



# HOW TO RUN A WASTE AUDIT AT SCHOOL

## MATERIALS NEEDED:

- Minimum of 3 students. Ideal group size is 5 – 30.
- 1-2 chaperones / teachers
- For a group of 6-8 students: 7 full classroom bags or 4 large cafeteria bags for every waste audit hour planned. (Audits generally run anywhere from 45 minutes to 1.5 hours, although it never hurts to request extra bags from custodial staff). **NO bathroom trash should be included.**
- For a group of 6-8 students: 3-4 long, cafeteria/outdoor tables (preferably without benches)
- 2-3 large tarps to completely cover tables
- Latex & latex-free gloves
- Aprons
- Goggles (if needed)
- Garbage and recycling bags to put sorted material in
- 6 bins or buckets for separating out different **municipal solid waste (MSW)** materials
- 6 signs designating MSW material categories for each bin/bucket:
  1. Mixed Paper & Cardboard
  2. Plastics (check with Stopwaste.org for your city)
  3. Metals
  4. Glass
  5. Food Scraps & Food-Soiled Paper
  6. Landfill – unrecyclable plastics, food packaging, straws, Styrofoam, etc.
- Scale (industrial hook-scales are best, although a bathroom scale would also work)
- Pencils
- Calculators
- Clipboards
- Tape for signs or to secure tarps
- Hand sanitizer
- Absorbent rags (for cleaning)
- 2-4 sponges (for cleaning)
- Eco-friendly cleaning spray (for cleaning)
- Digital camera with extra batteries

## PRE-AUDIT DISCUSSION

*“The laws of conservation of mass (Lavoisier, 1785) and energy (Mayer, 1842) unified by Einstein in 1907, state that energy and matter can be neither created nor destroyed. School waste audits provide your students with the opportunity to wrestle directly with the social, economic, ecological and political implications of these physical laws.”*  
(Adapted from San Mateo County Recycle Works [http://www.recycleworks.org/schools/s\\_audits.html](http://www.recycleworks.org/schools/s_audits.html))

A waste audit is an exciting opportunity to investigate the types and amount of materials that get thrown away on campus each day. One of the very best (and most accurate) ways to learn about any culture is to critically examine its waste – and thereby determine what it values, what it doesn't, and how people live on a day-to-day basis; students will therefore be acting more like *archeologists* than sanitation staff during their investigations. (Perhaps ties can be made to what students are currently studying in their History / Social Studies / Anthropology classes).

Conducting a waste audit is also an eye-opening exercise in determining what a culture deems disposable and what is *made* to be disposable (uneaten food or barely-used paper versus plastic food wrappers and to-go coffee cups). Two important terms you may want to introduce are **perceived obsolescence** (materials that are still useful but are thrown out for other reasons – such as being out-of-fashion) versus **planned obsolescence** (materials that are “designed for the dump” – or are made to be thrown out because they have limited use, such as food wrappers).

Explain that the amount and type of waste generated at a school can be estimated by conducting a **waste audit**. A waste audit can provide measurements of classroom waste and cafeteria waste for an entire day's worth of garbage generated on campus. According to StopWaste.org, the average student produces a ½ lb of garbage each day at school – given this information, have students calculate their school's daily average, as well as their its yearly average!

This daily average, plus the data collected during the waste audit, will help determine the effectiveness of the school's general waste reduction and recycling behaviors, and will highlight areas to take action. Conducting multiple waste audits throughout the year will allow students to compare the garbage generation and disposal rates at different times of the year and during different seasons.

Depending on the kind of waste the students wish to examine (classroom, cafeteria, both), begin by having students hypothesize what types of materials they think they will find in the school's waste stream and what the percentages of different material types will be. For example: “I think that 75% of all classroom trash will be mixed paper;” “I think that 50% of all cafeteria trash will be food waste,” etc. Be sure to write all predictions down or sketch a quick pie chart of predictions, so students may compare them with their results following the waste audit.

## **ESTABLISH SOME BASIC RULES:**

- ❑ All students who sort through the trash **MUST** wear latex or latex-free gloves for protection. We also recommend wearing aprons and goggles to protect clothing and eyes.
- ❑ No throwing or playing with trash. (No attempts to “toss” items across the table and into one of the bins/buckets. Students must physically walk to each bin/bucket).
- ❑ No **EATING** trash. This may seem like a strange request – however, students will likely find unwrapped food that seems "perfectly good" to eat. Even if the item seems to be clean and is still completely sealed, our recommendation is that it is unsanitary to eat. This is one reason why we encourage waste audit organizers to provide snacks for hungry participants who may otherwise be enticed by eating "trash."
- ❑ All students must remain aware of their surroundings, and avoid tapping their friends on the shoulders, backs, etc., to get their attention, if wearing gloves. Students should also be cognizant of the fact that if they clap/smack/pop their gloves during the audit, any of the juices on their hands may fly up into their faces.

## PROCEDURE

1. Organize the Waste Audit area as follows:
  - ❑ Set up the tables to form two, parallel lines (of two tables each).
  - ❑ Cover tables with re-usable tarps, or expect to thoroughly scrub down the tables afterwards!
  - ❑ Secure signs designating **municipal solid waste (MSW)** material categories on each bin with tape.
  - ❑ Set up MSW bins in a row on one line of tables, so that their signs face the other line of tables where students will conduct the audit. (Setting up the bins at waist level, rather than at ground level, helps facilitate the flow of an audit, as the signs are more easily readable).
  - ❑ Line up the previously collected trash bags along the sorting tables, untying knots and even gently ripping the sides open so that their contents spill out onto the table. (Pre-opening bags helps prevent students from dirtying their sleeves/arms by reaching into the opening of the bag only to “dig” for items).
2. **In the classroom: overview the Waste Audit process.** Explain that students will be assigned various tasks to complete the audit. Generally, students will work assembly-line style, sorting all of the trash to the best of their ability into one of the six MSW category bins provided. Students will then weigh and visually measure (for volume) each of the bins, and record all data before emptying the bins into the appropriate landfill, recycling, or food scraps/compost dumpster.
3. **Arrange students into teams to complete the following tasks, so that the waste audit flows smoothly:**
  - ❖ **Sorting Team:** These students will sort all trash into the proscribed MSW categories. Emphasize that accuracy – not speed – or quality versus quantity is most important in dividing up the waste, in order to obtain good data. These students will make up the majority of the class; they will be divided along both sides of the sorting tables.
  - ❖ **Weighing and Recording Team:** These students will weigh the bins, once full, and transfer the sorted MSW materials from the bins to the appropriate dumpsters or bags. They will also record all data into the worksheets. **Please note:** students in this team must first weigh an empty bin and subtract that weight each time it’s emptied of materials (it also helps to have a teacher or chaperone work with this group of students – accurate data is key to conducting a successful waste-reduction campaign!). Assign 3 students to this team; they will be stationed behind the bins during the audit.

- ❖ **Photographers and Journalists:** These students are responsible for capturing on film and paper the reactions of their fellow waste auditors, and the overall experience and feel of the audit (the qualitative data). These notes and photographs can later be used as part of the students' campaign, and possibly uploaded to the school's website to raise awareness as well. Assign 2-4 students for these roles; they will be "roamers" during the audit.
- ❖ **(Optional) Bin Monitor Team:** These students are each assigned to monitor one of the MSW bins, and be the "expert" in determining what belongs in his/her category. This is especially helpful for the "Food Scraps" and "Landfill" bins, as they tend to fill up the quickest and students have the most questions regarding what belongs in each. Assign 2-6 students for this team; they will be stationed behind their bins during the audit.

**Provide appropriate clipboards, pencils, data sheets, school cameras, and scale to the Weighing and Recording Team and Photographers and Journalists.**

4. **Outside, at the sorting tables: Suit up for safety!** Everyone – especially the Sorting Team – should gear up in aprons, goggles (if available), and gloves!
5. **Overview what can and cannot be recycled.** It helps to assemble a small sample of items found in the trash in advance to show students different examples of what is commonly found / consumed on campus. **For example:** "Hard plastic" water bottles with a #1 or #2 designation on the bottom can be recycled as Plastic; however, "soft plastic" Ziploc bags and packaging cannot be recycled, and go into the Landfill category. Paper can be recycled, but only if it is 90% clean and dry; otherwise, if it is less than 90% clean and soiled with pizza grease, it belongs to the Food Scraps category.
6. **Ask if there are any questions regarding responsibilities / tasks.**
7. **Begin!** Divide Sorting Team students on both sides of the sorting tables. The students on the side farthest from the bins should focus on making piles of different MSW categories (i.e. a pile of food wrappers for Landfill, a pile of soiled cardboard lunch trays for Food Scraps), while the students on the side closest to the bins should focus on carrying these piles to their appropriate bins. This will help prevent a "traffic jam" of students coming from both sides of the table and overwhelming the bins.
8. As each bin fills up, make sure the Weighing and Recording Team has space to weigh each bin and record its weight and volume before emptying it and putting it back on the table to be filled (a Bin Monitor can help hold up "traffic" as the bins are taken away to be weighed, as needed). If a bag doesn't weigh enough to register on the scale, have students count the number of items instead.
9. **Clean up!** All sorted materials should go to the appropriate landfill, recycling, or food scraps/compost dumpster on campus. All tarps and tables should be hosed / sponged down with an eco-cleaning spray and hung to dry (or folded away). All bins should also be hosed / rinsed out, and all students should wash up and remove protective gear! The

Waste Audit area (and students) should look just as it was / just as they were found, before the audit began 😊

## **THINGS TO KEEP IN MIND**

The categories provided are a general guide; if you have very few of some items, you can combine them into categories, or if students find a lot of one item -- such as paper bags or whole sandwiches -- they can make that a separate category.

For an especially eye-opening experience, have students put aside all wrapped or “untouched” foods – such as sealed granola bars, whole sandwiches or pieces of fruit – to find out how much “perfectly good” food their campus deems “trash” everyday. The same can be done for any particularly interesting/curious finds, including library books, sweatshirts, teaching materials, and even notes!

## **FOOD FOR THOUGHT – WRAP UP**

1. Re-group everyone around a whiteboard (or an indoor blackboard) and get comfortable. Have students analyze the results by graphing their data into appropriate pie charts and bar graphs. What was surprising about their findings? Did their initial hypotheses turn out to be correct? Why or why not?
2. Ask students their opinions on the data they collected on the volume and weight of the waste. Both are needed to fully assess their school’s current garbage situation. Volume is important because it informs a school what is “filling up” their landfill and/or recycling and compost dumpsters, and therefore determines how much a school pays to have those dumpsters emptied. Weight is important because waste is primarily measured in “tons diverted” from a school, a county, or a state.
3. How much garbage wasn’t actually “garbage”? Follow the 4R’s (Reduce, Reuse, Recycle, and Rot), which are arranged in a hierarchy according to how resource-efficient they are (energy, materials, labor, etc.). What items, could have been reduced, reused, recycled, or composted instead?
4. Share stories, too: what were students most surprised to find? What was the most interesting or the grossest find?
5. Lead a discussion to determine which areas need the most work, or assign a short reaction paper from students.
  - ❖ How do students rate their school’s present consumption and disposal practices (have students designate a letter grade and explain)?
  - ❖ How can the 4R’s be applied to the materials found? (What specific materials should the class focus on reducing, reusing, or recycling in the classroom? What specific materials should students focus on reducing, reusing, or recycling in the cafeteria?)

- ❖ What are the school's current waste services? How much might the school save by reducing the number of pick-ups, or the number of dumpsters, for garbage (and replacing it with a recycling or compost dumpster instead)?
- ❖ What are some of the school's past waste-reduction efforts?
- ❖ What information would other students and staff need to know to help change their behaviors?
- ❖ What resources does the school need to become more sustainable / reduce waste?
- ❖ What are some possible next steps?

## **VARIATIONS:**

**Recycling Audit:** Give the traditional waste audit a twist by examining and sorting through the school's recycling bins or food scrap recycling bins, to determine if students and staff are actively recycling what they should be recycling, or are using recycling bins as secondary trash receptacles instead!

**Personal Audit:** Provide students a more personalized approach to investigating waste by assigning them to collect their own garbage for 3-5 days. Hand students their own white garbage bag, and allow them to decorate / personalize it that first day. Instruct them that for the next 48-120 hours, any garbage they produce (EXCEPT bathroom waste) must be deposited inside this bag. Decide whether you would like students to focus on the sheer number of materials they consume every day (i.e. students should place all items, whether recyclable, compostable, or not, into the bag), or decide if students should only place what they deem "garbage" inside the bag (i.e. students are allowed to recycle or compost other items when appropriate). On the final day of collection, students should be provided gloves and allowed to sort and tally up the kinds of items they used, however they see fit. Later, the class can provide input and report back on what categories they used during their personal audit, and help develop a larger tally of items that represent the whole class. **For example:** a student may count four Hot Cheetos wrappers in his/her bag, and therefore choose to create a separate Hot Cheetos category. Reporting to the class, however, that student's information may simply be recorded as Food Wrappers.