Recycling and Waste Audit

Core Activity

Activity Summary:
Perform an audit of the school's waste to learn more about types of waste generated, amounts, and areas for improvement. Students will audit several bags of waste, record and graph the results, and compare their sample to national data. This lesson can precede or follow a more in depth look at landfills, recycling processes, and compost systems.

UNIT: Generation Zero

GRADES: 6th – 12th

MATERIALS:
- 6 Scales
- 6 Aprons
- 6 Tongs
- 6 goggles
- 6 buckets
- 1 Box of gloves per 50ppl
- Trash bags
- Recycling bags
- 6 dry erase boards
- 6 dry erase markers
- 6 tarps
- Waste bags (collect on site)
- 6 tally sheets
- Hand sanitizer
- Cleaning supplies: spray/paper towels

TIME REQUIRED: 50-75 mins

OBJECTIVES:
Students will be able to:
- Conduct an effective and accurate waste audit.
- Calculate amounts of waste generated at the school.
- Compare/Contrast findings to national average

TEKS CORE CONCEPTS:
See Teacher Resources

Before beginning - it is important to note that a Recycling Audit or Classroom Waste Audit is the best introduction to this process. Composting Audits and Cafeteria Audits with food heavy waste can be quite a bit messier and are best done after first having completed a Recycling or Classroom Waste Audit.

Set-up *(10-15 min)*

1. Choose Audit Type: Classroom Waste, Recycling Bin, Compost Bin or Cafeteria Waste
2. Identify the number of bags needed. One bag per 4-6 students per class. Bags can be reused for each classed for ease.
3. To get the waste necessary to do the audit, coordinate at least one week beforehand. Sometimes, teachers are able coordinate with the custodial staff to have them collect trash from the classrooms. Emphasize that trash should not be more than 24 hours old when the Audit starts. Decomposition happens quickly and old trash can be much more hazardous. Steer clear of Bathroom trash bags.
   a. Recycling – Collect from recycling dumpster (on your own) or classroom recycling collection bins (ask custodians to hold for up to 48 hours).
   b. Classroom Waste – custodians collect from classrooms and hold for up to 24 hours.
   c. Composting – Collect from Compost Dumpster (on your own but be careful to get fresh bags) or from composting collection bins (ask custodians to hold for up to 24 hours).
   d. Cafeteria Waste – Ask custodians to hold trash for no more than 24 hours.
4. Once you have collected your waste, find an outdoor space where you can set out the tarps, scales, and other materials. Alternatively, a classroom setting works as well if you have access beforehand.
5. Preview all waste and check for hazards such as sharps, biohazards, and objects not suitable for students to handle.

Introduction and Pre-Test *(10 min)*

2. Walk in and introduce yourself. *Hi! My name is (blank), and I will tell you more about myself in a minute. First, I want to do a quick activity with you. This activity is not for a grade, it's just to see how*

much you already know about what I'm going to talk about. This is a solitary activity. I want to know what YOU know, not your neighbor.

Pass out the knowledge assessment. Give students no more than 5 minutes to complete the activity.

3. Introduce yourself and Keep Austin Beautiful. *My name is (blank) and I work for a place called Keep Austin Beautiful. Have you ever heard of Keep Austin Beautiful before? What do you think we do at Keep Austin Beautiful?* Common answers and prompting questions:
    a. Clean the city (Pick up trash) – *How do you keep the city clean?*
    b. Make the city more beautiful (Plant flowers, trees, gardens) – *What would your parents do if they wanted to make your yard more beautiful?*
    c. Teach others how to recycle and compost – *I have the same job as (insert teacher's name). What is that?* Teacher. *I'm here to teach you about trash, recycling, and compost. I'm going to come a total of three times and we're going to have a lot of fun while we learn about those things. How does that sound?*
4. Preface what they will learn today: *Today we are going to learn about what we throw away in our trash.*

What's an audit? *(5 min)*

1. Ask the students about waste. *What is waste?* Stuff we don't use anymore, gross stuff, old things, etc.
2. *Where does trash go when we throw it away?* **Dump**, **landfill**.
3. *Do you think about the trash after you've tossed it?*
4. Share with the students that today they will be performing an audit of their school's (fill in Audit type) waste-stream.
    - *What does the word audit mean?* An **audit** is "conducting a systematic review of" a particular thing. If they don't know, relate it to a tax audit.
    - *If that's what an audit is, what do you think a waste audit is? What about a (insert type) Audit?*
5. Brainstorm about how the audit should be conducted to make it the most effective.
    - *Should they record every piece of trash they find?* No.
    - *Should they come up with categories?* Yes.
    - *What are some categories they might find?* Brainstorm as a class, guiding them to use the following categories: paper, plastic, metal, glass, food, other.

Auditing Their Waste *(25 minutes)*

1. Explain that they will now head outside to audit a couple of (trash or recycling) bags that have been collected and kept from the dumpster. Remind them that they are collecting important information so to NOT ERASE THEIR DATA until otherwise instructed. Their instructions, which should be explained before they begin, are as follows:
    - Split into groups of 4-6 (depending on class size)
    - When you get outside, every student should grab a pair of gloves and head with their group to tarp where a bag of waste* and their supplies will be waiting. Each tarp should have: a scale, pair of tongs, apron, pair of goggles, a tray, a whiteboard (w/columns),

and a dry-erase marker. Tell students to keep their hands off of the equipment until their roles have been assigned and they've been given the go-ahead.

- Assign one student from each group to be the waste manager and put on the apron and goggles. Next assign a weight manager and information recorder. Everyone else will help sort the waste as the waste manager removes it from the bag.
- Instruct the weight manager to turn their scales, adjust the unit so they are set to grams, and tare them with the bucket/tray on top.
- Once they begin, students should then split their waste up into the categories outlined above. Weigh each group and record the total weight in grams on the tally sheet under the appropriate column. Again, make sure they hold on to their data for the next part of the activity.
- Once finish, return waste to the trash bag once complete.
- If bags will not be reused for another class, students should sort their waste into recycling and landfill bags. Set aside a few minutes to explain what can be recycled/composted, and have students sort their waste into recycling, landfill, and compost bags.
- Clean their area when they're finished, throw away gloves, and wait until all the groups are ready.
- Assist with groups as needed. Once everyone is finished or your time is up, head back inside.

Reporting Back *(5 minutes)*

1. Have students sit back down at their desks after returning to the room.
2. Write the six categories on the board (paper, plastic, metal, glass, food, and other). Go around the room and have one student from each group report to you about how much of each category they found in their waste. Write these numbers on the board and then have the students total them so that you have the total amount in grams from the whole class for each category. (Can have different groups work on different categories when adding up)
3. Prompt students: *What is a tool we can use to visualize our data/compare and contrast our totals?* Bar graph.
4. Create a bar graph on the whiteboard as a class, using the totals. Depending on time, have students come up and draw in columns. Could ask students to create their own bar graphs using their whiteboards, also depending on age group and time.
5. Discuss the graph.
    - *What did you find the most of? The least?*
    - *Were any of these results surprising?*
    - *Do the largest categories make sense based off your location? How might the contents change in a different location?*
    - *Does the school need to be doing a better job at _____(recycling, composting, general sorting)?*
6. If time permits, this is a great jumping off point for brainstorming solutions and ideas.

Recycling and Waste Audit

Core Activity

Waste by the Numbers (10 Minutes) *Optional if working with long periods. Alternatively, this section can be the intro for the next lesson.*

1. Preface we are going to do an activity to compare what we found at our school to what is thrown away on average across the United States. Pull out an activity bag. Give clear instructions before passing out materials.
2. Instructions:
    - When you get your bag, pull out the marker and rag and set it to the side.
    - Pull out the category cards and set aside the chips.
    - Line the cards up along one edge of their table with the color facing in. Show the students an example of this.
    - Once you begin, those cards should not be moved.
    - Lay out your chips across the table in line with the colored boxes. (Could also choose to stack the chips to make a 3-dimensional graph) Match the colors to the categories.
    - When you're finished, sit down and wait for instructions.
3. Divide students into 5-6 groups (likely just keep them in their table groups). Distribute an activity bag to each group. Have students do the activity.
4. Ask students about the resulting graph with several data interpreting questions and compare these findings with the waste audit findings:
    - *What kind of trash do we produce the most of?*
    - *How did this compare to our waste audit?*
    - *Are there any surprising comparisons?*

Waste by the Numbers – Pie Chart **(5 minutes)**

1. Hold up the corresponding Pie Chart for the class. *What is this called?* A pie chart. *Bar graphs are good for comparing and contrasting, but pie charts are good for showing how much each part makes up of the total. Do you think the information in your pie chart and my bar graph are the same?*
2. For time saving, ask students to explain how we could show the bar graph info on a pie chart – count each color of chips and compare to the total number of chips. Explain since there are 100 chips, we can convert to percentages easily. *How would we generate percentages / a pie chart for the data we collected during our waste audit?*
3. Fill in the pie chart as a class according to numbers of chips per category.
4. If time, practice some fraction to percentage conversions.
5. Discuss:
    - *How is this pie chart helpful? What can it tell us that a bar graph cannot?*
    - *Why is all of this info important to know?*
6. Let students know that we will be revisiting this pie chart during the next visit.
7. Have students carefully put the chips, cards, and markers in the bags; checking the floor for any fallen items. Have students erase their dry erase boards and assign a student to collect the boards and bags.

Conclusion (*5 minutes*)

1. Introduce the City of Austin's Zero Waste Initiative. Goal in Austin to divert 90% of our waste from the landfills by year 2040.
2. Share that as of Fall of 2018, every AISD school has recycling and composting services and that their school has an opportunity to utilize this resource to make a big difference in Austin!
3. Ask how we can work to meet the goal? Recycling, composting, reusing
4. Ask if they think it is possible to meet the Zero Waste Goal?
    - Yes! We just need to learn how to compost and recycle as best as possible.
    - Share that that is just what the next visit is about.
5. **CHALLENGE students to think before they toss and to see what they throw away the most**

Next Steps: See Supplemental Activities