**How Much Landfill Space Can Be Saved In A Year By Recycling?**

**I. Introduction**

 In the United States, 80 percent of our trash goes into landfills. A landfill is an area where waste is deposited. In compliance with federal law, landfill deposits must be covered with dirt on a daily basis. The dirt prevents debris from blowing away, and it reduces the odors produced by decaying waste. When landfills are covered with dirt, however, oxygen is sealed out of them. Aerobic bacteria and other decay-promoting organisms cannot survive. As a result, much waste material that could be naturally decomposed and recycled back into the environment remains buried in landfills for decades.

 Sanitary landfills must have liners that trap waste to prevent hazardous materials from leaching or draining into the soil and groundwater. Liner systems may include layers of plastic or concrete, clay, gravel, polymer fabric, and dirt. Liners must also be installed with drainage and collection systems to remove any liquid waste that might seep through the refuse.

 Space in landfills is limited, and acceptable areas for building new landfills are scarce. Many materials buried in landfills decompose slowly. They can remain there for hundreds or thousands of years, creating problems for future generations. By conserving, recycling, and reusing materials we can divert a significant amount of waste from landfills.

 In this Virtual Lab you will gather data on recyclable materials and their effect on landfill space. You will recycle materials such as plastic, glass, paper, food waste, metal, yard waste, and other materials. You will calculate and analyze the percentages of volume and weight of waste that is diverted from landfills by recycling.

**II. Procedure**

 1. Start the activity by going to the following website :

<http://www.glencoe.com/sites/common_assets/science/virtual_labs/ES19/ES19.html> .

 Note : The way a material is handled or processed and the amount of moisture present in it can

 make substantial differences in its weight per volume. Because of these differences, the data

 in this Virtual Lab may not represent actual landfill data.

 1. Recycle any type of waste material by dragging it to the recycling bin.

 2. Observe the amount of waste reduced in the landfill.

 3. Click the laptop computer. Click the Recycling Information button to find out specific

 information about the material you recycled. Click the General Landfill Information button to

 find out more information about landfills.

 4. Calculate the percent by which the total landfill tonnage can be reduced if the selected waste

 material is recycled.

 - Click the laptop computer to access the data.

 - Open the Calculator.

 - Input the total landfill tonnage for one year when no recycling is done.

 - Subtract the tonnage left in the landfill if the material is recycled.

 - Divide the result by the total landfill tonnage when no recycling is done.

 - Multiply that figure by 100.

 - Enter this percent in the Table.

 5. Calculate the percent by which the total landfill volume can be reduced if the selected waste

 material is recycled.

 - Click the laptop computer to access the data.

 - Open the Calculator.

 - Input the total landfill volume for one year when no recycling is done.

 - Subtract the volume left in the landfill if the material is recycled.

 - Divide the result by the total landfill volume when no recycling is done.

 - Multiply that figure by 100.

 - Enter this percent in the Table.

**III. Data**

 1. Record your data in the table.

|  |  |  |
| --- | --- | --- |
|  **Recycled Material** | **% Contribution To Landfill** **By Tonnage** | **% Contribution To Landfill**  **By Volume** |
| Plastic |  |  |
| Glass |  |  |
| Paper |  |  |
| Food Waste |  |  |
| Metal |  |  |
| Yard Waste |  |  |
| Other Materials |  |  |

**IV. Analysis & Conclusions**

 **1. From your sample data, determine which type of material makes up the largest percent**

 **of the landfill wastes by weight and which type of material makes up the largest percent**

 **by volume.**

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 **2. From your sample data, calculate how much trash an average person produces in a**

 **year. How much would that be in a day, per person? Compare these data to the amount**

 **of trash you produce in a day.**

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 **3. Statistics show that only 20 percent of all paper is recycled in the United States. From**

 **your sample data, determine how many more trees would be saved by a town of 10 000**

 **people if all paper were recycled. (Seventeen trees produce a ton of paper.)**

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 **4. Assume that after plastics, glass, paper, food wastes, metals, yard wastes, and all other**

 **miscellaneous solids have been recycled, the remaining tonnage consists of moisture and**

 **dirt. What percentage of the landfill is made up of moisture and dirt according to your**

 **data?**

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 **5. Recycling one metric ton of compacted mixed materials saves about five cubic meters of**

 **landfill space. If a metric ton of recycled materials consisted entirely of plastics instead**

 **of mixed materials, would more or less than five cubic meters of landfill space be saved?**

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 **6. From your sample data, calculate how many kilowatt hours of energy could be saved if**

 **all the glass were recycled.**

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 **7. List the reasons why it may not be economical to recycle certain materials. What kinds**

 **of costs occur in recycling?**

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