worked?**
- **Applicability to other schools.** What advice would you give to other schools with similar populations who want to replicate your project?

The advice that I would give to other schools who would like to try this project is to make sure that they are organized. This is a tremendous task and if it were not for the collaboration of the entire science department, nothing could have been accomplished. As well, make sure that you have helpful outside resources to show the students so that they can really get into the project. When real-life meets the classroom, that is when learning and exploration begins.

- **Measuring success.** Describe how you measured the success of your project. Explain any impact on the students or community.

We will measure success by a.) the construction of vertical gardens that can support plant life and b.) the grow of plants in recyclable pots. Even if these measuring sticks fail, as long as the students realize where they could make improvements to their projects and then write that up in a lab report, that is success as well.

In conclusion, if we are lucky enough to win this grant, we plan to use it to give back to the main root of the project, which is to grow plants no matter what environment you live in. We plan to create a compost pile on the school grounds so we can keep the initial gardens in bloom for years to come. Plus the money will help get the

necessary materials to make this a great experience for the Spellman community in the up-coming years.

## Vertical Garden Sketches and Set-Ups

The following sketches were designed by students prior to the actual building of the structures. These pictures are the actual implementation of the garden designs. The students used 2 locations on site. The Courtyard is where the tipsy-turvy, stacking pots and hanging-from-the-tree designs were built. The Courtyard is a reflective area, and the artistic expressions of these designs added another dimension to the space. The self-watering water bottles and blankets with aluminum cans were attached to a fence in a community garden. This garden of herbs and flowers compliments an existing garden of vegetables that are planted in the ground.

*Community Garden and Fence Set-Up*



## The Courtyard



**Most materials used in this project came from items that were used in past projects and from material that would have been properly disposed of in a recycle bin.**

### 1. Plants hanging from tree sketch and picture



This design used plastic pots and dental floss. The structures were strung together and attached to a tree branch. Flowers were planted in each pot.

### 2. Topsy-turvy sketch and pictures



This design used 4 clay pots, which varied in size (one 12-inch, two 10-inch, one 8-inch, and one 6-inch pot, respectively), and 1 metal rebar that was left over from a construction project. The students placed the planters on an angle as they attached each pot to the rebar. Flowers were planted in each pot which was decorated by students.

### 3. Blanket with Campbell's soup cans sketch and picture



This design used 25 tin cans. In order to attach each can to the blanket the students punched holes in the back of the cans. This allowed for water drainage and also a site for attachment to the blanket. The students then took a pair of scissors and made two small openings in the blanket and attached each can with a twist tie. Soil was placed in each pot and planted with herbs. The students also decorated cans with acrylic paint.

### 4. Water bottles and Soda Bottles hanging on fence sketch and pictures



Students collected plastic bottles from the Cardinal Spellman High School community. Holes were placed in the bottle caps and the bottles were cut in half. The top half of the bottle was inverted and placed into the bottom half so that the structure became "self-watering." The students then punched holes into the back of the bottles and threaded wire into the bottles and attached them onto the fence. Herbs and flowers are grown in these structures.

## 5. Stacks sketch and pictures



Students used 4 plastic pots that varied in size (12-inch, 10-inch, 8-inch, 6-inch). They filled each pot with material that would have been tossed in the garbage as waste. Examples of the material used were plastic milk containers, paint cans, and plastic water bottles. Students then filled the pots with soil. The waste inside the pots elevated the level of each pot. Students used paint and stencils to decorate the pots.

## 6. Use of cardboard toilet paper tubes for seed germination.



Students put 4 slits on the bottom half of the tube then folded in the sections in a weave-like fashion to create a solid base for the tube. They then used different minerals in their soil to germinate seeds. The young seedlings were then transferred into pots. Over time the cardboard material will disintegrate in the soil since the tubes are biodegradable.