Name _____

Lab 11. Solid Waste Lab

Municipal solid waste (MSW) is the name given to ordinary office and household trash: that which is generally disposed of through the usual garbage collection services offered or contracted for by municipalities. Our trash is made up of the things we commonly use and then throw away. These materials range from packaging, food scraps, and grass clippings to old sofas, computers, tires, and refrigerators. It does not include industrial, hazardous, or construction waste.

Figure 1. MSW Generation Rates, 1960–2006
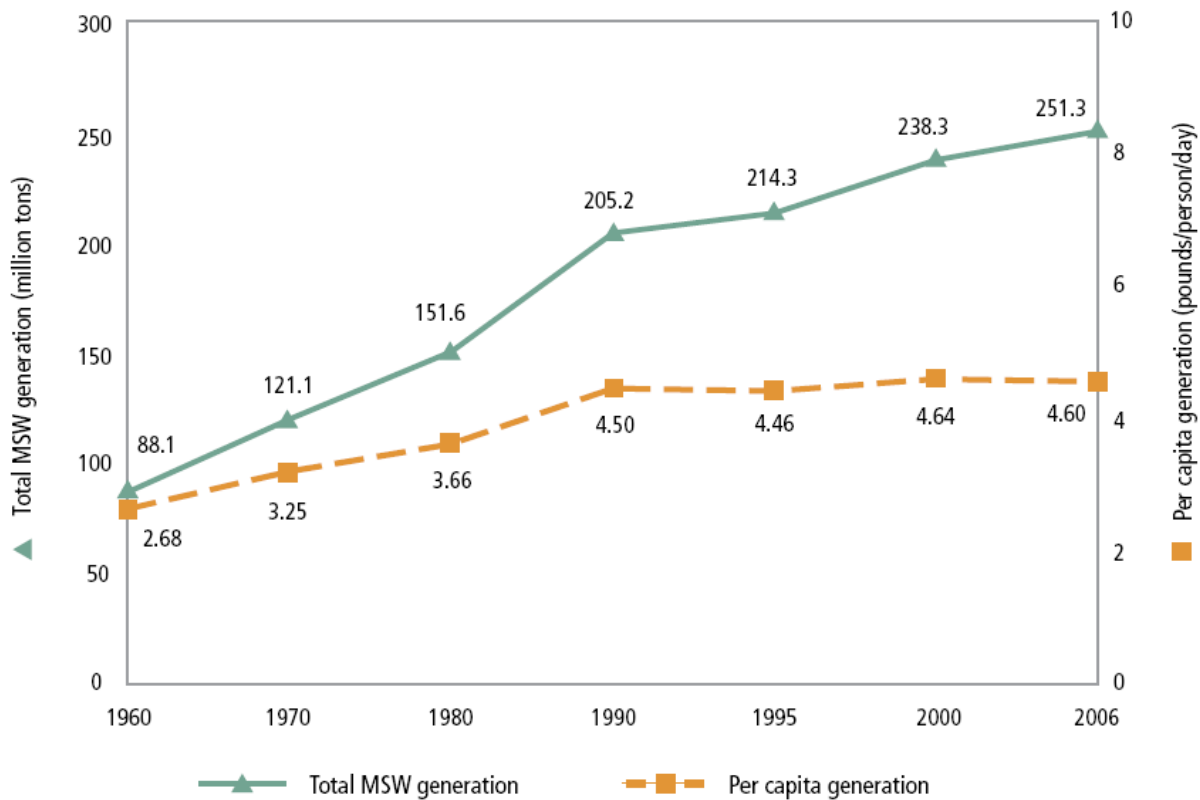
Looking at Figure 1, what was the per capita waste generation in 2006 (*include units*!)?

How many pounds of waste will the average American produce in 30 years? Show work:

Has the general trend for total MSW been increasing, decreasing or constant?

Has the general trend for per capita MSW been increasing, decreasing or constant?

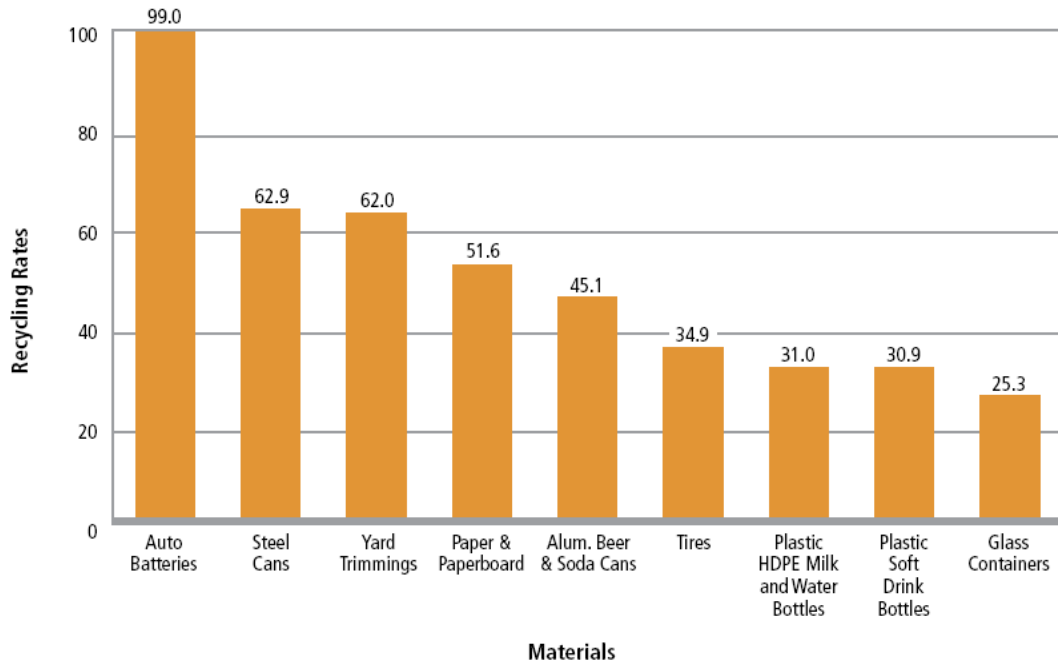Explain any difference between the trends in total vs per capita MSW:

Figure 2. MSW Recycling Rates, 1960–2006
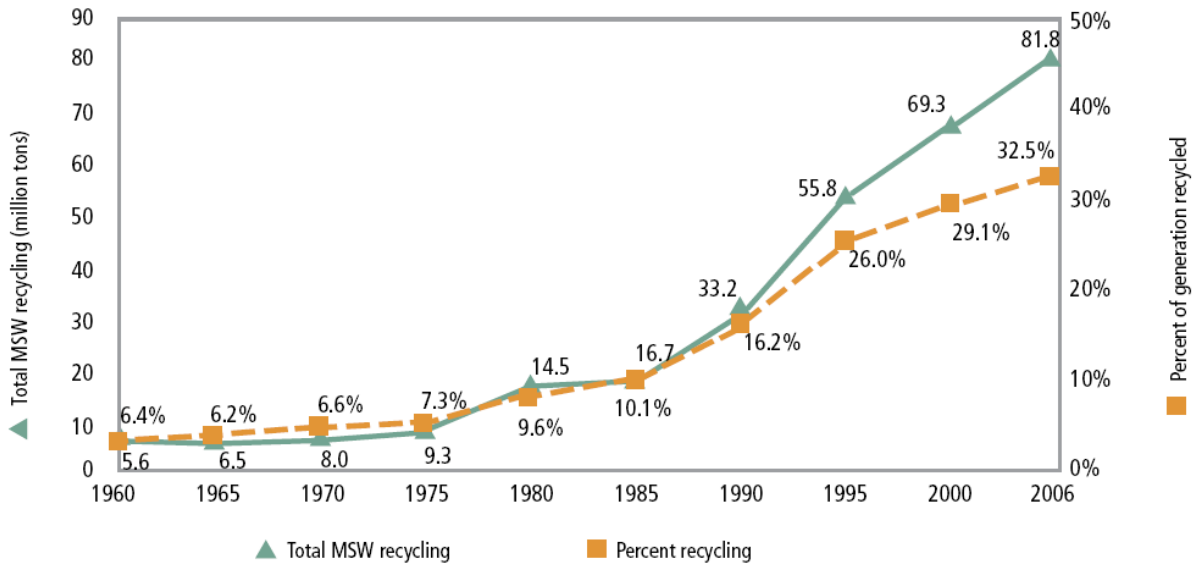
Looking at Figure 2, what percent of MSW was recycled in 2006?

Has the general trend been toward more or less recycling since 1985?

Figure 3. Recycling Rates of Selected Materials, 2006

Looking at Figure 3, what is the *most* recycled material?
Why is this item so efficiently recycled?

What is the *least* recycled material?
Why is this item less commonly recycled (think about incentives and cost)?

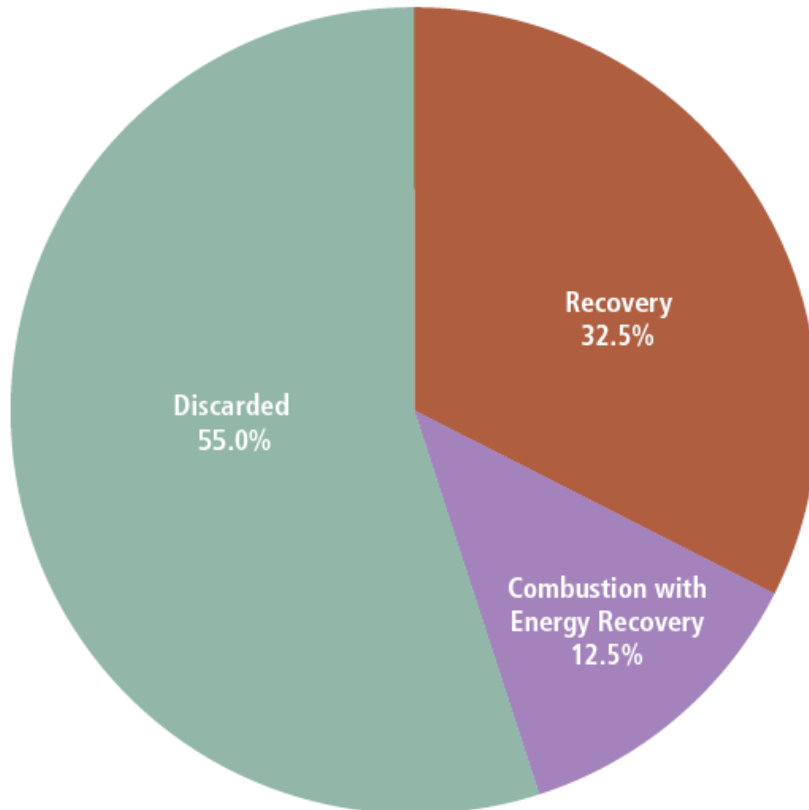Figure 4. Management of MSW in the United States, 2006

Figure 4 shows the fate of all US MSW. **Discarded** waste is the amount put into landfills. **Recovery** is the amount that is recycled. **Combustion** refers to waste that is burned (incinerated) and can be used to generate electricity or heat.

Most nations in Europe recycle over 50% of their MSW. How does the US compare to this rate?

Which do you think is a better way to dispose of waste: recovery (recycling) or combustion? Justify your answer by weighing the costs versus the benefits.

Benefits of Recycling

What is so great about recycling? Making a soda can from recycled aluminum uses less energy (95% less) and it reduces mining impacts such as pollution because less aluminum has to be mined and smelted. Of course it also conserves aluminum, which is a nonrenewable resource.

How many recycled aluminum cans can be made for the same energy it takes to make 1 aluminum can from aluminum that is mined from a rock?

Of course the benefits of recycling depend on what material is being mined or extracted to make a product.

What is paper made from?
What is plastic made from?
What is glass made from?

Which of the above items are made from nonrenewable resources? Explain.

Recycling not only saves the resource itself, it has many other benefits. For example, by Recycling 1 ton of paper you save: 17 trees , 6953 gallons of water, 463 gallons of oil, 587 pounds of air pollution, 3.06 cubic yards of landfill space, 4077 Kilowatt hours of energy

What Do People Throw Away?

Figure 5. Total MSW Generation (by Material), 2006
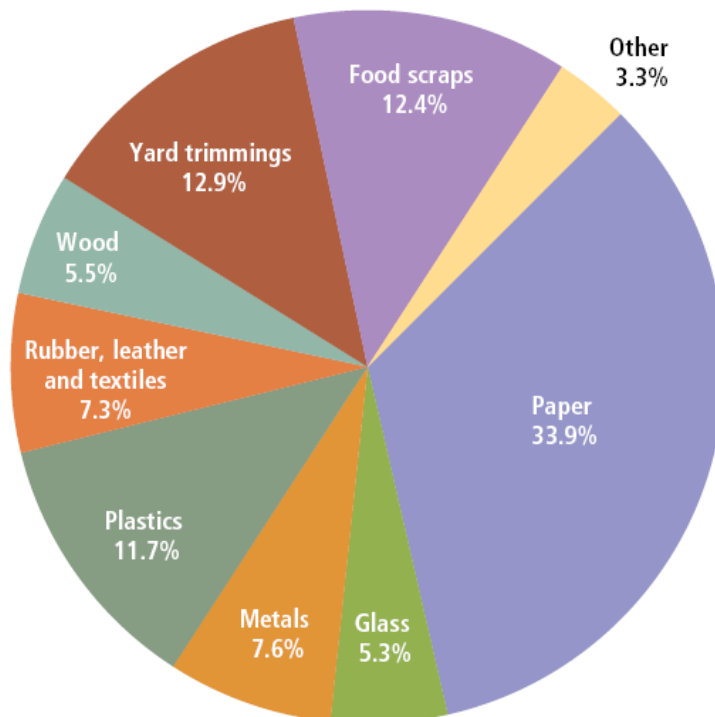251 Million Tons (Before Recycling)

Figure 5 shows the composition of waste discarded by the average person.

What material is the largest proportion?
What is the material used for to make it so common? Name 3 uses of it.

Figure 6. Total MSW Generation (by Category), 2006
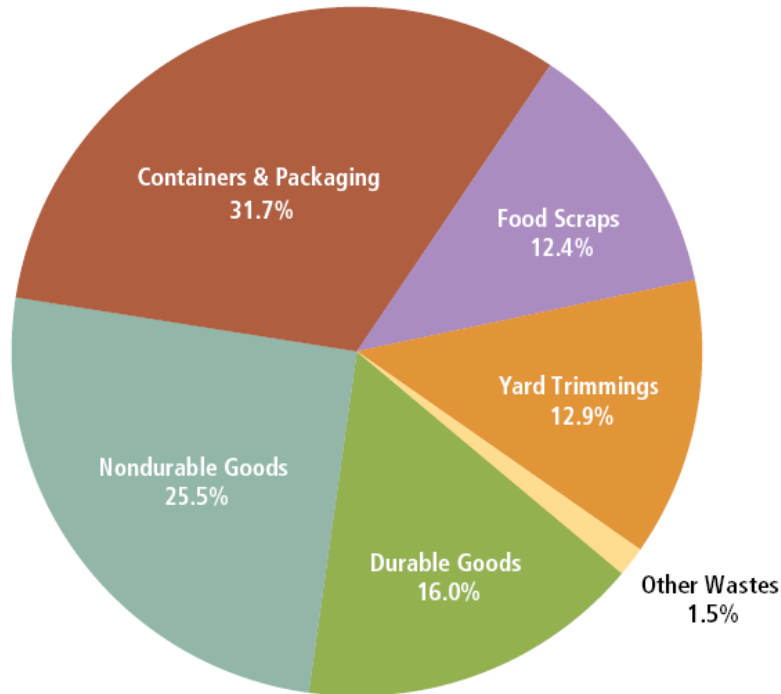**251 Million Tons (Before Recycling)**

Figure 6 shows the waste as classified by its original use (not composition). What is the largest component of this waste ?
Name a simple way to reduce the amount of this source of waste:

Composting is a way of recycling food scraps and yard trimmings into fertilizer. What percent of our waste could be recycled by composting?

Lab Activity: Doing a Waste Audit

Break up into groups of 3 or 4. Each group will get a bag of solid household waste ("trash"). (Don't worry, the waste is chosen to be not too messy so food and yard waste is removed.) **When finished, please return all waste into the bag!**

Step 1: weigh the bag: _____ pounds
Step 2: get gloves and open the bag and sort the trash into the categories below:
1) composition class – paper, plastic, etc – **weigh each class**
2) function class – cups, packaging, etc - **weigh each class**.

By composition:

	Weight	% of total weight	% from Fig. 5
Paper			
Cardboard			
Plastic			
Metal			
Glass			
Styrofoam			
Others? Specify:			

Total bag weight

Questions:
1) What is the most common material (by composition)?
2) What is the least common material?
3) Which of these materials could "save trees" if they were recycled?
4) Which of these materials could "save oil" if they were recycled?
5) Besides Styrofoam, all materials listed are recyclable. What percent of trash in your bag could be recycled?
6) Look at Figure 5. How does the composition of waste from the average person compare to your trash. (Put Fig. 5 data in the column shown) Remember food and yard waste was removed from your trash

By function:

	Weight	% of total weight
Wrappers		
Boxes		
Drink containers		
Writing paper		
Newspaper		
Others? Specify:		

Total bag weight

1) What is the most common material (by function)?
2) What is the least common material?
3) What percent of your trash could be classified as "packaging"?
4) Look at Figure 6. How does packaging in your trash compare to the average waste discarded

When finished, please return all waste into the bag!
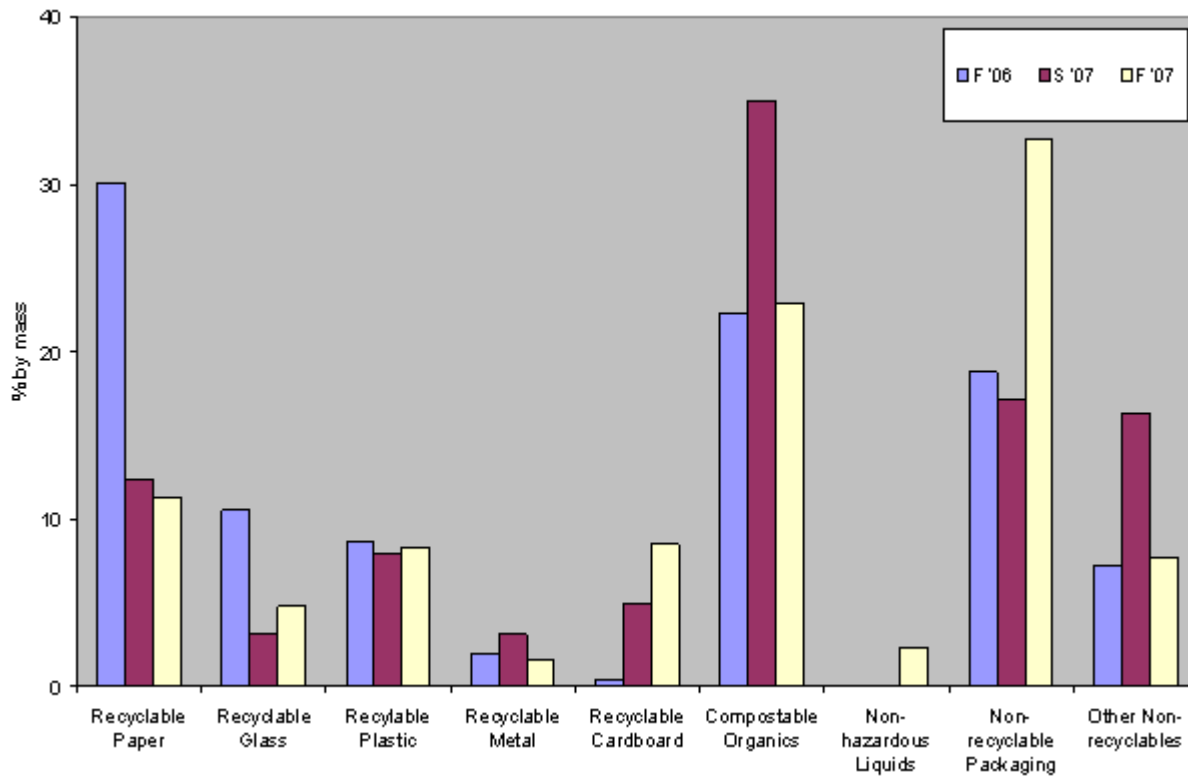
The data above are from a "dumpster" audit at Marist college in NY. These are very similar to dumpster audits done here at UT (unpublished)

What do you suppose are "compostable organics"?
Is packaging also a big category found in dumpsters?
How do these overall data compare to those in your trash?

Other Activities for TA to do :

1) **Outside litter audit.** Go outside the building and see what trash you find on the ground. List the items below and classify them according to composition and function:

Why do people litter?

2) **Audit of recycling bins.** Go down the hall and see what you find in the recycling bins. Is there much waste in them?
What percent of items put into the wrong slots (for example, plastic into the metals?)
Which of the recycling slots has the most items?