

RECYCLING CURBSIDE VS. DROP-OFF

New Mexico Supercomputing Challenge

Final Report

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Team 002

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Executive summary:

In this project, we will study the effects on the atmosphere of carbon dioxide emitted by vehicles used to transport recyclable good to the recycling plant. In our model, we will focus on the difference between the carbon dioxide emitted when recyclables are being picked up by a recycling truck versus a car taking them from a home to the recycling plant. The number of emissions will prove whether it is more helpful to reducing the carbon footprint to have the recyclables picked up or to drop them off at the recycling plant.

Problem Statement

Which method of recycling will have a lower impact on the carbon footprint, drop off or curb side? Our steps in considering an answer are:

- Develop a simulation of curbside pickup versus personal drop-off and the carbon dioxide emitted from each
- Record the data collected of the emissions and compare
- Apply the data to real world emissions calculations
- Run the simulation with the real world calculations, collect the data and compare

Recycling:

Recycling has become a very important topic in the world today, especially in our town of Aguilar, but there are many debates on if recycling is actually worth doing and which method reduces carbon dioxide more efficiently. We understand that recycling helps the environment, but we think that it doesn't help the atmosphere. We want to try and find a way to help reduce the carbon footprint in terms of the atmosphere. So we decided to compare two different methods of recycling and see which one is more efficient: drop off (each individual take the recyclables to the recycling center) and pick up (a truck going from house to house picking up the recyclables and taking them to the recycling center).

Our hypothesis is: which method of recycling is safer to the atmosphere and will help reduce the carbon footprint, curb side pickup or drop-off? As we all know, recycling will be much safer to the environment because we can just renew materials instead of mining virgin materials and harming the environment. With that said, we also discovered a little flaw that

recycling has. We found out that the very trucks that take the renewable materials the recycling plant emit CO₂, or carbon dioxide. We understand that recycling helps reduce the carbon footprint, but it doesn't eliminate the problem because of the emissions the recycling truck pollutes. We also found out that drop-offs emit CO₂ as well. Either way, carbon dioxide will be emitted without question, so we're going to experiment to see which way will reduce the least amount of carbon dioxide.

The Carbon Footprint:

The carbon footprint is your personal effect on the environment, the atmosphere and the world. It's the measure of how much electricity you use, how much water you waste, how much renewable materials you trash and how much pollutions your car emits, house, etc. The more you waste and emit pollution, the bigger your footprint is. Simple things such as turning a light off, not wasting water and recycling can reduce your footprint size. As we stated, we can't eliminate CO₂ from the environment, but we can reduce it because without CO₂, we wouldn't have oxygen.

This is important because recycling and the carbon footprint are really hot topics in today's society, especially since the awareness of global warming. If we don't recycle, deforestation will become a severe problem and mining will destroy the environment. If both of these take place, what becomes of the wildlife, society, even the world itself? Recycling and the carbon footprint is a very extreme issue today and must be exercised.

Model Description:

To help us explain our model, we will be observing the emissions that cars and diesel trucks put out. In our model for the pickup we will be using the average trash/recycling truck. For drop off we will use the average car/light duty pickup. The emissions in our model will be portrayed by spheres floating up and moving around in our atmosphere. We will then graph the amount of "pollution" emitted by the truck and the car. We will then compare the amounts emitted and if our model works correctly find out which method of recycling is greener.

Conclusion & Acknowledgements:

Unfortunately, we ran out of time and could not get our model to run the way we expected it to. We can't get our trucks to return to the homes that they started from and therefore, cannot get the data for our graph to conclude which method of recycling is the best for the carbon footprint and the environment.

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