

# **Reducing Waste in the Classroom**

## **A Classroom Instructor’s Guide for Zero Waste Initiatives**

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## Why is this Important?

- Schools generate massive amounts of landfill waste
  - Schools and other educational facilities are often among the largest waste generators in any city, county, or state<sup>1</sup>
  - Food waste can account for up to 24% of school waste;<sup>2</sup> in four Boston middle schools, over \$432,000 of food (26% of the allocated budget) was discarded by students in one year<sup>3</sup>
  - The average student in the U.S. generates ~67 pounds in discarded school lunch packaging per year, creating 18,760 pounds of waste annually for an average elementary school<sup>4</sup>
- The majority of school waste can be diverted away from landfills
  - At least 40% of a typical school's waste stream is paper<sup>5</sup>
  - An estimated 80% of school waste can be recycled or composted<sup>6</sup>
- Education and activities for waste reduction and resource conservation are empowering for students
  - Check out the [Oxford Elementary class' YouTube video](#) series, "Trash Tales", which outlines the implementation and outcomes of their zero waste classroom

*"For students, the experience of a Zero Waste classroom is a real and empowering step towards approaching the greater environmental challenges of plastic pollution and climate change; students learn that their choices-their small daily acts-do matter" —Jackie Omania, Oxford Elementary zero waste classroom teacher<sup>7</sup>*

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<sup>1</sup> American Federation of Teachers (n.d.), Greening at the grass roots: School recycling, *A Union of Professionals*, Web.

<sup>2</sup> MPCA (2010), Digging deep through school trash: A waste composition analysis of trash, recycling, and organic material discarded at public schools in Minnesota, *Minnesota Pollution Control Agency*, Web.

<sup>3</sup> Cohen, J. F., Richardson, D., Austin, S. B., Economos, C. D., and E. B. Rimm (2013), School lunch waste among middle school students: Nutrients consumed and costs, *American Journal of Preventative Medicine*, 44(2), 114-121.

<sup>4</sup> Beyer, Melissa (2012), The shocking stats behind back-to-school waste (infographic), *Ethical Ocean*, Web.

<sup>5</sup> American Federation of Teachers (n.d.).

<sup>6</sup> Beyer (2012).

<sup>7</sup> Ecology Center (2016), Plastic-free July inspiration: Jackie Omania's zero waste classroom at Oxford Elementary, *Ecology Center*, Web.

# I Want To...

## Increase Recycling

### *Suggested steps*

- Conduct an audit of classroom waste to determine average waste generation per day, week, and/or school year (see waste audit guide below)
  1. Save two days' worth of all classroom trash, including food waste
  2. Spread the waste out on a large tarp
  3. With students, sort the items into compost, trash, recyclables, and reusable materials
  4. Weigh the different categories of waste and record the data in a table
  5. Make a pie chart representing the composition of your class trash can. Discuss the findings and make a plan to improve waste diversion as a class
- Establish a recycling system
  1. Communicate with students about the "what", "how", and "why" of classroom recycling, and ask for student input and assistance in setting up the class recycling program
  2. Acquire recycle bins and add descriptive labels identifying appropriate recyclable materials. Pair each trash can with a recycle bin, making sure the receptacles' sizes, colors, and labels are consistent throughout your classroom, and, ideally, your school
  3. Start small! Begin by recycling all classroom paper, and build on your progress by adding other recyclables as capacity needs and opportunities change
  4. Contact custodians as needed to modify schedules for classroom trash and recycling pickups
  5. Evaluate (and celebrate!) the recycling efforts. Conduct additional audits to identify items that are still being sorted incorrectly, and brainstorm new ideas for improving upon the program as a class

### *Materials needed*

- Waste audit materials: waste audit guide (example below), tarp, disposable gloves, trash bags, scale
- Recycling bins (enough to pair with each classroom trash can)
- Signage for recycling/trash bins listing where different items should go
  - Republic Services accepts batteries, metal, cardboard, paper, and plastics #1 & #2 in Missoula
  - See the Sustainable Business Council's map (below) for additional information on additional facilities accepting other recyclable materials
  - Students can help design signs using this [online sign-maker](#) tool

### *Anticipated outcomes*

- Improve waste diversion and reduce need for custodial trash pick-up
- Give students hands-on experience in the measurement and tracking of material waste while considering the environmental impacts of their daily choices
- Create quantifiable savings in terms of money and energy from materials recycling

Classroom/School Waste Audit Guide

*What can be done with this material?*

Type of Material	Number of Items	Total Weight (lbs.)	What can be done with this material?						
			Compost	Reduce	Reuse	Recycle	Donate	Landfill	
Cardboard									
Electronics									
Food									
Glass									
Metal									
Other									
Paper									
Plastics (#1-2)									
Plastics (#3-7)									
<b>TOTAL</b>			<i>How many items can stay out of the landfill?</i>						

*Estimation of Annual Classroom Waste Generation*

<b>Material</b>	<b>Measured Weight (lbs.)</b>	<b>% of Audited Waste</b>	<b>Daily</b>	<b>Weekly</b>	<b>In Academic Year</b>
Cardboard					
Electronics					
Food					
Glass					
Metal					
Other					
Paper					
Plastics (#1-2)					
Plastics (#3-7)					

**TOTAL:**

Overview of Missoula, MT Recycling Facilities<sup>8</sup>



Note: Opportunity E-Cycling is no longer in business, and Home ReSource is not a recycling facility. Oreo's Refining (phone: (406) 369-0005) now offers e-waste recycling.

<sup>8</sup> Modified from SBC (2015), The SBC's online guide to moving Missoula toward zero waste, *Sustainable Business Council*, Web.

## Reduce Classroom Waste

### *Suggested steps*

- Ensure all students have reusable water bottles (preferably metal) to use on a regular basis. Students without water bottles should be encouraged to borrow an extra bottle from another student or from the class/teacher
- Ask your custodian to stop stocking paper towel dispensers in your classroom. Instead, bring a few hand towels for students to use to dry their hands and wash as needed
- Limit classroom paper use by minimizing printing, printing double-sided, and keeping one-sided copies for scrap paper, and switch to using paper with recycled content in your classroom
- School supplies
  - Encourage parents and students to limit purchases of school supplies that are not durable or recyclable (like mechanical pencils and plastic pencil boxes, binders, and rulers). Instead, have parents purchase (or provide in the classroom) items like wooden pencils, fabric pencil bags, cardboard or metal binders, and metal rulers
  - Establish a bin for communal class supplies, including broken pencils and crayons. Students can sharpen and reuse these supplies as needed
  - Consider investing in refillable whiteboard markers, like those from [EcoSmart](#)
  - Find ways to “upcycle” school supplies, like [creating jump ropes from marker caps](#)

### *Materials needed*

- Reusable water bottles and cups/mugs
- Collection bins for scrap paper
- Classroom paper with recycled content
- Dishwashing and laundry supplies (dish soap, sponge, drying rack, laundry basket, and laundry soap)
- School supplies
  - Reusable or recyclable school supplies to make available to students, such as wooden pencils, fabric pencil bags, metal rulers, and class sets of markers and crayons
  - Durable classroom pencil sharpener (electric or wall-mounted)
  - Collection bin for reusable communal school supplies for use during the academic year
  - Collection bin for donated supplies at the end of the school year
  - Refillable whiteboard markers

### *Anticipated outcomes*

- Decreased classroom paper usage and environmental footprint
- Reduced trash volume from paper towels, disposable cups, and school supplies
- Student acquisition and use of durable school supplies that can be reused in years to come
- Reduced need to purchase new school supplies for the classroom from year to year

## Reduce Trash at Lunchtime

### *Suggested steps*

- Encourage students who bring lunches and snacks to school to do so in a waste-free way. This can be done by packing food in durable lunch boxes and glassware, using fabric sandwich bags, packing metal silverware and cloth napkins, and limiting pre-packaged food items
- Provide students with durable dishes, silverware, cups, and cloth napkins for school meals and daytime snacks. Students can help to wash dishes at the end of the day
- Encourage students to save unwanted or leftover food for a snack later on in the day. You may also want to work with cafeteria staff to set up a food share table for unopened or uneaten food

### *Materials needed*

- Reusable dishes and drinkware for student use, including silverware, plates, bowls, cups, mugs, and water bottles
- Cloth napkins
- Dishwashing supplies: soap, towel, sponge, drying rack

## Compost in the Classroom

### *Materials needed*

- Worm bin (can be plastic or wood) about 3' X 2' X 1' in size. A bin this size can handle six pounds of food scraps per week. Air holes should be drilled in the bottom of plastic bins for ventilation.
- Scrap newspaper
- Soil (either potting soil or topsoil)
- One pound of red worms (500-1,000 individuals)
- Food scraps (avoid dairy, meat, oils, compostable foodware, and foods containing fats or oils)
- Outside educational resources and lesson plans as needed

### *Set-up procedure<sup>9</sup>*

1. To prepare the bedding: tear about 10 pounds of newspaper into 0.5-1" strips lengthwise, and then quickly dunk the strips in water and use to line the bin. Mix with a few handfuls of soil
2. Place worms in the moist bedding
3. Put a handful or two of food waste near the worms and cover well with more bedding
4. Add dry shredded newspaper to fill the bin, and cover the bin with a layer of burlap or cloth
5. Let the worms get to work! Do not add additional food scraps to the bin for the first 1-2 weeks
6. After 1-2 weeks, feed the worms every 3-7 days, always burying the food under paper (take care to avoid overfeeding). Keep adding more paper as needed to cover the food scraps
7. Monitor the temperature in the bin. The optimal temperature for worm bins is 50-70° F

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<sup>9</sup> CVSWMD (2007), Do the rot thing: A teacher's guide to compost activities, *Central Vermont Solid Waste Management District*, Web.



8. To harvest compost, move the finished compost to one side of the bin. Fill the empty side with fresh bedding material and food scraps. Give the worms several weeks to move to the new bedding materials. Then, remove the finished compost and refill the bin

*Anticipated outcomes*

- Significant reduction in food trash waste
- New opportunities for STEM learning through hands-on activities on composting, worm biology, nutrient cycling, and sustainability
- A final product to the project. Compost can be used in school gardens or can be made available to family plants and gardens

# What Else can I Do?

## Integrate Waste Management into Class Curriculum

- Curriculum resources and ideas
  - EPA: [The quest for less: activities and resources for teaching K-8](#)
  - CalRecycle, CA: [Closing the Loop](#), grades K-6
  - Chaffee, Lake & Custer Counties, CO: [Lessons in sustainable waste management](#), grades 3-5
  - New York City, NY: [NYC K-12 school RRResource guide](#)
  - Oregon DEQ: [Rethinking recycling... an Oregon waste reduction curriculum](#)
  - Wake County, NC: [Recycling and waste reduction lessons/activities](#)
- Supplemental media resources
  - Annie Leonard's video project, *The Story of Stuff*
  - Dr. Seuss' book, *The Lorax*
  - Shel Silverstein's poem, "Sarah Cynthia Sylvania Stout"
  - Andy Barker's short story, "The Birds of Zazurds"
  - Documentaries on waste generation and disposal (e.g., "The Wasteland", "Death by Design", and "War on Waste")

## Start a Student Green Team

- What is a Green Team?<sup>10</sup>
  - Informal group of school stakeholders (students, staff, parents, administrators)
  - Meet regularly to educate themselves about sustainability and plan initiatives to improve sustainability efforts within the school campus
  - Coordinate and lead diverse projects to improve campus sustainability
  - Communicate with the broader school community to share successes and future projects
- Starting a Green Team<sup>11</sup>
  - Gather a small group of students, staff, and parents who are passionate about "greening" the school and begin goal-setting
  - Do some sustainability "recon" by looking around the school to see what needs to be improved. Talk to different departments and offices to get ideas for projects, and take note of the waste habits of students and faculty
  - Research projects and campaigns organized by Green Teams in other schools to get ideas for your own projects. Adapt the strategies and lessons of other Green Teams to start a small project at your school
  - Create a Green Team plan to achieve your sustainability goals. Consider designing projects and associated methodologies to meet the identified goals, anticipating potential challenges to implementation, reporting results, and communicating to students and faculty

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<sup>10</sup> Duke Sustainability (n.d.), Start a Green Team, *Duke University*, Web.

<sup>11</sup> Bradbury, M. (2016), How to kick start a green team at your school, *Busch Systems*, Web.

- Gain support for the Green Team and its proposed projects from school administrators, facilities staff, and PTA or PTO groups
- Establish a media presence for the Green Team (emails, newsletters, and social media) to share the work of the Green Team and increase outreach
- → See Oregon Green Schools' "[Ideas for School Green Teams](#)" for a comprehensive idea list
- Tips for running successful Green Teams<sup>12</sup>
  1. Start small: gather a small group of students and staff and agree on achievable goals
  2. Hold regular meetings and host community celebrations at the beginning and end of each school year to celebrate progress
  3. Breakdown borders: work on issues across departments, schools, and campuses to share the workload and encourage collaboration
  4. Involve facility and building services: custodial and facilities staff are instrumental in gathering data and garnering approval and support for infrastructural changes throughout the school
  5. Create campaign calendars: create a campaign schedule to focus on a different sustainability topic in your school each month
  6. Encourage project ownership: discuss interests and priorities and empower students to make tangible projects happen
  7. Communicate: use emails, newsletters, and/or social media to spread the word about the Green Team and its initiatives
  8. Show appreciation: always recognize and show appreciation for Green Team student and adult volunteers!

### Coordinate a Zero Waste School Event

- Waste at school events<sup>13</sup>
  - An average school event with 250 people produces ~80.5 pounds of waste from food and disposable foodware
  - If all U.S. schools host only two events every year, the events will generate about 16.5 million pounds of food waste
  - One zero waste school event can save the equivalent of 180 pounds of CO<sub>2</sub> emissions
  - If all U.S. schools held two zero waste events per year, the savings would reach about 50 million pounds of CO<sub>2</sub> emissions, the equivalent of reducing car mileage in the U.S. by 54 million miles
- Zero waste event ideas
  - Food waste
    - Plan carefully to ensure that purchased and served food is not over-ordered
    - Encourage students and guests to only take what they can eat
    - Create a plan to use leftover food or donate it to local nonprofits

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<sup>12</sup> Harvard University Sustainability (2015), 10 tips for a successful Green Team, *The President and Fellows of Harvard College*, Web.

<sup>13</sup> Green Schools Initiative (n.d.), Strive for zero-waste school events: Events that are fun don't have to make waste by the ton (infographic), *Green Schools Initiative*, Web.

- Offer compost collection for discarded food, making sure compost buckets are easily identifiable and labelled with a list of compostable items
  - Drinks
    - Encourage (and consider incentivizing students and guests to bring their own cups
    - Provide plenty of accessible water stations and pitchers
    - Collect recyclable bottles and cans in a well-labelled, identifiable recycle bin
    - Avoid selling drinks in disposable containers (juice boxes, drink pouches, etc.)
  - Cups and plates
    - Only serve food with reusable cups and plates
    - Avoid plastic dishware, opting for durable or compostable products instead
    - Offer composting services for compostable foodware
  - Utensils
    - Serve “finger foods” that require minimal utensils
    - Hold a “fork drive” and use reusable forks
    - Buy and use compostable utensils
- Steps to plan a zero waste event
  1. Plan
    - a. Get the event committee to commit to a goal of zero waste
    - b. Plan on serving “finger foods” to avoid utensils
    - c. Know what your school can recycle and/or compost (Missoula Compost Collection [can provide](#) 64-gallon compost bins on short notice for special events)
    - d. Coordinate with custodial staff to discuss needed collection services
  2. Buy
    - a. Buy items that are recyclable and/or compostable, and purchase items that contain recycled content
    - b. Avoid buying juice boxes, plastic, or Styrofoam
  3. Set-up
    - a. Set up multi-sort waste stations with color-coded, eye-catching signs to encourage good sorting practices. Be sure to add signs for what items are recyclables, compostables, or landfill items
    - b. Assign waste monitor volunteers to help students and guests sort properly
  4. Clean-up
    - a. Dispose of sorted waste in appropriate dumpsters
    - b. Donate leftover food to a local shelter or food bank
    - c. Celebrate your success! Thank volunteers and custodians, and publicize the success of the event

## Participate in a School-Wide Compost Collection Service

- Potential for school-wide compost collection in Missoula
  - [Missoula Compost Collection, LLC \(MCC\)](#)
    - Offers compost pickup and delivery for commercial services such as restaurants, grocery stores, and schools
    - Can provide and deliver 10-gallon and 64-gallon composting bins to customers
    - Can customize a pickup schedule that is appropriate for individual facilities
    - Delivers compostables to [Garden City Compost](#)
  - Potential arrangement between Missoula Compost Collection and Missoula schools
    - School cafeterias are a great place to start!
      - Provide labelled 64-gallon bins in cafeterias and kitchens to collect food waste from meal preparation and mealtime
      - Arrange a pick-up schedule that is appropriate for the volume of compost collected on a daily basis (this may need to change as students and staff improve their composting habits)
      - If MCC bins are only placed in the cafeteria, students and teachers could still collect compostable materials in their own bins. These could be emptied into the cafeteria bins and rinsed daily
    - Increasing school compost infrastructure
      - To further promote school-wide composting, MCC 10-gallon bins should be placed in classrooms, lounges, and hallways
      - Plan to empty the bins into the cafeteria's 64-gallon bins and clean them daily
        - Bins could be emptied and rinsed by teachers and students
        - Custodial staff could empty the 10-gallon bins, to be washed by kitchen staff, student/staff volunteers, or a school "green team"
      - MCC could continue collecting compost from main cafeteria bins until the capacity needs for the school's compost program grow. More pick-up locations may be needed as the collection program becomes more widely implemented and used
    - It will be necessary to educate staff and students (via assemblies, news bulletins, PTA meetings, and announcements) about the composting program as it begins and changes over time
- Teachers' roles in classroom compost collection
  - Teach students about composting, and lead by example
    - Adapt and use [lesson plans](#) about composting, ideally in conjunction with STEM units
    - Reinforce [guidelines](#) for compostable materials in Missoula (no meat, dairy, grease & oil, compostable containers, or paper products)
  - Collect compost in the classroom
    - Provide your own labelled bin if not provided by MCC
    - Have a class discussion about what items can be placed in the bin, and create a class plan for regularly emptying and cleaning the bin
    - Measure your success! Weigh the composted food scraps before emptying into school bins, and record how much waste is being diverted from the landfill

## Encourage “Green” Procurement in Your School

- Overview of “green” procurement
  - Defining characteristics<sup>14</sup>
    - Purchasing products and services that cause minimal adverse environmental impacts
    - Includes consideration of human and environmental health in the search for high quality, cost-competitive products
  - Benefits of environmentally preferable purchasing<sup>15</sup>
    - Reduce and eliminate toxic and hazardous materials in schools
    - Improve environmental health
    - Reduce asthma-related absenteeism rates
    - Reduce overall consumption of materials
    - Support markets for renewable, recycled, recyclable, and compostable products
    - Reduce greenhouse gas emissions
    - Conserve water and energy
    - Reduce landfill materials
    - Promote long-lasting, high-quality, reusable products
- “Green” procurement recommendations
  - Create and adopt a school board policy for green procurement (see [pages 22-23](#) of this school recycling guide for an example)
  - Identify and utilize resources for purchasing agents
    - Find environmentally preferable [products](#)
    - Consider encouraging your school to participate in the [Green Schools Alliance \(GSA\) Purchasing Solution](#)
- Supporting school “green” procurement efforts<sup>16</sup>
  - Understand the procurement process in your school
  - Identify administrators’ priorities for procurement (costs, convenience, product longevity, etc.)
  - Make the case for using green procurement options in a way that meets these priorities
  - Begin sustainable purchasing

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<sup>14</sup> Environmental Protection Department (2016), Green procurement, *The Government of the Hong Kong Special Administrative Region*, Web.

<sup>15</sup> CalRecycle (2017), School waste reduction: Environmentally preferable purchasing for schools, *California Department of Resources Recycling and Recovery*, Web.

<sup>16</sup> Perry, K., and Z. Garippa (n.d.), Purchasing solutions: Guidance for the school sustainability champion, *Green Schools Alliance*, Web.