CALIFORNIA STATE SCIENCE FAIR
2011 PROJECT SUMMARY

Name(s)

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Project Number

S1125

Project Title

Think About It, Take a Second

Abstract

Objectives/Goals

Plastic bags are found littering parks and street corners, while millions of trees are cut down in order to produce paper bags. The objective of this project was to test which grocery bag (paper, plastic, cotton, or polyester) after being thrown away is most environmentally friendly. IF plastic, paper, cotton, and polyester grocery bags are placed in controlled environments, THEN paper will decompose the fastest.

Methods/Materials

Phase 1: Forty 4x4 inch pieces of plastic, paper, polyester, and cotton grocery bags were placed in bins filled with: mulch, water, salt water, or leaves, while also stapling 10 of each bag onto wooden posts exposed to sunlight. Each bin was uncovered allowing weather such as rain, snow, heat, and wind to effect the environment. After 7 weeks each bag was measured for surface area changes. Phase 2: Twenty 4x4 inch pieces of paper, plastic, cotton, and polyester bags were placed in Tupperware containers filled with: tap water, salt water, mulch, soil with yeast, or soil with salt and yeast, in an incubator at 30°C. After 3 weeks these samples were removed and measured. Phase 3: a survey was conducted outside the Edwards Air Force Base Commissary, 150 participants were asked 2 questions regarding grocery bags.

Results

75% of the paper bag pieces in mulch and leaves had changes in surface area by roughly 1 centimeter. While, the cotton grocery samples differed by less than 1 centimeter. The plastic and polyester pieces showed no change in all five environments. After Phase II in the incubator, the paper in potting soil with yeast decomposed completely, while cotton in the same environment broke down into small pieces. The surveys showed 51% of the 150 participants thought cotton grocery bags are best for the environment. 28% percent stated that paper bags are best, 9% believe plastic is best, and 12% stated polyester grocery bags are best for the environment.

Conclusions/Discussion

Overall, the data did support the hypothesis. The results showed that the paper pieces decompose most effectively. Paper in potting soil with yeast at 30°C decomposed in the least amount of time. Therefore, paper grocery bags will decompose the fastest leaving less trash littering the Earth. The survey shows that although individuals believe cotton bags are best for the environment; these bags are not being used as often as plastic bags due to convenience issues.

Summary Statement

This project tested which kind of grocery bag once thrown away will stay in the Earth's environment for the least amount of time.

Help Received

Debbie Lewis supplied this project with an incubator.