# WASTE & RECYCLING INVESTIGATION


Kansas Association for Conservation & Environmental Education (KACEE)

**Kansas Green Schools Program**

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KACEE
KANSAS ASSOCIATION FOR CONSERVATION & ENVIRONMENTAL EDUCATION

KANSAS GreenSchools

# Waste and Recycling Table of Contents



## 1.1 Introduction to KACEE and Kansas Green Schools

- **KACEE has been promoting and providing conservation and environmental education for all Kansans since 1969.**
- **KACEE supports community education, outreach and engagement programs statewide to advance the mission of our natural resource agency, higher education, and non-formal education partners.**
- **KACEE's environmental education curricula help teachers improve student achievement, engagement in STEM, critical thinking, problem solving, and 21st century job skills.**
- **KACEE's professional development programs give educators the confidence to take students outdoors to learn with hands-on activities that are fun and meaningful for students.**
- **Environmental Education connects kids to nature, supports healthier, active lifestyles, and encourages students to take action to improve their school and environment.**
- **KACEE encourages and recognizes outstanding achievement through Excellence in Conservation and Environmental Education Awards and Kansas Green Schools Recognition programs.**

- **Kansas is the only state to have a unique, collaborative partnership with KACEE, Project Learning Tree and the National Wildlife Federation to coordinate Green School certification and recognition between state and national programs.**

- **Since 1998, the KS Green Schools Program has connected students to their community and the world, while growing problem-solving and leadership skills through service learning projects.**
- **KS Green Schools investigations engage students in exploring their school's energy, water, school grounds, waste management and creating a greener and healthier learning environment.**
- **The KS Green Schools Network supports teachers in creating greener and healthier schools through training, networking, grant funding, curriculum resources, and more!**
- **The KS Green Schools program celebrates and recognizes schools across the state for their green achievements through the KS Green Schools recognition program.**
- **The KS Green Schools Network connects and inspires teachers in over 500 Kansas Green Schools through an annual Green Schools Conference, Online Forum, Green Schools Updates, Professional Development Workshops, Facebook, and more!**

**Join us on Facebook at [www.facebook.com/groups/kansasgreenschools](www.facebook.com/groups/kansasgreenschools)**
**Here you can connect with KACEE and to hundreds of Kansas Educators!**

## 1.2 Leadership Resources

### Correlations to Academic Standards

The Kansas Green School Investigations are designed to support your efforts in the classroom with many national education standards. To keep up to date with the correlations, visit [https://www.plt.org/alignment-to-standards](https://www.plt.org/alignment-to-standards).

## Career and Technical Education for Kansas Kids

Tying Kansas kids to real world applications is a great way to engage your students in the investigations. We encourage you to introduce your students to real world professionals throughout the investigations to increase the direct learning opportunities and to increase the depth of experiences. Here are a few of the fields that students may discover throughout the investigations:

- Recycling Facility Manager or Employee
- Solid Waste Manager
- Professor of Solid Waste Management
- Manager or Employee of a Non-Profit Recycling Organization
- Recycled Materials Artist
- Recovered Materials Entrepreneur
- Environmental Law and Policy Specialist
- Environmental Scientist
- City Recycling Coordinator
- Paper Mill Employee
- Landfill Operator and Technician
- Environmental and Landfill Engineer
- Environmental Health and Safety Technician
- Household Hazardous Waste Manager or Employee

**Did you know Green Jobs are growing in the state of Kansas?** The highest areas of growth are in the renewable energy area. Other areas of growth include increasing energy conservation, clean transportation and fuels, agriculture and natural resource conservation and pollution prevention/environmental cleanup. https://www.cleanjobsmidwest.com/state/kansas

## Why Should Students Study Waste?

How can we have the greatest impact on the waste stream? Our greatest impact can come by not creating waste in the first place. By reducing and reusing, consumers and industry can save natural resources and reduce waste management costs. In 2018, **the amount of waste produced per person was 4.9 pounds per day**. **This results in the average person producing around 1788 pounds of trash a year!**

**It is estimated that upwards of 80% of the waste we create can be recycled or composted.** By recycling and composting, we reclaim resources that would otherwise literally go to waste. Recycling, composting, reuse and reduction of waste also helps to reduce energy use and can save schools money on waste hauling fees. Studying about waste, recycling, composting, source reduction, reuse and composting in schools provides unique and relevant opportunities for students to engage in scientific inquiry, problem-solving and critical thinking as they investigate, gather data, analyze and propose solutions. Waste offers real world opportunities for development of scientific content knowledge and process skills in the areas of chemistry, biology, engineering, observation, inference, measurement, data collection and analysis, communication and more.

Waste management challenges bring together the fields of economics, environmental science, sociology, political science, health, and engineering. A more informed citizenry has the potential to come up with better solutions to our waste problems and knows the importance of reducing the amount of waste in our homes, schools and communities. The role of educators is fundamental to this process. The students in your classroom will be the policy makers, scientists, and voters of tomorrow. It is critical to help students realize that they can make decisions and take responsible action, which in turn can have positive effects on their community.

## What are the Benefits of Recycling?

Benefits of recycling include environmental, economic and community impacts. For schools, recycling is an opportunity to save money. Recycling reduces your hauling fees and schools can earn money by recycling certain items like aluminum cans. Teaching about "Reducing, Reusing and Recycling" are ways we can develop an environmentally literate Kansas citizenry. Here are other benefits of recycling: (Source: http://www.epa.gov/osw/conserve/rrr/recycle.htm)

- Recycling protects and expands US manufacturing jobs and increases US competitiveness.
- Recycling reduces the need for landfilling and incineration.
- Recycling prevents pollution caused by the manufacturing of products from virgin materials.
- Recycling saves energy.
- Recycling decreases emissions of greenhouse gases.
- Recycling conserves natural resources such as timber, water, and minerals.
- Recycling helps sustain the environment for future generations.

## Understanding E-Waste

According to the Environmental Protection Agency, “e-waste”, “electronic waste”, “e-scrap” and “end-of-life electronics” are terms often used to describe used electronics that are nearing the end of their useful life, and are discarded, donated or given to a recycler. Though “e-waste” is the commonly used term, EPA considers e-waste to be a subset of used electronics and recognizes the inherent value of these materials that can be reused, refurbished or recycled to minimize the actual waste that might end up in a landfill or improperly disposed in an unprotected dump site either in the US or abroad.

An undetermined amount of used electronics is shipped from the United States and other developed countries to developing countries that lack the capacity to reject imports or to handle these materials appropriately. Without proper standards and enforcement, improper practices may result in public health and environmental concerns, even in countries where processing facilities exist.

The EPA has serious concerns about unsafe handling of used electronics and e-waste, in developing countries, that results in harm to human health and the environment. For example, there are problems with open-air burning and acid baths being used to recover valuable materials from electronic components, which expose workers to harmful substances. There are also problems with toxic materials leaching into the environment. These practices can expose workers to high levels of contaminants such as lead, mercury, cadmium and arsenic, which can lead to irreversible health effects, including cancers, miscarriages, neurological damage and diminished IQs.

## Kansas Case Study

Students in the Shawnee Mission School District have implemented an impressive recycling and composting program used in the schools’ cafeterias over lunch in addition to what they have in place in the schools already! At Brookwood Elementary, the school went from producing nine bags of trash over lunch to only one bag a day! Check out the You Tube video the school district created with easy “how-to” steps.

**https://www.youtube.com/watch?v=LwtCljpUPuI**

## Waste Glossary

The following definitions may be helpful in completing the Waste and Recycling Investigation.

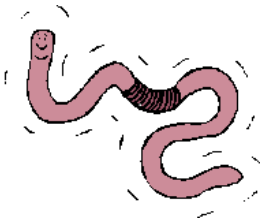
***Composting***- the controlled biological decomposition of organic solid waste such as food scraps and yard trimmings. Through the composting process, organic waste materials are transformed into soil conditioners, such as humus or mulch.

***Garbage***-typically refers to food waste.

***Hazardous Waste***- Solid waste that may cause or pose a substantial hazard to human health or the environment when improperly disposed. This waste is deemed hazardous if it exhibits corrosive, flammable, toxic or reactive characteristics.

***Municipal Solid Waste***- Materials that are unwanted and have been discarded, including durable goods, nondurable goods, containers, packaging, yard trimmings, and food wastes. Many waste items that are discarded have the potential to be reused, recycled or composted.

***Recyclables***- Waste materials that are capable of being reprocessed for use in the manufacturing of the same type of product or a new one.



***Trash***- Everyday items we throw away.

***Vermicomposting***- Vermicomposting is the process of using worms to compost material. (Check out vermicomposting: https://urbanwormcompany.com/vermicomposting-ultimate-guide-beginner-expert/).

**Did you Know?** One pound of mature worms (approximately 800-1,000 worms) can eat up to half a pound of organic material per day. It typically takes three to four months for these worms to produce harvestable castings, which can be used as potting soil. Vermicomposting also produces compost or "worm" tea, a high-quality liquid fertilizer for house plants or gardens. Vermicomposting offers great opportunities for school fundraisers!

## Why Do Schools Purchase Sustainable Products?

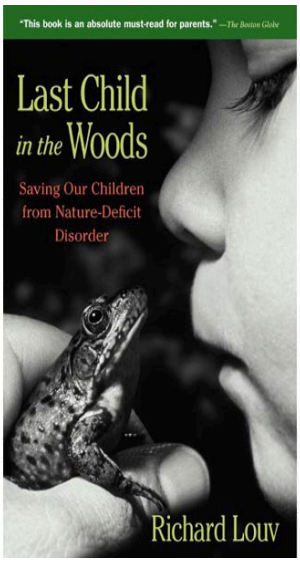
Many schools are adopting and implementing sustainable purchasing policies. There are several reasons for doing so, including buying products that are more environmentally sound and supporting the growth of environmentally conscious businesses. Also, buying products that are environmentally based are often a great way to improve your school's indoor air quality. More environmentally based products often improve the indoor health quality of your school, which supports the health of faculty and students and lowers

breathing related problems. Many sources for sustainable products are available and can be found locally or online.

## Why is Connecting Our Kids to Nature and Environmental Education Important?

Here are some statistics about the average child in the United States.

- In 2004, American children spent less than half as much time outdoors as their parents. (Kaiser Family Foundation, 2005).
- Kids are reported to spend 7.5 hours per day on electronic equipment during their free time. (Kaiser Family Foundation, 2010).
- A longitudinal study found that children under 13 living in the United States spend on average only about half an hour of unstructured time outdoors each week (Hofferth & Sadberg, 2001).




In 2005, **Richard Louv** coined the term, "Nature Deficit Disorder" in his book, ***"Last Child in the Woods."*** This term was used to define the potential impacts on children of spending less time outdoors.

*Louv states, "Nature-deficit disorder is not an official diagnosis but a way of viewing the problem, and describes the human costs of alienation from nature, among them: diminished use of the senses, attention difficulties, and higher rates of physical and emotional illnesses. The disorder can be detected in individuals, families, and communities" (Louv, 2005).*

The reduced contact children are having with nature is leading to a rise in many emotional, mental and physical health risks. Some examples in his book are a rise in childhood ADHD, correlation with rises in childhood obesity and negative impacts on cognitive and conceptual development.

## How Does Nature and Environmental Education Help Our Students?

Numerous studies have shown that environmental education has many benefits to children.

- **Science Scores-** Numerous studies have shown that environmental education boosts science scores.
- **Physical Health-** Physical activity is shown to improve children's health, and a growing body of evidence suggests that exposure to natural environments can improve attention & decrease stress in children. (McCurdy et. Al, 2010)

- **Increased Focus/Improved Cognition -** Wells observed that proximity to nature, access to views of nature, and daily exposure to natural settings increases the ability of children to focus and improves cognitive abilities. (Wells, 2000)
- **Behavioral Management-** Taylor and her colleagues found that children with attention-deficit disorder (ADD) benefited from more exposure to nature –the greener a child's everyday environment, the **more manageable are the symptoms of ADD.** (Taylor, 2001)
- **Emotional Health-** Taylor also observed that access to green spaces for learning and play, and even having views of green settings, **enhances peace, self-control, and self-discipline** among inner-city youth, especially among girls.
- **Group Cohesion/Increased Creativity-** At the school environment level Bell and Dyment observed that children who experience school grounds or play areas with diverse natural settings are **more physically active, more aware of good nutrition, more creative, and more civil to one another.** (Bell & Dyment, 2006)
- **Community Involvement-** Getting students involved in recycling projects, composting, community swap days and waste education can promote stronger social ties to the community.

## Waste Education Resources

Many organizations provide educational resources related to waste, recycling and composting. See the **Resources** section for a list of organizations that provide curricula, professional development and more.

### Educational Opportunities for Teachers

KACEE provides professional learning opportunities for educators across the state with the option to attain one hour of college credit for participating courses. For a current opportunity schedule and learn about the eeCredential Program, visit https://www.kacee.org/eecredentials.

## Home Connection

The results of this investigation will show students how they can make a variety of improvements to their school's waste stream by reducing, reusing and composting. Many of the ideas they generate can also be used at home. See the **Home Connection** chart that can be distributed or made available on school websites for families to download and use at the end of this investigation.

# Waste and Recycling Investigation Materials

## 1.3 Directions for Green Team Leaders

There are five areas you might want to investigate as a part of becoming a Kansas Green School of Excellence. These areas include:

1) **Energy-** This investigation will help your team identify current energy management practices and will help in thinking of ways to modify these practices to make your school greener and healthier! Your results will inform school staff and students where they can make improvements and also to generate an action plan to reduce school energy use.
2) **Waste and Recycling-** This investigation will help your team identify current waste management practices and will help in thinking of ways to modify these practices to make your school greener and healthier! Your results will inform school staff and students where they can make improvements and also to generate an action plan to reduce school waste.
3) **Water-** This investigation will help your team identify water practices and will help to identify ways in which your school can conserve water! Your results will inform school staff and students where they can make improvements and also to generate an action plan to improve water efficiency, improve water quality and create conservation ideas for students and staff.
4) **Healthy School Environments-** This investigation will help your team identify air quality and transportation management practices and will help in thinking of ways to modify these practices to make your school greener and healthier! Your results will inform school staff and students where they can make improvements and also to generate an action plan to improve school health for students and staff.
5) **The Learning Community-** This investigation will help your team identify improvements for your school grounds, and ideas to help local wildlife, flora and fauna, the school community, and your neighborhood, city, state, country and world. Your results will inform school staff and students where they can make improvements and to also generate an action plan.

### Getting Ready to Begin the Investigation

**Step 1. Identify Leaders-** Identify one or more Green Team Leaders to be in charge of the Waste and Recycling Investigation.

**Step 2. Obtain Permissions-** Leaders will want to obtain the necessary permissions from school administrators before starting the investigation. They should decide how and when the investigation will be conducted to avoid conflicts with school classes and activities.

**Step 3. Form Your Green Team-** Leaders should decide who will be conducting the investigation. A team approach is recommended. The more diverse the representation on your Green Team, including students and their grade levels, members of the community, etc. the higher the Globe Level you can apply for. Consider including the following representatives:

- Teachers
- Students
- Administrative staff members
- Custodial and maintenance staff members
- Cafeteria staff members
- Parent/Grandparent volunteers
- Resource Professionals in the community

**Step 4. Develop Questions for Discussion -** Before you begin, gather your KGS Green Team and come up with a list of items and/or questions you have regarding your school's energy use, waste practices, water quality and usage, school grounds and overall environmental quality. Be sure to add on any items/questions you have that are not included in the investigations.

**Step 5. Develop a Schedule and Assign Roles-** Discuss how team members are going to conduct the investigation. Will the team always work together, or will the team split into groups and assign sections to each group? Are specific school staff members (custodial, maintenance, administrative) needed during certain parts of the investigation? If so, contact them to schedule a time for that part of the investigation. Develop a schedule for how the team will conduct the investigation.

**Step 6. Print or Provide the Link to Share the Investigation-** Provide a printed copy or the Google doc of the entire investigation to the Green Team members who will be conducting the investigation. Then, they can record information as they walk around the school and complete the investigation. Encourage team members to answer the questions to the best of their ability according to time allotted and documents and materials available to them. Add any questions that your Green Team discussed that were not covered in the investigation.

**Step 7. Gather Documents and Supplies**- If possible, gather the following documents and supplies before the team begins the Investigation:

·Trash disposal and recycling service contracts;
· Monthly and/or annual billing statements from the trash disposal and recycling service;

· Any written policies related to waste management, recycling, and so forth;
· Tape measure;
· Scale to weigh trash;
· Protective goggles and gloves if students handle any waste materials;
· Tarp or large bins to lay out trash on to do the waste analysis;

**Step 8. Conduct the Investigation**- Green Team should answer the questions to the best of their ability within the time allotted, and with the information and equipment available.

**Step 9. Develop and Implement an Action Plan**- Based on the information and data collected, the Green Team will prioritize their ideas for action projects and implement one or more of their plans.

**Step 10. Apply for Recognition**- Once your investigation and action plans are complete, you will apply for a Silver, Gold, or Gold Globe Level of Recognition. Rubrics on how each level will be scored along with the applications are available on the KGS website. Visit http://www.kansasgreenschools.org for more information.

**Step 11. Celebrate Your School's Success**- Communicate your school's findings and action plans with the school, school administrators, families, the community and your representatives!

## 1.4 Waste and Recycling Investigation

### Wondering About Waste Investigation!

**Introduction**

Have you ever wondered about your school's trash and recycling efforts and how you can help? Your team will assess how much trash your school produces, what types of trash is produced and where the majority of your waste goes after it's used.

This investigation will help your team identify current waste management practices and will help in thinking of ways to modify these practices to make your school greener and healthier! Your results will inform students, school staff and/or the district where improvements can be made and also help generate an action plan to reduce school waste.

**Objectives**

- Students will investigate the waste stream in the school.
- Students will develop an understanding of how individual and collective student actions can affect the waste stream.
- Students will learn about sustainable approaches to waste management and why it is important to adopt sustainable practices.
- Students will generate a plan to improve their school's waste and recycling practices and overall sustainability.
- As approval, time, and funding permit, students will implement one or more of their waste improvement strategies.

**Time Requirement:**

The "Classroom Waste Survey" will take approximately 45 minutes to complete per classroom. The "School-Wide Waste Investigation" will take several 45-minute sessions to complete, depending on the documentation available, equipment being used, and help from supporting school staff. Be sure to gather all of the needed supplies ahead of time.

## School Waste and Recycling Investigation

Reducing waste, reusing items, recycling and composting save natural resources, energy, and landfill space. Practicing waste reduction and recycling can also save your school money. This investigation will help identify current methods of handling waste at school more environmentally friendly and sustainably. Sustainable practices are those which meet the needs of the present without compromising the ability of future generations to meet their needs.

**School Name: _____ Date: _____**

**Conducted By: (Please include administrators, teachers, school staff, students, and parents, community members, etc. involved in this investigation.)**

**Name Title/Role**

_____ _____
_____ _____
_____ _____
_____ _____

| | |
|---|---|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

**School Population**
Students: _____
Staff: _____

## 1.5 Waste Removal and Waste Investigation

Where is away? When we throw something away, does it actually "go away?" What materials and products do we use in the school? Do we either recycle, reuse, compost or throw away these items? Where did the items come from and where do they go when we get rid of them? What services are available in our community? What does our community recycle? What happens to the materials once they leave recycling? What products could we purchase that use recycled materials? What about Household Hazardous Waste? Visit www.kansasrecycles.org to find an interactive Kansas Map that lets you search by your location and material type.

## Learning About Landfills:

Landfills are an important part of the waste cycle and where the majority of our waste currently goes, but just how much do you know about landfills?

Explore this article and consider the following questions:

- What are some of the environmental impacts of landfills?
- What are some of the social impacts of landfills?
- What can we do to avoid landfills as individuals and in our school community?

You may have noted that one of the pressing environmental impacts of landfills is the production of methane gas. Learn more about EPA's voluntary program to reduce or eliminate methane gas in the following articles:

- Basic Information About Landfill Gas

**Trash Disposal at Your School**

*To answer the following questions, you may want to interview school personnel who manage the school's trash disposal service and/or review billing statements from the trash disposal service:*

1. How many dumpsters for non-recyclables does your school have? _____

2. Who picks up your trash?
   - ☐ Municipality
   - ☐ Private Hauler
   - ☐ School Staff

3. What does your school pay for trash disposal services?
   Monthly _____
   Annually _____

4. If figures are available from billing statements, how much waste is thrown away by your school (tons or cubic yards)?
   Monthly _____
   Annually _____

5. Where is the trash taken or where does it end up (be specific)?

6. Briefly explain the local, state or federal regulations that affect trash removal, recycling programs or the disposal of electronic and household hazardous waste materials at school. (For example, some counties require schools to collect mixed paper and cardboard separately for recycling, whereas other counties allow schools to co-mingle all recyclables).

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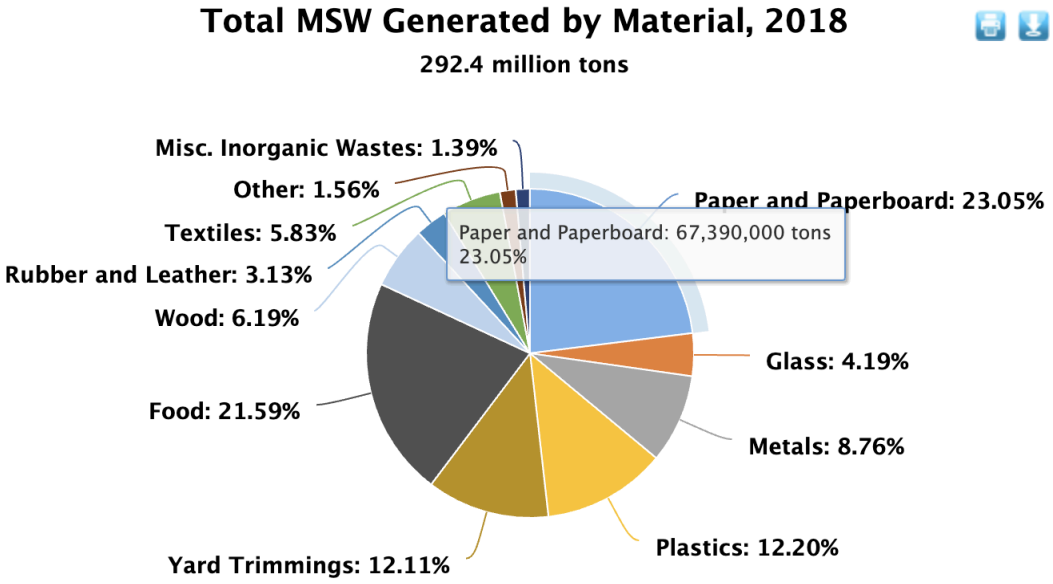
7. Does your school have any policies about when and how often trash can/bins are emptied?

**Waste Investigation**—What is waste? How do we categorize waste? What do we throw away at our school? What categories of waste do we produce the most of? What do we do with the waste we create? First, let's explore our school waste. Recruit classrooms to help you investigate what's in trash cans around your school. For each classroom participating, you will need plastic gloves, goggles (optional), a plastic tarp to empty the trash can, a scale to mass trash and a data sheet. Make sure to record your data by mass. Also in each category, the classroom should indicate whether they think this waste is mainly recycled or mainly thrown away.

Did you know? The total generation of municipal solid waste (MSW) in 2018 was 292.4 million tons or 4.9 pounds per person per day. Of the MSW generated, approximately 69 million tons were recycled and 25 million tons were composted. Together, almost 94 million tons of MSW were recycled and composted, equivalent to a 32.1 percent recycling and composting rate. www.epa.gov.

NOTE: To have more accurate data, you may want to do these investigations multiple times and average your results.




**Learning About Recycling :**

When talking about waste, there are six common strategies (all starting with the letter R) for reducing or eliminating waste.

- Refuse/Rethink (don't buy or accept it- this is the beginning of the waste stream)
- Reduce
- Reuse
- Recycle
- Recover/Repair
- Rot

Out of these strategies, we most commonly talk about recycling, but refusing, reducing and reusing make a bigger difference in the waste stream than recycling. If the item isn't in the waste stream yet, it doesn't have to be recycled, composted or trashed. Let's see how much you know about the United States recycling system.

Explore this article and consider the following questions:

- What are the three main steps in the recycling process?

In order to understand recycling and what can and can't be recycled, read the following three articles on how to decode and understand recycling different items and their associated symbols.

- Recycling Symbols for Recycle Signs and Labels
- How to Recycle Glass

Before beginning the Waste & Recycling investigation of your school, it is important to know what items are accepted for recycling and what items are not in your community. Follow the directions in this mock Recycle and Trash Sort to prepare for your school trash audit.

**Using Metric Measurements!**

In the next activity, you will be massing items found in your schools trash cans. The following conversion information may be useful to you as you conduct this investigation:

1 kilogram = 2.2 pounds

NOTE: A standard versus metric conversion chart is located in the appendices of Project WET.

# 1.6 Waste Investigation: Individual Classroom

There are a variety of ways to complete the Classroom Waste Investigation. Your team could distribute this sheet to classrooms that are willing to complete this Waste Investigation. Each classroom will need to analyze both the materials in their trash can(s) and if applicable, the recycling bin. Another option is to ask the custodian to pull the trash bags and put them in a location for your team to sort through and weigh later. Classroom label stickers can be made so the custodian can stick them on the bags so your team knows which bag came from what classroom or use a piece of masking tape and have them write the room number the bag came from.

Begin by introducing the categories of types of waste from the chart below. Using a tarp, empty the trash can and sort the waste by categories and then weigh and record the amount of waste for each category. Repeat the process with your recycling bin (if applicable). Your school's Green Team will add your classroom's results to their whole school investigation data to find trends and make recommendations for reducing waste in the school. A copy of this datasheet may be found HERE.

**Turn into _____ by _____.**

| **Classroom Number:**<br>**Teacher's Name:**<br>**Date of Investigation:** | | | |
|---|---|---|---|
| **Types of Waste** | **In Recycle Bin:** (Recorded by Mass in kilograms) | **Thrown Away** (Recorded by Mass in kilograms) | **In the Compost Bin** (Recorded by Mass in kilograms) |
| **Items which are recyclable:** (Mixed Paper. Magazines, Catalogs, Cardboard, Newspaper, Plastic, Aluminum) | | | |
| **Other items which can be recycled or repurposed** (Printer or Toner Cartridges, Electronics, Fluorescent Light Bulbs, Metals, etc.) | | | |
| **Items which cannot be recycled, reused or repurposed** (e.g. facial tissues, paper towels, meat scraps, etc.) | | | |
| **Food which can be composted** | | | |
| **Items which need to be specially disposed of** (e.g. fluorescent lights, most batteries, etc.) | | | |
| **Other** | | | |
| **TOTAL Combined Weight** | | | |

1. What is the total combined weight of the waste being thrown away and recycled in your classroom?

2. What were the main items that were being thrown away that could be recycled, reused, repurposed and/or composted?

3. If you assume that the average school is in session for 180 days, how much waste is your classroom creating in a school year? _____ (in kilograms and pounds)

4. How many trash cans are in your classroom? Do you need the number you have?

5. Does your community have a recycling program?

6. If not, is there a need for recycling in your classroom?

7. If your classroom recycles, what is recycled?

8. What recommendations do you have for your Green Team members about how to reduce the amount of waste you are throwing away and/or increase the amount of waste you are recycling and/or composting?

## 1.7 Whole School Waste Investigation

Green Team members investigate other areas of the school (offices, gymnasium, auditorium, library, athletic field, locker rooms, etc, **except** the cafeteria) collecting waste bins and analyzing contents by weight and whether they are recycled, thrown away or composted. Record your data using this table and insert rows as needed. Once you have recorded the data from the other school areas, also use this table to include the classroom data you have collected from participating teachers:

| **Location** | **In Recycle Bin: (Recorded by Mass in kilograms)** | **Thrown Away (Recorded by Mass in kilograms)** | **In the Compost Bin (Recorded by Mass in kilograms)** | **NOTES:** (e.g. What were the main items being thrown away that could be recycled, reused, repurposed or composted? Are there items could be reduced?) |
|---|---|---|---|---|
| Location: EXAMPLE MAIN OFFICE | | | | |
| **Items that are recyclable** | 1.2 kilograms | 3.0 kilograms | | |
| **Other items which can be recycled or repurposed** (Printer or Toner Cartridges, Yard Waste, Electronics, Fluorescent Light Bulbs, Metals, etc.) | | .45 kilograms | | |
| **Items which cannot be recycled, reused or repurposed** (e.g. facial tissues, paper towels, meat scraps, etc.) | 2.4 kilograms | | | |
| **Items which cannot be recycled, reused or repurposed** (e.g. facial tissues, paper towels, meat scraps, etc.) | | | | |
| **Food which can be composted** | | 3.2 kilograms | | Composting could reduce waste in the office area |

| | | | | |
|---|---|---|---|---|
| **Items which need to be specially disposed of** (e.g. fluorescent lights, most batteries, etc.) | | .25 kilograms | | School needs a battery recycling container |
| **Other** | | | | |
| Location: | | | | |
| **Items that are recyclable** | | | | |
| **Other items which can be recycled or repurposed** (Printer or Toner Cartridges, Yard Waste, Electronics, Fluorescent Light Bulbs, Metals, etc.) | | . | | |
| **Items which cannot be recycled, reused or repurposed** (e.g. facial tissues, paper towels, meat scraps, etc.) | | | | |
| **Items which cannot be recycled, reused or repurposed** (e.g. facial tissues, paper towels, meat scraps, etc.) | | | | |
| **Food which can be composted** | | | | |
| **Items which need to be specially disposed of** (e.g. fluorescent lights, most batteries, etc.) | | | | |
| **Other** | | | | |
| Location: | | | | |
| **Items that are recyclable** | | | | |
| **Other items which can be recycled or repurposed** (Printer or Toner Cartridges, Yard Waste, Electronics, Fluorescent Light Bulbs, Metals, etc.) | | . | | |
| **Items which cannot be recycled, reused or repurposed** (e.g. facial tissues, paper towels, meat scraps, etc.) | | | | |
| **Items which cannot be recycled, reused or repurposed** (e.g. facial tissues, paper towels, meat scraps, etc.) | | | | |
| **Food which can be composted** | | | | |
| **Items which need to be specially disposed of** (e.g. fluorescent lights, most batteries, etc.) | | | | |
| **Other** | | | | |
| **TOTALS** | | | | |

How much waste does your Green Team estimate that your school produces in a year?

# School Wide Waste Alternative Assessment

A good option for waste is to find alternatives to throwing things away. This can be accomplished through recycling, composting and reusing items that would normally wind up in the landfill. In this section, you will investigate what your school is currently doing as alternatives to throwing things away.

Recycling in Your School

1. Does your school have a recycling program?

- ☐ Yes
- ☐ No

*If no, is there a need for a recycling program at your school? (If you answered no, skip to Composting in Your School).*

- ☐ Yes

☐ No

*To answer the following questions, you may want to interview school personnel who manage the school's recycling service and/or review billing statements from the recycling service:*

2. How many dumpsters for recycling does your school have?_____

3. What is recycled at your school?

☐ Paper
☐ Aluminum containers
☐ Plastic
☐ Glass
☐ Printer cartridges
☐ Copier cartridges
☐ Other

_____

4. Who does the recycling within your school?

☐ Students
☐ Teacher
☐ Custodial staff

Other _____

5. Where are the recycling bins located within your school?

☐ Classrooms
☐ Hallways
☐ Cafeteria
☐ Gym
☐ Office
☐ Copy Room

Other: _____

6. Who picks up your recyclables and takes them to a recycling center?

☐ Municipality
☐ Private Hauler
☐ School Staff
☐ Club

Other: _____

7. If figures are available from the recycling service, what is the volume of items being recycled?_____

_____

_____

8. What does your school pay for recycling services?

Monthly _____
Annually _____

9. Does your school receive any income from recyclables?

☐ Yes
☐ No

If yes, how much? _____

10. Where do your recyclables go after they are taken from the school (be specific)?

_____
_____
_____

11. What happens to recyclables after they leave the recycling center (be specific)?

_____
_____
_____
_____

12. Does recycling continue over the summer?

☐ Yes
☐ No

If yes, who does the recycling:_____

13. Does your school have a plan to recycle e-waste (or electronic waste)? E-waste includes almost any household or business item containing circuitry or electrical components with either power or battery supply. Examples include TV appliances, computers, laptops, tablets, mobile phones, fridges, washing machines, dryers, toys, coffee makers, etc. To learn more, this short video explains more about the issues with e-waste: https://youtu.be/FmJFVmtWf-I

☐ Yes
☐ No

If yes, who does the recycling:_____

## Learning About Hazardous Waste :

Improperly disposed waste can be not only harmful to the environment, but to humans and other living things. The EPA provides the following definition, "Simply defined, a hazardous waste is a waste with properties that make it dangerous or capable of having a harmful effect on human health or the environment. Hazardous waste is generated from many sources, ranging from industrial manufacturing process wastes to batteries and may come in many forms, including liquids, solids, gases, and sludges." To explore more on identification, classification, regulation and disposal, explore EPA's Hazardous Waste website below.

While hazardous waste comes from many sources, we all have a part in reducing, recycling and safely disposing hazardous waste. Explore this guide to household hazardous waste.

The following information is from the Kansas Department of Health & Environment, Bureau of Waste and cites specific HHW issues and where to find Household Hazardous Waste disposal sites in your community.

- Household Cleaning Chemicals- Household cleaning chemicals contribute significantly to pollution problems. All Kansans can help improve the quality of our water and air by using readily available non toxic cleaning alternatives.
- Lithium Battery Disposal- Properly disposing of lithium batteries is important. When exposed to liquid, lithium batteries start fires and cause serious damage if accidentally swallowed.
- Compact Fluorescent Light Bulb Disposal
- Locations of Household Hazardous Waste Program sites by county across Kansas accessible HERE.

**Composting in Your School**

1. Does your school have a compost program?
   - ☐ Yes
   - ☐ No

2. If yes, does your school have a compost program for:
   - ☐ grass clippings
   - ☐ yard waste
   - ☐ leaves
   - ☐ food waste

Other _____

3. If no, is there a need for a compost program at your school?
   - ☐ Yes
   - ☐ No

Use the space provided below to explain what your school could compost:

_____

_____

_____

**Purchasing, Reducing and Reusing in Your School**

*To answer the following questions, you may want to interview the personnel who manage the school's environmental policies and oversee the purchasing of school supplies.*

## Learning About Product Life Cycles :

One of the ways to effectively reduce and/or refuse is to learn more about the lifecycle of the products we use. Knowing this information is critical to making more sustainable choices as an individual and as a school community. This is often referred to as *Life Cycle Assessment (LCA),* learn more about LCA in this article from National Geographic.

Looking at the product life cycle of different products can provide insight on potential solutions, Explore the following resources:

- Product Life Cycle information from earth.org on Fast Fashion and Slow Fashion
- Impacts of Product Life Cycle on the Environment:
  - Marine Plastics
  - Water Pollution

1. Does your school or district buy recycled office paper?
   - ☐ Yes
   - ☐ No

2. Does your school or district buy other items made from recyclables?
   - ☐ Yes
   - ☐ No

If yes, list them:

_____

3. Does your school make an effort to purchase products with minimal packaging?
   - ☐ Yes
   - ☐ No

4. Does your school save paper by:

   Printing on both sides of the paper?
   - ☐ Yes
   - ☐ No

   Reusing scrap or paper written on one side?
   - ☐ Yes
   - ☐ No

5. Does your school extend the life of items by:

   Serving food on reusable trays?

☐ Yes
☐ No

Using metal silverware instead of disposable eating utensils?

☐ Yes
☐ No

Donating unclaimed “lost” items to a charity?

☐ Yes
☐ No

Collecting clothing, food, etc. for charities?

☐ Yes
☐ No

Sponsoring swap days?

☐ Yes
☐ No

Salvaging items for reuse when desks are cleaned out at the end of the school year?

☐ Yes
☐ No

6. When classes go on field trips, do they:

Recycle cans and bottles they brought with them?

☐ Yes
☐ No

Minimize the amount of trash they generate by using lunch boxes or cloth bags and reusable containers.

☐ Yes
☐ No

7. Are there any other ways your school is using alternatives to throwing things away?

_____

_____

_____

**Wrapping Up Your Whole School Waste Investigation**

1. After completing the whole school waste investigation, what did your Green Team learn about both strengths and opportunities for reducing and/or eliminating waste at your school?
2. What are some potential actions that your Green Team can propose to reduce or eliminate waste in your school?

# 1.8 Cafeteria Waste Investigation

## Learning About Food Waste and Solutions:

The Environmental Protection Agency estimates that in 2019, 66 million tons of wasted food was generated in the United States, and most of this waste (about 60%) was sent to landfills (EPA, 2023). Food waste is one the largest components of landfills.

What is food waste and how can we reduce or eliminate food waste? Food waste is often a catch all phrase which refers to both food loss which happens before food reaches the consumer and food waste, which happens after food reaches the consumer. Explore this article from the Harvard School of Public Health to learn more about food loss and waste.

Now explore the following resources to learn more about food waste, analysis and solutions:

- Explore this interactive tool to learn about food waste in different industries and strategies for reduction.
- Composting Program Food Too Good To Waste Program

**Option 1:** If your school **does not** currently divert any waste from your cafeteria (i.e. your school does not have recycling, composting or food recovery in your cafeteria), we recommend that you work with your cafeteria staff to set up a system for students to sort their lunch waste into four bins: Trash, Recycle, Compost and Food Recovery for items like pieces of whole fruit or unopened items which could be offered to students or local food programs. You may wish to have some Green Team members on hand to help students sort as they are cleaning their plates or discarding their lunch bag items. Your team will also want to collect any trash from food preparation and staff lunchrooms. The Green Team will then weigh the items in each bin and record the data using the Cafeteria Waste Investigation Chart in your Course Journal. Remember that your Green Team is looking for opportunities to reduce or eliminate waste from food service, so in addition to weighing the waste, consider the number of bags of waste, especially if your cafeteria uses lightweight disposable lunch trays.

| **BASELINE CAFETERIA INVESTIGATION** | | |
|---|---|---|
| **Date of Investigation:** | | |
| **Type of Waste** | **Mass** | **Notes** (What observations do you have of the waste being collected? Any patterns?) |

| | | |
|---|---|---|
| **Trash** (Recorded by Mass) | | |
| **Recycled** (Recorded by Mass) | | |
| **Composted** (Recorded by Mass) | | |
| **Food Recovery Program** (Recorded by Mass) | | |
| **TOTAL Mass of Waste** | | |

**Option 2:** If your school **does** divert waste from your cafeteria (i.e. your school has recycling, composting and/or food recovery in your cafeteria), we recommend that your Green Team set up any new bins you might not be currently implementing and that your Green Team members be on hand to help coach students to use the new bins, but allow them to do what they would normally do for any existing bins you might have for recycling, composting and/or food recovery. At the end of the food service, collect and weigh your bin contents and record. For any existing bins, pull a random bag and do a quick audit to make sure that the items in the bins don't belong elsewhere. For example, if your school has a lunchroom recycling bin, make sure that the items in that bin are recyclable and that there aren't items in the trash that could be recycled. NOTE: If your school already has a program in place for recycling, composting and food recovery, allow students to do what they would normally do and after food service is completed, pull random bags for each bin and do a quick audit to make sure that the items in the bins don't belong elsewhere.

Remember that your Green Team is looking for opportunities to reduce or eliminate waste from food service, so in addition to weighing the waste, consider the number of bags of waste, especially if your cafeteria uses lightweight disposable lunch trays.

1. Assuming there are 180 days in a school year, how much waste does your school produce from lunch service in a year?

2. Assuming that students are in school for 180 days, if your school implemented a program to sort and recycle, compost and gather uneaten food for others, how much waste could you prevent from going to the landfill?

3. What did you notice about the type of waste being produced? (e.g. packaging, uneaten items, serving trays and utensils, beverages, etc.)

4. How many bags of trash were produced over lunch? Assuming school is in session 180 days a year, how many bags of trash would be produced from the cafeteria? Does your school serve breakfast as well? You may want to talk with your custodial staff about this and ways that the Green Team could reduce waste and make that person's job easier.

5. Your Green Team may want to research what can be recycled or composted in your school and if it might be possible, to save uneaten food items like pieces of fruit, unopened packaged food items or beverages that could be given to students or others.

6. What options could your green team implement to reduce the amount of packaging being thrown away?

7. Does your school have any policies about food recovery of unused food suitable for reuse?(For more information, explore: https://www.epa.gov/sustainable-management-food/sustainable-management-food-basics

8. If your school is not currently composting, what steps could your Green Team take to explore the possibility of implementing a cafeteria composting program?

9. After completing the cafeteria investigation, what did your Green Team learn about both strengths and opportunities for reducing and/or eliminating cafeteria waste at your school?

10. What are some potential actions that your Green Team can propose to reduce or eliminate cafeteria waste in your school?

## 1.9 Waste Education in Our School

An important part of greening your school is making sure that the students, teachers, administrators, school personnel, parents and community have the knowledge and skills to make informed and responsible decisions. In this section, you will explore ways your school is engaging in education and outreach about recycling, composting, reusing and recycling. Here is the Waste Education Google Link.

**Curriculum and Community**

*To answer the following questions, you may want to interview the personnel who manage the school's environmental policies and professional development. Information on academic standards may be available on school websites.*

1. Do your school's academic standards include waste reduction and recycling?

- ☐ Yes
- ☐ No

If yes, in what grades is this being taught?_____

2. Has your school staff participated in training programs/workshops that include waste reduction and recycling education?

- ☐ Yes
- ☐ No

3. Does your school participate in waste reduction and recycling projects that benefit the community?

☐ Yes
☐ No

If yes, what are they?_____

4. Some waste management facilities can be used as educational resources for field trips and guest speakers. Which facilities are found in your community?

☐ Landfill; Location: _____
☐ Municipal Composting; Location: _____
☐ Material Recycling Facility; Location: _____
☐ Local solid waste or recycling office; Location: _____

5. Does your town sponsor community recycle days when people can bring items that are difficult to recycle such as computers, batteries, cell phones?

☐ Yes
☐ No

If yes, when are these community recycle days offered?

_____
_____

6. Are students and staff encouraged to find ways to lower their waste production?

☐ Yes
☐ No

If so, how?

_____
_____
_____

7. Does your school website, newsletter and/or other media outlets emphasize the school's waste reduction goals or programs?

☐ Yes
☐ No

If not, are there ways to communicate these goals?

_____
_____
_____

8. Are there any other ways your school is educating the students, staff or community about waste consumption, waste reduction or composting?

## 1.10 Go Green Random Waste Classroom Audit

To encourage ongoing efforts, your KGS Green team may consider doing periodic random audits to determine how well classrooms are doing in being good waste managers. Your KGS Green team might also develop certificates or other reward systems for letting others know which classrooms are doing a great job! Here is the link for the Random Waste Audit.

| |
|---|
| **GO GREEN RANDOM WASTE AUDIT**<br>**Room:**<br>**Date and Time:** |
| **Things your classroom is doing well:** |
| **Ideas for Improvement:** |
| **Comments:** |
| **Auditors Signatures:** |

## 1.11 Waste & Recycling Action Planning

To get the big picture of waste in your school, develop a waste characterization or profile report for your school. Summarize the data your school's Green Team collected from classrooms, other areas of the school and the cafeteria. Include graphics, pictures and other visuals when appropriate. Highlight potential recommendations from classrooms and from the whole school analysis and develop a strategy to communicate this information to the school, parents and community, including school boards or district personnel.

Based on the information you found out from this investigation, what recommendations do you have for the school to improve its waste and recycling programs?

Explore the data you have collected from the classrooms and the whole school. It may be helpful to combine data into overall totals to help your Green Team analyze your data. Here is the Waste Action Planning Google link and found in your Course Journal.

**Calculations:**

- Weight of the total amount of waste being thrown away: _____
- Weight of the total amount of waste being recycled: _____
- Weight of the total amount of waste being composted: _____
- What is the total weight of waste being thrown away, recycled, and composted? _____
- Excluding the weight of the containers, what percent of your cafeteria's waste is being thrown away? _____
- What percent is being recycled? _____
- What percent is being composted? _____

NOTE: If you only collected data on one day, you may want to repeat your data samples on multiple days to get more accurate results. You may also want to conduct periodic classroom and school wide waste characterization investigations to chart your schools progress.

What additional information from your investigation did you find that might have implications for your action plan:

_____

_____

_____

To develop your action plan, consider the following questions:

- What are your school's goals to reduce waste?
- What are the potential economic benefits of reducing school waste? How much do you estimate the school might save in trash hauling services?
- What are the environmental and/or health benefits of reducing school waste?
- How can you engage the broader school and community in setting goals?
- What are some potential strategies you might use to address those areas where your Green Team would like to make improvements?
- What resources (including funding) will your school need to implement strategies and where might your school obtain these resources?
- How can you engage students, school personnel, parents and community in helping to develop and implement these strategies?
- What waste education needs to be a part of your plan?

- How can you encourage students to support your school's waste goals at home?
- How can you share and celebrate your school successes with your local and state representatives?

**NOTE**: Use your tracking data to demonstrate your program's success to administration, staff, students, and the public. Take advantage of tools and resources to convert hard-to-understand measurements, such as kilowatt-hours or tons of waste, into vivid equivalents - numbers of cars removed from the road or numbers of trees saved. This can also be an excellent project for math and science. Check the following websites for conversion tools: https://www.montgomerycountymd.gov/sws/footprint/ and https://www.papercalculator.org/

The following template may be helpful to create an action plan for success!

| Waste Action Plan<br>School Name:<br>Waste Goal: | | | | Date: |
|---|---|---|---|---|
| Strategies | Resources Needed | Persons Responsible | Timeline | How will you measure, communicate and celebrate success? |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

## 1.12 Home Connections

**Use the Home Connections chart to analyze waste and recycling practices at home. Identify which types of waste are found and the method of disposal. You can do many things at home to help the environment. You can view what materials are accepted in your community and where: http://www.kansasrecycles.org/**

Below is an EXAMPLE of what your Home Investigation might look like.

List of items that can be recycled- cardboard, paper, newspaper, aluminum

Not recycled: Glass bottles

Questionable items to find out in your community: Where does our community recycle batteries?

**NOTE**: "Fast fashion" and its environmental impacts can also be investigated from home. Explore from earth.org information on **Fast Fashion and Slow Fashion.**

What's your family's plan for reducing the amount of waste that goes to the landfill from your trash? Example- we found out there's a ton of yogurt plastic packages in our trash so instead of buying individual yogurts we will buy a big tub that's recyclable and put our yogurt in a bowl.

| **Family Name:**<br>**Total Number of People in My Household:**<br>**Date of Investigation:** | |
|---|---|
| **Types of Waste** | **List and Number of Items in My Trash** |
| **Number of items that can be recycled at the curb** | **Example:** Aluminum Cans- 5 cans, Plastic #1- 7 items |
| **Number of items that could be recycled but not curbside** | **Example:** Glass bottles- 3 bottles |
| **Organic Waste** | |
| **Everything Else (diapers, etc)** | |
| **Plastic (#1 & #2)** | |
| **Plastics (other)** | |

| | |
|---|---|
| **Other (Printer Cartridges, Electronic Waste, etc.)** | |
| **Facial Tissues/Paper Towels** | |
| **CFL's (compact fluorescent light bulbs*** ** | |
| **Other:** | |

## 1.13 Resources

### General Links

- Contact the Kansas Association for Conservation and Environmental Education (KACEE at www.kacee.org) for local resource contacts.
- Kansas Green Schools for resources and contacts with other schools in the state (www.kansasgreenschools.org)

### Waste Links

- https://19january2017snapshot.epa.gov/students/pack-waste-free-lunch_.html This website provides information on developing and implementing a waste free lunch program at schools. It includes tips, success stories, and resources.
- https://www.epa.gov/environmental-topics/land-waste-and-cleanup-topics: This **U. S. EPA website** provides waste education resources.
- https://www.epa.gov/cfl/recycling-and-disposal-cfls-and-other-bulbs-contain-mercury: This **U.S EPA** website provides information on proper disposal of fluorescent light bulbs. Fluorescent light bulbs must be properly disposed of because they contain very small amounts of mercury.
- https://foodtoogoodtowaste.com/resources Visit the Food to Good to Waste website to learn more about composting and food recovery.

### Elementary, Middle and High School Reading Suggestion

- Bowden, Rob. *Waste, Recycling and Reuse: Our Impact on the Planet*. Raintree Publishers. 2002. In this selection from the "21st Century Debates," subtitled "Our Impact on the Planet," author Rob Bowden provides readers with an analysis of the issues linked to waste management. Bowden provides background in areas such as waste disposal, pollution, recycling, and reuse. ISBN: 0739831801

# 1.14 Curriculum Connections

## Project Learning Tree Curriculum Connections- Waste and Recycling

Project Learning Tree (PLT) has a variety of environmental education curriculum materials that support and enhance the Kansas Green Schools "Wondering about Waste" Investigation. Educators may want to conduct one or more of the following PLT activities to prepare students for the investigation. Through these activities, students will learn waste and recycling terminology, why it is important to reduce waste, how our society has dealt with waste over time, and ways students can reduce waste at school and at home.

**Preschool – 8th Grade- *PLT's PreK-8 Environmental Education Guide*:**

### #24 Nature's Recyclers

Through this inquiry-based activity, students will learn about the process of decomposition. They will devise an experiment to investigate the eating habits of decomposers, such as earthworms and pill bugs. This activity provides a good introduction to the process of composting.

### #37 Reduce, Reuse, Recycle

Students will analyze the waste that they generate over a period of time. They will learn what happens to various types of waste when it is discarded. Students will develop a plan for reducing the amount of waste their community.

### #51 Make Your Own Paper

Students will learn how to recycle paper by making their own paper.

### #52 A Look at Aluminum

Students will learn about the sequence of steps that go into making aluminum products and participate in a service learning project to encourage aluminum recycling in their community.

### #82 Resource-Go-Round

This activity gives students the opportunity to explore a variety of natural resources and products that people depend on every day. They learn about product life cycles, using a pencil as an example, and then they research a specific product to find out the sources of its various components.

### #83 A Peek at Packaging

Students will learn about the different purposes of packaging, the pros and cons of certain packaging, and which packaging is recyclable and biodegradable.

### #96 Improve Your Place

Students learn about the steps involved in developing a service learning project. They plan and conduct a project that focuses on making positive environmental changes in their community.