



ESTIMATING DATA

To convert from volume to weight you need to know:

1. The type of container and volume
2. The mix of material in container and correct conversion factor
3. How full the container is when emptied
4. How often it is emptied per week/month

STEP 1: Identify your recycling container type and volume. See samples below.



Typical Trash Bag Volume:

Small bags:	Large bags:
4 gallon (bathroom)	30 gallon
8 gallon (bathroom)	33 gallon
13 gallon (kitchen)	39 gallon
	45 gallon





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Some recycling containers maybe be stored outside your school. This could include:

- Dumpsters: The most common size is an 8 cubic yard container.
- Roll-carts which are usually 95 or 65 gallons but there are smaller 35 gallon carts also, and/or
- Roll-off dumpsters: These are large containers that would most often have a gable top to keep the rain off the material. They would be hauled very infrequently.

Others you may find in and around your school are:

- 35 gallon recycling containers which are the size of a typical cafeteria trash can,
- 18 gallon recycling containers like you might have in a curbside recycling program and/or
- 55 gallon drums like what you might see in an athletic facility parking lot.

STEP 2: Identify the type and mix of material in container and correct conversion factor. We are asking everyone who will be converting volume to weight to use similar conversion factors so that we can compare apples to apples. The weights provided are for uncrushed aluminum cans, plastic bottles, glass bottles, steel cans and loose paper and cardboard. Depending on your container, you will want to use either the conversion for pounds per gallons or pounds per cubic yard.

Source Separated: (in alphabetical order)

Single Material	Pounds/Gallon	Pounds/Cubic Yard
Aluminum drink cans	0.22	45.53
Cardboard boxes (thick 3 ply paper with a flat sheet, wavy sheet and another flat sheet)	0.57	109.38
Cartons (milk and juice)	0.25	50.00
Glass bottles and jars	2.06	415.52
Paper (office paper, unwanted mail, magazines, newspapers, cardboard, shoe boxes, etc.)	1.89	360.75
Plastic bottles (water, soda, detergent bottles, etc.)	0.16	32.14
Steel cans (soup and vegetable cans from cafeteria)	0.69	135.59



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Commingled Material/Single-Stream Recycling: This is when material listed above is mixed into one container. Please pick the conversion factor that most closely resembles your mix of material. (in order of weight)

Commingled Materials	Pounds/Gallon	Pounds/Cubic Yard
Containers (Plastic bottles, Aluminum cans, Steel cans, Glass bottles) and Paper	1.31	264.59
Containers (Plastic bottles, Aluminum cans, Steel cans, Glass bottles), Cardboard and Paper	.46	92.22
Containers (Plastic bottles, Aluminum cans, Steel cans, Glass bottles) – NO PAPER	.35	69.82
Plastic bottles, Aluminum cans ONLY	.16	32.22

Below you will find the weight of one item, in case you want to count the number of items you have. However, this isn't recommended and a paper conversion factor is not provided. (in alphabetical order)

Material	Pounds for 1 Item
Aluminum can	0.03
Cartons (milk and juice)	0.03
Glass bottle	0.44
Plastic bottle	0.04
Steel can	0.09

*These conversion factors were created using various samples conducted by partners in both 2011 and 2012. 1 cubic yard equals 201.974 liquid gallons and 1 gallon equals .00495 cubic yards.

STEP 3: Note how full each container is when emptied. It is easiest to calculate when the container is full. For example, if you have a 65 gallon container full of cans and bottles than you will use the conversion factor for 1 gallon of cans and bottles and multiple it by 65. If the container isn't full, you need to estimate how full it is and then multiple by that number of gallons. Using the example before, if the 65 gallon container is only half full, then use the 1 gallon can and bottle conversion factor but only multiple by 32.5.





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STEP 4: Note how often the container is emptied per week. For example, if you have an 4 cubic yard commingled/single stream dumpster that is full when emptied, you need to know how often your hauler empties the container. Is it once a week, twice a week, etc.? You can either track how full the container is daily and/or contact your hauler to see how frequently and on which day your dumpster is emptied.



Sample calculations are at the end of this document.

STEP 5: Track your data.

Besides doing volume-to-weight conversions, you could weigh one full bag of material on a household scale and then count the number of similar bags and extrapolate that way.

Sample scorecards and calculation spreadsheets can be found here - <http://recycle-bowl.org/playbook/competition-resources/>.

For those schools that receive monthly weight data from their hauler, take your monthly October and November data and average them and report that number.



STEP 6: Report your data.

Schools must return to the Re-TRAC Connect system (<https://connect.re-trac.com>) at the end of the 4 weeks to report their weight data by **December 14, 2012**. You will only report once, at the end of the competition. However, you should have some internal mechanism for collecting and tracking data. This might be requested if you are a prize winner.

At the end, you will be asked to verify your school population. This should include teachers and students. Winners will be asked to provide us with a link to a publicly published population figure for your school



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Sample Calculations

*lbs = pounds and gal = gallons

1. **Question - Your school emptied 5, 35-gallon bins full of paper during the competition. What is the estimated weight of the material?**

Answer - 490 lbs.

Using the Recycle-Bowl conversion factors there is **2.80 lbs/gal**
Cross multiply and you get 98 lbs

$$\frac{?? \text{ lbs}}{35 \text{ gal}} = \frac{2.80 \text{ lbs}}{1 \text{ gal}}$$

But you have 5, 35 gallon bins. Therefore you take $5 \times 98 \text{ lbs} = 490 \text{ lbs}$.

2. **Question - Your school emptied 3, 18-gallon bins full of cans & bottles during the competition. You weighed one bin empty. Then you weighed one bin full and subtracted the weight of the empty bin. So the weight of only the material in one bin was 2.7 lbs. What is the estimated weight of all the cans and bottles collected?**

Answer – 8.1 lbs.

We simply multiply 2.7 lbs by 3 (the number of full containers), which equals **8.1 lbs**.

3. **Question - Your school has an 8 yd³ dumpster for paper. It was full the first and second week and half full the third and subsequent final week of tracking. It was emptied each week. What is the total weight of paper in pounds collected during the competition?**

Answer – 8219.76 lbs

Using the Recycle-Bowl conversions there is **342.49 lbs/yd³**
Cross multiply and you get 2739.92 lbs.

You have an 8 yd³ dumpster, so: $\frac{342.49 \text{ lbs}}{1 \text{ yd}^3} = \frac{??? \text{ lbs}}{8 \text{ yd}^3}$

The 8 yd³ was full for two weeks so multiply, $2739.92 \text{ lbs} \times 2 = 5479.92 \text{ lbs}$.

Next, the 8 yd³ is half full, so 4 yd³: $\frac{342.49 \text{ lbs}}{1 \text{ yd}^3} = \frac{??? \text{ lbs}}{4 \text{ yd}^3}$

Cross multiply and you get 1369.96 lbs.

Since the dumpster was half full for 2 weeks, multiply $1369.96 \text{ lbs} \times 2 = 2739.92 \text{ lbs}$.

To get your total add: $5479.92 \text{ lbs} + 2739.92 \text{ lbs} = 8219.76 \text{ lbs}$ of recycled paper.