



Waste-Free Lunch

CHALLENGE

WASTE AUDIT INSTRUCTIONS AND LESSON PLAN

Description

A waste audit is a tool to measure waste production. The audit will measure how much waste is produced from school lunches, and will also find out how much waste is being sent to landfill or being diverted by recycling and composting. Students will collect, sort and weigh the waste from their lunches on a normal day and again each day during the Waste-Free Lunch Challenge. The results will be compared to see whether there has been any change in the volume of waste produced from school lunches.

Please note: This lesson is a simplified version of a full waste audit where items are sorted and results are measured to a greater level of detail. For information about conducting school-wide comprehensive waste audits, please visit www.wrwcanda.com (Waste Reduction Week in Canada) or www.ontarioecoschools.org (Ontario Ecoschools).

Lesson Objectives

1. To understand how school lunches can be a source of waste
2. To understand why it is important to have a waste-free school lunch
3. To identify those items within the average school lunch that are reusable, recyclable, compostable or garbage which must be sent to landfill
4. To identify ways of reducing waste from school lunches

Curriculum Connections

The following table provides sample Ontario curriculum connections to the Waste-Free Lunch Challenge. For a detailed overview of Ontario environmental curriculum connections (JK and grade eight), please visit the Ministry of Education's 2011 Environmental Education: Scope and Sequences of Expectations:

<http://www.edu.gov.on.ca/eng/curriculum/elementary/environ18curr.pdf>. For a detailed overview of suggested curriculum connections related specifically to waste, please visit Ontario



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EcoSchool's Waste Minimization Grade 1-8 at:

http://www.ontarioecoschools.org/curriculum_resources/downloads/WastebyGrade_Nov08.pdf.

| Grade | Subject | Strand and Topic |
|---------|---------------------------------|---|
| JK-SK | Personal and Social Development | Awareness of Surroundings |
| | The Arts | Visual Arts |
| Grade 1 | Drama | Creating and Presenting |
| | Science and Technology | Everyday Structures |
| Grade 2 | Visual Art | Creating and Presenting |
| | Mathematics | Data Management and Probability |
| Grade 3 | Language | Reading |
| | Mathematics | Data Management and Probability: <i>Collection and Organization of Data</i> |
| Grade 4 | Language | Writing |
| | Social Studies | Canadian and World Connections: <i>Canada's Provinces, Territories and Regions</i> |
| Grade 5 | Health and Physical Education | Active Living- Safety |
| | Science and Technology | Understanding Earth and Space Systems: <i>Conservation of Energy and Resources</i> |
| Grade 6 | Health and Physical Education | Healthy Living: <i>Making Healthy Eating Choices</i> |
| | Social Studies | Canada and World Connections: <i>Canada's Links to the World</i> |
| | Mathematics | Measurement: <i>Attributes, Units and Measurement Sense</i> |
| Grade 7 | Music | Creating and Performance |
| | History and Geography | Patterns in Physical Geography |
| | Science and Technology | Understanding Life Systems: <i>Interactions in the Environment</i> |
| Grade 8 | Language | Media Literacy |
| | Mathematics | Data Management and Probability |



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Materials Needed

- Metric scale for weighing garbage (e.g. kitchen scales or hanging scales such as those used for measuring the weight of fish),
- Gloves for each person who will be handling the waste (e.g. food handling gloves, gardening gloves or washing up gloves – be sure to check for latex allergies),
- A set of kitchen or BBQ tongs (can be used if students do not want touch the garbage even with gloves),
- Large tarp or plastic sheet for sorting garbage (at least 2m by 2m),
- Containers (e.g. buckets, tubs) or extra bags for sorting and weighing materials. Their weights when empty need to be recorded before the audit starts. Make sure containers are thoroughly cleaned at the end of the audit if they are to be used again,
- Labels or signs for waste categories (Garbage, Reusable, Recyclable, Compostable/Organic), and
- Copies of the worksheets (attached at the end of this document), clip boards and pens/pencils.

Time Required

It is recommended that you allocate approximately **40-60 minutes** to complete the normal day waste audit (i.e. before the Challenge). This will need to include time for set up, sorting, a brief discussion and clean up.

During the Waste-Free Lunch Challenge, it is recommended that you allocate approximately **10-15 minutes each day** to complete the waste audit after lunch. Less time has been allocated as we anticipate that minimal waste will need to be audited during the Challenge.

The assessment discussion points may be saved for the last day of the Waste-Free Lunch Challenge or for the following week when there is time to analyze the results and incorporate the exercise into relevant subject areas such as Mathematics or Science and Technology.

School Specific Considerations

When planning your waste audit, please consider the following questions as they will influence the discussion points at the end of the lesson.



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- What is the procedure for managing recyclable materials? Does your school have a recycling collection service?
- What is the procedure for managing organic food scraps? Does your school have a composting or vermiculture (worm farm) system or collection service?

If your school does not currently have a recycling or organic collection service, the auditing activity still provides a valuable opportunity for students to identify items which may be recycled or composted if a service or system was introduced. The audit may be used as a way of identifying future waste diversion initiatives at your school.

Schools that do not currently have a recycling or organic collection service are also still eligible to enter the Waste-Free Lunch Challenge. Simply complete the audit exercise and record your results as if there are recycling and organic waste collections available. This will enable your classroom/school entry to be judged fairly with others.

Activities

Classroom Waste audit

1. On the nominated day instruct students in the registered classroom to place their throwaway lunch waste into a single bag or container separate from all other school bins. This is to ensure that you are measuring school lunch waste from your classroom only. Keep lunch boxes or lunch bags on hand for sorting as 'reusables'.
2. Label the bag or container with the date and classroom.
3. After the lunch/nutrition break - spread the tarp or plastic sheet out in a suitable space – well ventilated and room for students to move around the sorting sheet.
4. Use labels/signs to create separate sections for items on the tarp/plastic sheet. Make sure space is left for the unsorted waste. Briefly explain the meanings of the different categories.
5. Assist students to put their reusables (i.e. lunch boxes, lunch bags) in the correct position.
6. Tip the lunch waste bag or container onto the sheet.
7. Select students to sort items (using gloves and tongs) into categories according to their final destination (landfill/garbage, recyclable or compostable).



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Note: If there is no recycling program, organics collection or in-school compost system, it may be useful to use the 'compostable' category as a way of identifying a future classroom or school project to manage food scraps. Classrooms that do not currently have a recycling or organic collection service should simply complete the audit exercise and record results as if there are recycling and organic waste collections available. This will enable the classroom entry to be judged fairly with others.

8. Select students to place each pile in a **pre-weighed bag** or container and weight it. Subtract the weight of the container. Record all information on the Waste Audit Worksheet including: weight of waste generated, weight of recyclables, weight of compostable material and number of student lunches.

Hint: If your bathroom scale is not sensitive enough, try weighing yourself with the container filled with the waste you are attempting to measure. Next, weigh the container and yourself. Subtract your first number from the second— this is the weight of the material.

Example:

Your weight plus the container filled with waste – 60 kg

Your weight plus the container – 59.3 kg

$60\text{kg} - 59.3\text{ kg} = 0.7\text{ kg}$

0.7 kg = Weight of waste

Hint: If you are still unable to get results, use the resource: Sample Weights of Common Lunch Items. Using this sheet, you can tally your results.

School Waste audit

If a whole school is participating in the Waste-Free Lunch Challenge, they have two options – audit all classrooms individually and then tally the results, or, they can conduct a school wide waste audit. In the first option, each classroom in the school will follow the waste audit classroom instructions and submit their result to a designated individual who will tally the final results for the schools. Alternatively, the school can collect their lunch waste in one location and do one assessment for the school.

1. On the nominated day ensure that each classroom places their lunch waste into a bag or container separate from all other school bins. This is to ensure that you are only measuring school lunch waste.



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2. Do not put reusable lunch boxes or containers into the bag with the lunch waste. If you would like to provide a visual reusable container demonstration, label each student's lunch bag and containers with the student's name and classroom. Select a separate area (e.g. table) for reusable items such as lunch boxes. For health and safety purposes, this *must* be separate from the waste. Collect the reusable containers and observe the difference between the reusable containers and the waste.
3. After lunch, each class will bring their bag of lunch waste material to a designated location where the school lunch audit will occur.
4. Spread the tarp or plastic sheet out in a suitable space – well ventilated and room for students to move around the sorting sheet.
5. Use labels/signs to create separate sections for items on the tarp/plastic sheet. Make sure space is left for the unsorted waste. Briefly explain the meanings of the different categories.
6. Tip each classroom's lunch waste bag or container onto the sheet.
7. Select students to sort items (using gloves and tongs) into categories according to their final destination (landfill/garbage, recyclable or compostable).

Note: If there is no recycling program, organics collection or in-school compost system, it may be useful to use the 'compostable' category as a way of identifying a future classroom or school project to manage food scraps. Classrooms that do not currently have a recycling or organic collection service should simply complete the audit exercise and record results as if there are recycling and organic waste collections available. This will enable the entry to be judged fairly with others.

8. Select students to place each pile in a **pre-weighed bag** or container and weight it. Subtract the weight of the container. Record all information on the Waste Audit Worksheet including: weight of waste generated, weight of recyclables, weight of compostable material and number of student lunches.

After the Waste Audit

1. Select students to collect items in each category and dispose of waste, recycling, etc as appropriate. Ensure that all reusable items (lunch boxes, lunch bags) are returned to their owners.
2. Clean containers and/tarp as appropriate and return to storage.
3. Make sure all students wash their hands thoroughly before returning to class.



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Analyzing the results

As part of the competition, complete the waste audit on a normal day and then each day during the week-long Challenge. To analyze results:

1. Download the Waste Audit Worksheet Tool from the Teachers Resources page of the WFLC website.
2. Copy your results into the appropriate sheets and view final results in the sheet entitled *Final Results for Entry Form*. This table will show the difference between the waste produced on a normal day and the daily average produced during the Waste-Free Lunch Challenge (as a total and per student). Alternatively, have the students complete the calculations and compare the results.
3. The Recycling Council of Ontario will begin accepting final submissions on October 21st. On the Waste-Free Lunch Challenge website homepage, click on the SUBMIT YOUR RESULTS button. Transcribe your results and answer all of the questions. The final submission questions can be found in Attachment 4. Please note that any responses over the word count will be cut off and any additional text will not be sent to the RCO for assessment.

Assessment

The following suggestions are provided for discussion and for assessing students' knowledge and understanding of waste management issues.

Primary (JK-3):

- Where does the waste in each category (garbage, recycling, and organics) go once you put it in the bin?
- How does it make you feel when you look at a waste-free lunch and a lunch that produces lots of garbage?
- What should/should not be in a waste-free lunch?

Junior (4-6):

- How much waste do you think you produce each year just from your school lunches?



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- Can you explain why some piles are bigger than others?
- What are some of the natural resources needed to produce the items in our school lunch? (e.g. aluminum for soft drink containers, oil/petroleum for plastics)
- Where does the waste in each category (garbage, recycling, and organics) go once you put it in the bin?
- What are the components of a waste-free lunch?
- Will you make changes to your personal behaviour?

Senior (7-8):

- What role has technology played in generating the waste from our lunches?
- What are the impacts on the environment from waste produced as part of our school lunches?
- Where do the products in your lunch come from? (e.g. imported fruit and vegetables)
- Which do you think is healthier - a waste-free lunch or one which has throwaway items?
- Has your involvement in the Waste-Free Lunch Challenge changed the way you value the environment?

Standards

Before you complete the waste audit, ensure:

- The selection or appointment of an assessment coordinator to monitor health and safety (this may include the completion of a risk assessment).
- Support is received from the school community including approval from the Principal.
- Availability of staff or parent volunteers to help with the audit.
- Allocate adequate time for the audit. Depending on the volume of waste, the audit may be very quick or may take some time to complete.
- Safety! When handling waste, be sure the necessary precautions are taken such as wearing gloves and using appropriate safety equipment and procedures.



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Useful Websites

Ministry of Education- Environmental Education

This is an extremely helpful resource created by the Ministry of Education. It outlines in detail how to connect environmental topics to all areas of the curriculum between JK-8. The provided link is the 2011 Edition.

<http://www.edu.gov.on.ca/eng/curriculum/elementary/environ18curr.pdf>

Ontario EcoSchools – Waste Minimization by Grade (1-8)

This resource is organized around “big ideas” that identify clusters of learning expectations in Science and Technology, Social Studies, and Geography linked to Waste Minimization. Archived internet resources offer background facts and student learning activities.

http://www.ontarioecoschools.org/curriculum_resources/waste_ele.html

Waste Reduction Week - Resources for Schools

Includes a slide show and homework assignment.

http://www.wrwcanada.com/index.php?option=com_content&view=article&id=16&Itemid=19&lang=en

Enviro Schools - Measuring Change (New Zealand)

Zero Waste Annual Summary Sheet, Zero Waste Data Collection Sheets, Zero Waste Teacher Support Activities

<http://www.measuringchange.org.nz/resources/zero-waste>



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ATTACHMENT 1. Waste Audit Worksheet – Normal Day (Pre-Challenge)

Please note that these worksheets are excerpts from the Waste Audit Tool (Excel file)

WASTE AUDIT WORKSHEET - NORMAL DAY (PRE-CHALLENGE)

School or Classroom:

Number of student lunches:

1 lb = 0.45359237 kg

1 kg = 2.20462262 lbs

Insert your measurements according to the destination of the lunch waste. See example below.

| | Material | Weight (kg)* |
|--------------|--|--------------|
| A. | Garbage - items that are not recyclable or compostable and will have to be sent to landfill | |
| B. | Recyclable - items that can be recycled (e.g. municipal or private contract recycling collection) | |
| C. | Organics - items that can be composted (e.g. municipal organic waste collection or in-school composting /worm farm program) | |
| Total | | |

* Remember to consider the weight of the container in your results

Example Only - Results are not typical

School or Classroom:

Number of student lunches:

| | Material | Weight (kg)* |
|--------------|--|--------------|
| A. | Garbage - items that are not recyclable or compostable and will have to be sent to landfill | 4.2 |
| B. | Recyclable - items that can be recycled (e.g. municipal or private contract recycling collection) | 3.4 |
| C. | Organics - items that can be composted (e.g. municipal organic waste collection or in-school composting /worm farm program) | 2.6 |
| Total | | 10.2 |



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ATTACHMENT 2. Waste Audit Worksheet – During the Challenge
Please note that this worksheet is an excerpt from the Waste Audit Tool (Excel file)

WASTE AUDIT WORKSHEET - DURING THE CHALLENGE

School or Classroom:

1 lb = 0.45359237 kg 1 kg = 2.20462262 lbs

Insert your results each day during the week according to the destination of the lunch waste.

| Material | Weight (kg) * | | | | | Daily Average (= Week Total/5 days) |
|---|---------------|---------|-----------|----------|--------|--|
| | Monday | Tuesday | Wednesday | Thursday | Friday | |
| A. Garbage - items that are not recyclable or compostable and will have to be sent to landfill | | | | | | |
| B. Recyclables - items that can be recycled (e.g. municipal or private contract recycling collection) | | | | | | |
| C. Organics - items that can be composted (e.g. municipal organic waste collection or in-school composting /worm farm program) | | | | | | |
| D. Number of Student Lunches | | | | | | |

* Remember to consider the weight of the container in your results



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ATTACHMENT 3. Final Results for your Entry Form

Please note that this worksheet is an excerpt from the Waste Audit Tool (Excel file)

RESULTS FOR YOUR ENTRY FORM

School or Classroom:

Insert your collated results from both worksheets in the coloured cells below and complete the calculations. Please note that the Excel version of this table (in the Waste Audit Tool) will complete the calculations for you.

Copy these results into Section 2 of your Entry Form

| | Normal Day (before) | Daily Average during WFLC (weekly total/ 5 days) | Change in waste produced |
|---|------------------------|--|-----------------------------|
| A Garbage (kg) - items that cannot be recycled or composted | | | |
| B Recyclable material collected (kg) - items which can be recycled | | | |
| C Organic food waste collected (kg) - items which can be composted | | | |
| D Total number of students lunches - students in the registered classroom or school only | | | |
| Weight of garbage to landfill per student (kg) = (A) divided by (D) | | | |



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ATTACHMENT 4. Final Entry Form

SECTION 1. CLASSROOM OR SCHOOL REGISTRATION

This information will help us to keep track of your entry and to confirm that your classroom or school participated in the Waste-Free Lunch Challenge during Waste Reduction Week.

District School Board (If applicable) _____

School Name _____

Name of registered Classroom Teacher/Principal _____

Email address of registered Classroom Teacher/Principal _____

Participating classroom(s)/grade(s) _____

Number of participating students _____

Dates of your Waste-Free Lunch Challenge _____

Which category are you nominating for? Beginner__ Advanced (established low/waste-free programs) __

Has your school Principal given permission for your entry to be reproduced by the Recycling Council of Ontario?

Yes _____

Name of Principal _____

Please note: Final entry may be used by the Recycling Council of Ontario to develop case studies for future years. You may be contacted by the RCO for further information about your activities.

SECTION 2. WASTE AUDIT RESULTS

Please complete section two to report your collated lunch waste audit results on a normal day and during the Waste-Free Lunch Challenge. Please provide measurements in metric kilograms only. These results will be used to judge your classroom performance in the Challenge.

Normal Day (before)

(A) Garbage (kg) - items that cannot be recycled or composted _____ kg

(B) Recyclable material collected (kg) - items which can be recycled _____ kg

(C) Organic food waste collected (kg) - items which can be composted _____ kg

(D) Total number of students lunches - students in the registered classroom/school only



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Weight of garbage to landfill per student (kg) = (A) divided by (D) _____

Daily Average during WFLC (weekly total/number of days)

(A) Garbage (kg) - items that cannot be recycled or composted _____ kg

(B) Recyclable material collected (kg) - items which can be recycled _____ kg

(C) Organic food waste collected (kg) - items which can be composted _____ kg

(D) Total number of students lunches students in the registered classroom/school only

Weight of garbage to landfill per student (kg) = (A) divided by (D) _____ kg

Change in waste produced

(A) Garbage (kg) - items that cannot be recycled or composted _____ kg

(B) Recyclable material collected (kg) - items which can be recycled _____ kg

(C) Organic food waste collected (kg) - items which can be composted _____ kg

Weight of garbage to landfill per student (kg) = (A) divided by (D) _____

SECTION 3. CLASSROOM/SCHOOL REPORT

Please describe below, in 100 words or less (per question) how your registered class or school participated in the Waste-Free Lunch Challenge. Answers should address the following questions and may be answered by students where appropriate.

1. Why did your class/school choose to participate in the Waste-Free Lunch Challenge? (Max. 100 words)

2. How did you promote the Waste-Free Lunch Challenge in your classroom/school? (e.g. posters, letters home to parents, announcements) (Max. 100 words)

3. How will your class/school continue to reduce waste from school lunches?



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(e.g. a waste-free lunch policy or regular waste-free lunch days throughout the year) (Max. 100 words)

4. How did your classroom/school respond to the Challenge? (i.e. what did you learn? Student testimonials encouraged) (Max. 100 words)

5. Advanced Category only- If your school lunches are already low waste or waste-free, please tell us how you promote waste reduction in other areas of the school or community (e.g. waste reduction activities as part of an EcoAction Plan) (Max. 100 words)

SECTION 4. FEEDBACK

Your feedback is a valuable source of ideas and suggestions to improve future waste-free lunch events. Please select all options that apply to you.

1. Which of the resources provided on the Waste-Free Lunch Challenge website did you find useful?

- Teacher Resource List:
- WFLC Summary Video
- Getting Started - Teacher's Planning Guide
- Planning Your Event Task List
- Waste Audit Instructions and Lesson Plan
- Useful Web links
- Waste Audit Instructional Video
- Waste-Free Lunch Challenge Poster
- Sample Letter to Parents
- Sample Announcements
- Waste Reduction and Recycling Facts
- Sample School Newsletter
- Waste-Free Lunch Challenge Sample Web Banner
- Sample School Media Release



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- Waste Audit Tool (EXCEL)
- Weight of Common Lunch Items
- Sample Student Certificate
- Fridge Reminder Resource (Parent Resources)
- How to pack a waste-free lunch Video (Parent Resources)
- How to Shop for a waste-free lunch Video (Parent Resources)
- All of the above

2. Please indicate who participated in or supported your waste-free lunch event (check all that apply)

- Other teachers
- Custodian/caretaker
- School administration
- Parents/School Council
- School Eco Team
- Trustees
- Other, please specify

3. Please let us know about any other ideas/comments you have regarding the Waste-Free Lunch Challenge (limit 200 words)

4. The Waste-Free Lunch Challenge would like to provide coveted grand prizes that reward a school's effort to go waste-free. Please let us know if you have any feedback or suggestions about the prizes being offered.



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